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ABATI—GYROSTEUS.

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ABATIMENT OF LEGACIES. [LEGACY, P. C., p. 391.]

ABATI, or ABATTI, NICCOLO', was born at Modena in 1512. He is more frequently called Dell' Abate, but erroneously according to some foreigners, as his family name was Abati. Before Tiraboschi, Niccolò's surname was supposed to be unknown, and the name of Dell' Abate was given to him from the circumstance of his being less known for his own works than as the assistant of Primaticcio, who was called L'Abate by the Italians after he was made Abbé of St. Martin near Troyes, by Francis I. of France.

Abati executed in fresco the Adventures of Ulysses and other works from the designs of Primaticcio, for the palace of Fontainebleau, the decoration of which was intrusted to Primaticcio after the death of I Rosso. Prints from the Adventures of Ulysses, by Van Thulden, were published in Paris in 1630: the original works were destroyed by the building, in 1798, to make room for a new structure.

Abati's own works, however, in Modena and Bologna, were productions of the greatest merit, according to the Caracci; and in the celebrated sonnet of Agostino, which is a sort of recipe for making a great painter, he is mentioned in conclusion as combining in himself all the required excellences:—

Ma senza tant'arte e tanto stento Si ponga ad il core a fumare Che qui la fonto il nostro Niccolino.'

There are few of Abati's works remaining, and these are chiefly frescoes; he seems to have painted comparatively little in oil. It is not known who his master was, or whether he had any other master than his father Giovanni Abati, who was an obscure painter and modeller of Modena. From a similarity in his works to the style of Correggio, some have supposed that he was a pupil of Correggio; he is also said to have studied under the sculptor Begarelli: if so, he was probably well acquainted with Correggio, with whom Begarelli was intimate.

His earliest essays upon his own account were in partnership with another painter, Alberto Fontana, a practice not unusual at that period in Italy, when there was little or no distinction between artists and artisans in the manner of employing them or estimating their works. In 1537 he painted with Fontana, at Modena, some frescoes in the butchers' market, by which he obtained some reputation; and he acquired great distinction when he decorated the Scala dei Giganti, in the palace of the Grand Duke of Tuscany, which is still extant; they have been engraved by Gajani. These, with some conversation-pieces and concerts in the Institute of Bologna, a Nativity of Mary, and the portico of the Leoni Palace, and a large symbolic picture in the Via di San Mamolo, in the same city, are the only frescoes now extant by Abati; and his oil-pictures are likewise very scarce.

P. C. S., No. 1.

Of the works in the Institute Zonetti has written an account—Delle Pitture di Pellegrino Tibaldi e Niccolo Abati,' &c., in which there are engravings of them: Malvasia also has given a laudatory description of them: they have been compared with Titian. The Nativity of the Leoni Palace, which has been engraved by Gondolfi, is mentioned in the highest terms by Count Algarotti, who discovered in it 'the symmetry of Raphael, the nature of Titian, and the grace of Parmegiano.' Of his easel-pictures in oil, the most celebrated is the Martyrdom of St. Peter and St. Paul, a large picture on wood, which was painted for the Church of the Benedectines at Modena, in 1648. It is now in the Dresden Gallery, and has been engraved by Folkema for the 'Recueil d'Estampes après les plus célèbres Tableaux de la Galerie de Dresde.'

From about 1646 until 1659, when he accompanied Primaticcio to France, Abati lived in Bologna, and his Bolognese works were painted during this interval: he died in Paris, in 1571.

Abati's principal faculty was painting in fresco, in which he had surprising facility. According to Vasari he never touched his works when dry, which cannot be said of many fresco-painters: yet, says Vasari, the paintings of an entire apartment were executed with such uniformity that they appeared to be the work of a single day. Abati excelled in landscape, for his period: there is a Rape of Proserpine in the Duke of Sutherland's collection, of which the background is an extensive landscape; it was formerly in the Orleans Gallery, and was sold at the sale in this country in 1860.

Several of Abati's relations also distinguished themselves as painters: his brother Pietro Paolo was a clever horse and battle painter; his son Giulio Camillo, his grandson Ercole, and his great-grandson Pietro Paolo the younger, were all painters of ability, especially Ercole, who was born in Modena in 1653, and died in 1618; he executed, with B. Schidone, the frescoes of the council-ball of Modena.

(Vodiani, Vite de' Pittori di Modena; Tiraboschi, Notizie de' Pittori, &c. di Modena.)

ABERCROMBIE, JOHN, M.D. Fellow of the Royal Colleges of Physicians and Surgeons of Edinburgh, &c., was born on the 11th of November, 1781. He was the son of the Rev. Mr. Abercrombie, for many years one of the town-ministers of Aberdeen. Edinburgh was at the time the most distinguished seat of medical education in the empire. Applying his mind to that branch of professional knowledge, Abercrombie studied in the Scottish metropolis, and took his degree there on the 4th of June, 1803. He entered into practice subsequently in Edinburgh, and became a Fellow of the Royal College of Surgeons in that city in 1805, thus qualifying himself to teach surgery, and taking the highest professional rank in that class.

However, though he so far combined the practice of a surgeon with that of a physician even in his early career, according
to a common Scottish custom, his disposition was better suited to the pursuits of the pure physician; and into these he fell altogether soon after the decease of the celebrated Dr. Greg-
ory in 1821. Dr. Abercrombie from that time began to oc-
cupy the entire time and attention of a man elected con-
ducting physician, not only in Edinburgh but in all Scotland, and
he was often called to great distances in the country. He
became a licentiate of the Royal College of Physicians in 1823,
and afterwards received a Fellow of the Royal Society. With
receiving subsequent honours from his colleagues, his high
position in after-life also gained him many complimentary
distinctions from other quarters. In 1834 the University of
Oxford marked their estimation of his character and talents by
confering upon him the honorary degree of Doctor of Medi-
cine—a somewhat rare mark of respect to the alumni of
Scottish universities. In the year 1856 Dr. Abercrombie was
elected Lord Rector of the venerable Marischal College of
Aberdeen. Of the other honours bestowed upon him by public
and private bodies, we need only notice his appointment to the
vice-presidency of the Royal Society of Edinburgh, and to
the office of physician in ordinary to her Majesty for Scot-
land. The numerous subsidiary places which he held, most of
which were connected with benevolent societies, need not be
enumerated. Dr. John Abercrombie died suddenly on Thurs-
day, November 14, 1844, at his house in York Place. On a
post-mortem examination, it was found that the bursting of
the coronary artery of the heart had been the immediate cause of
death.

The writings of Dr. Abercrombie contributed no less to the
establishment and maintenance of his fame than his singularly
useful career as a practical member of his profession. In the
earliest months of his professional career he published:
*Edinburgh Medical and Surgical Journal,* and other peri-
odicals in his own department of science. His first distinct
work of moment, leaving out of consideration published cases
of disease and similar minor treatises, was one entitled
*Pathological and Practical Researches on Diseases of the
Brain and the Spinal Cord,* Edinburgh, 1828, 8vo. In this
work, which is characterised by no ordinary degree of purely
scientific knowledge, he also gave an indication of the beauty
of his mind. He had been long accustomed to discuss the
cases of mental disease, and had thus acquired a high
degree of extensive experience and reading, and to examine their
bearings on the various metaphysical and moral systems that
have been established. The result of his labours is to be found
in the three volumes which were published under the titles:
*Imaginative and Intellectual Powers and the Investigation of Truth,*
Edinburgh, 1830, 8vo; and the other called *The Philosophy of the
Moral Feelings,* London, 1833, 8vo. The latter is in some
measure sequel to the first, and the whole compendium view
of human nature intellectually and morally, in which the facts
of science and the revelations of religion are combined together
in peculiar harmony. The best of these two works in every
respect is perhaps that on the Intellectual Powers. It is not
so much the product of profound original research, as the na-
rnal result of the quiet meditations of a superior mind aided by all
the advantages of much reading and large practical experience.
The work is more reflective than penetrative or suggestive.
In both, we find the labour of the author on whose critical
cases of spectral illusions which have so long interested the
medical profession, is a proof at once of Dr. Abercrombie's
powers and skill in his profession, and of his capacity for in-
vestigating the difficulties of mental philosophy. In so brief
and so elaborate a treatment, he manages to show the mind con-
tained in a man as Dr. Abercrombie. For range of acquisitions, sol-

tude, he stood unexceeded among the Scottish physicians of
his day. He earned by his writings a name that will not be
lost, but be preserved as the mark of a genius, not of a private
individual, for his singular pieté and benevolence.

**ABERDEENSHIRE,** a maritime county in the east of
Scotland, bounded on the north-east and east by the North
Sea, on the south-east by Kincardineshire, on the south by
Forfarshire, and on the west by Inverness-shire, and on the
north-west by Banffshire. Its form is irregular, having its greatest
length from east-north-east to

d-west-south-west, from Rattray Head between Peterhead and
Fraserburgh to the junction of the three counties of Perth,
Inverness, and Aberdeen, 88 or 89 miles; and its greatest
breadth at right angles to the length, from the border of the
county of Banff to the city of Aberdeen, 34 or 35 miles. A
small part of Banffshire (the parish of St. Fergus) is insularised
by this county and by the sea near Peter-

head. The area of Aberdeen, including the few lochs,

which are stated to be large, is 1,892,000 acres. While

inhabitants are described as 1,169,000, the

estimates make it rather less); it is in size the fifth of the
Scottish counties, being 658 square miles less than Perthshire,
the next county above it, and 163 miles greater than Suth-

erlandshire, the next below it. The population at the different
quarters of the county is stated as follows:—

*1801, 150,683; 1811, 153,075; increase in ten years 10 per cent; 1821,
153,387, increase 15 per cent; 1831, 177,657, increase 14 per cent; 1841, 192,283, increase 8 2 per cent. In the

years from 1811 to 1831 the rate of increase exceeded the average of Scotland; but during the rest of
the period it has been below the average. According to the
census of 1831, which we retain to facilitate comparison, there
were 90 persons to a square mile. It was then the third of the
Scottish counties in amount of population, being exceeded only
by Lanarkshire and Edinburghshire; and the thirteenth in
density of population, being next below Kinross-shire and next
above Elginshire. According to the census of 1841 it retains
its rank in the same order. The number of inhab-

itants in the county was 977,956, while the

area in the form of that county is 1,892,000 acres; the

annexation of Banffshire, which was an

accretion of 19,423 acres, the county then

became of 1,892,119 acres. The area of.the

county is within the limits of its ancient

custom, but the sea has eaten the dimoun of

about 5,000 acres, and the inincrease of popula-

tion: it had then between 93 and 98 inhabitants to a square mile.

**Coast-line.—** The coast of Aberdeenshire has a tolerably
regular outline, for the most part convex to the sea. From
Edinburgh, on the north, to the mouth of the Dee, it is 100
miles; from Edinburgh to the mouth of the Forth, it is 102
miles; from Edinburgh to the mouth of the Firth of For-


cardineshie, it proceeds in a tolerably direct line for 12 miles

north by east or north-north-east to the mouth of the Ythan.
The Don and several smaller streams fall into the sea in this

part of the coast: the mouth of the Dees, about 2 miles

north of the mouth of the Dee; the outfall of the other streams

is more to the northward. From the Ythan the coast at first

runs a little more to the eastward, but turns gradually to the

north, north-west, and west, forming near Broughty Ferry a

little promontory, divided from the mouth of the little stream

which separates the county from Banffshire. In this semi-

circular sweep the coast has several headlands, but little promi-

nence: they are White-ness, Brigges-head, Bows-ness, Boddam

or Buchan-ness, Invernessy-point or Salloth-head, Inchkeith-

point (the last three in Peterhead parish, and near the town

of that name), Rattery or Rattray-head, Tillyduff-point,

Calmhulg-point (all three between Peterhead and Fraser-

burgh), and Kinnaird-head near the county of Banffshire.
The most landward point is in the detached part of Banffshire,

between Inchkeith-point and Rattray-head. Buchan-ness and

Inchkeith-point are the easternmost points of the mainland of

Scotland: they are in 1° 45' W. long. There is a light-

house 118 feet high, which is painted in white and black, and

presents the form of a lighthouse, being stilted at its top by

a flashing light, on Buchan-ness. The bays between the mouth

of the Ythan and the point where the boundary between this

county and Banffshire meets the coast, are—Cruden bay,

between Briggs and Buchan-ness; Bows-bay, between

Banffshire and Boddam-ness; between Cruden bay, Buchan-

ness and Salloth-head; Peterhead bay, between Boddam-

ness and Inchkeith-point; St. Fergus bay between Scoto-

stown-point (in the detached part of Banffshire) and Rattray-

head; Strathbeg or Stratheg bay, and Rattray bay (which at

low water becomes a lough, communicating with the open

sea by a narrow passage adjacent to Rattray-head on the north-

west); Fraserburgh bay, between Calmhulg-point and Kinnaird-

head, Fingask bay, west of Kinnaird's-head; and Aberdour

bay, near the Banffshire boundary.

The coast from the border of Kincardineshire northward
to the mouth of the Ythan is comparatively low and shelv-

ing: from the mouth of the Ythan it assumes a bolder

character, being scarred in some places by great promontories

of 200 feet above the level of the sea. These rocks are gen-

erated by some remarkable fissures and caverns which formerly

afforded great facilities for the concealment of smuggled

goods. The rocks are chiefly of black slate rocks, mica slate

granite. About Peterhead they form mural precipices. Some

of the bays which indent this generally bold coast have a flat

beach of sand or pebbles. North of the Ugie, which joins the

sea just to the north of Peterhead, the shore loses its arid

character, and the Ythan and little stream which separates

an accumulation of drift sand; near Rattray-head there is a

ridge of rocks projecting into the sea, by which at high


water they are covered. Beyond Brairay-head the coast is low and sandy to Kinaird's-head, a promontory of considerable
height: westward of which the coast is sometimes sandy,
sometimes lined with rocks, in which are some remarkable
caves. Great Traps, a group of the most remarkable, are found in the peninsula of Bressay, a high island to Lord
Pitlurg after the battle of Culloden in 1746. There are no
islands on the coast deserving of notice.

Surface and Geology.—The county is generally hilly; in
the south-western part it is mountainous. The crest of the
principal chain of hills is found in the eastern part of the
county, but there are many other similar systems of low
hills and hilly parts of the county; and veins or dykes of trap
are observed in parishes near the east coast. (Boi., Essai Geo-
logique sur l'Écosse; New Statistical Account of Scotland.)

The mountain district of Braemar, in which the neigh-
borhood most of these peaks are included, is chiefly granite:
the mountains frequently present conical summits with steep
precipitous sides. Ben Macdhui has on its sides precipices
of more than 1000 feet high. Conical summits are not so frequent,
but Cairn Toul and Loch na Gair have this form. The sides
of the mountains vary in character, presenting sometimes mural
precipices, sometimes slopes more or less steep: at the foot of the
precipices or steeper slopes considerable masses of granite
defbris are observable. The granite of Braemar is chiefly pure;
the mica is the least of its constituent minerals: the felspar and
quartz, in the proportions of 70 to 30, make up the bulk of the
granite, and the mica is porphyritic. In the upper part of the
valley of the Dee a large mass of syenite is found; but this belongs
chiefly to Pershaw, if not entirely.

The neighborhood of Aberdeen, extending for some miles
north of the city, is chiefly low land; towards the west, is occupied
by granite. The limits of this granite district do not appear to
be well ascertained, but it extends westward as far as Midmar
parish, and is found even as far as Coul and Tarland parishes.
The principal mass of granite forms rounded hills west of
Aberdeen between the Don and the Dee, and extends to the
northward of the Don. The granite is neither very coarse
nor very fine grained. It is quarried in large quantities
(chiefly of grey granite), and shipped at Aberdeen for London
and other parts of the kingdom.

Granite is found in various other parts of the county; in
the parishes of Kelg, Prenmary, Monymusk, Orne, Daviot, and
Chapel of Garioch, near the banks of the Don, and of the
Ugie, between the estuary of the Dee and Udny, Elsick, and
Teres, near the banks of the Ythan; in those of Huntly,
Drumballe, and Glenbuchet, near the Doveran; and in those
of Fraserburgh, Longside, and Peterhead, near the coast. It
is quarried in Drumballe and Peterhead parishes. The granite
is found in many places along the coasts, especially in the state
as to be easily dug into by the pickaxe and spade; yet
large blocks of fine building-stone, capable of resisting the
action of the weather, are frequently quarried in the midst of
a mass of distinguished mica. Granite is found in various parts,
especially in the parishes of Peterhead and Lunmey near the coast; in
Alford and Methlick parishes in the interior; and in Strathdon and Glen-
buchet, near the head of the Don. Granite is found in the
district adjacent to the granite, but not in great quantity.
The predominant rock in the county is mica slate. In the

parts adjacent to the granite it is quartzose and very compact,
showing a tendency to pass into gneiss, or alternating with
that rock. Serpentine and primitive limestone are found in
a few places. Clay slate, granuvack, and granuvack slate are
found in the parishes of Tarland and Udny; and the granite
and hilly parts of the county; and veins or dykes of trap
are observed in parishes near the east coast. (Boi., Essai Geo-
logique sur l'Écosse; New Statistical Account of Scotland.)

The Dee rises in the south-western part of the county, in
the mountains which there separate Aberdeenshire from In-
verness-shire. It rises high up the side of the mountain Brec-
ach, at an altitude of about 2000 feet, and flows for about
11 or 12 miles in a south-west direction to the junction of the
Geonny or Geusay, a stream 10 miles long. From the
junction of this stream its course is east by north for about 12
miles to Newton, below the castle of Braemar. In this part
its course is through a mountainous district; it flows past
the Quaich or Coich, each about 10 miles long, on the
left bank, and the Ey and the Chumie or Clanaught, at the
same length, on the right. In the upper part of the Dee there
are several falls of about 60 miles to its outlet at Aberdeen.
Its whole course is above 90 miles. In the ' Gazetteer of
Scotland,' published by Fullarton and Co. of Glasgow, and in
Chamber's 'Gazetteer of Scotland,' its length is estimated at
90 or 97 miles. About 24 miles above its outlet it quits Aber-
deenshire to enter Kincardineshire; but flowing about ten
miles through Kincardineshire, returns to the border of Aber-
deeshire, and for the rest of its course separates the two coun-
ties. It receives the Gairden or Geirn, 18 miles long, on the
left bank; the Cruises, 10 miles long, on the right bank; and
Loch Muick, 12 miles long, on the right bank, about two miles
lower down. In the upper part of the Muick there are two small but picturesque
lakes. Dhu-loch, 'the Black Lake,' is supposed to obtain its
name from its being overshadowed by the lofty cliffs of Craig
Dhu-loch, which rise from its shore, and are marked by
steepness of more than 1000 feet. A mountain rill falls into it on the
north side from a height of more than 900 feet. Loch Muick
is about two miles long, from south-west to north-east, and
half a mile broad. It receives a stream from Dhu-loch and
others from the surrounding mountains; and its waters are re-
markable for their coldness even in the midst of summer.
There is a small island near its south-western end, where sea-
gulls are always to be found. A little below the Muick,
another stream from the Dee on the west side of the
hill rises to the Don near the head of the river. This is the
outlet of two small lakes; Loch Connor, surrounded by
birch-woods and studded with small islands, and Loch Dawn.
The Dye, the largest feeder of the Dee, with the Aven its
head, rises in the mountains, and joins the Dee on the right bank in Kincardineshire. Two small
lakes, Loch Drum and Loch Skene, are connected with the
Dee by streams which flow into it on the left bank, after it
again touches the border of the county.

The Dee rises on the western border of the county, in
the parish of Strathdon; its course is elevated about 1610 feet
above the level of the sea; its course is very winding; first

B 2
north-east, to the neighbourhood of Kildrummy kirk, 30 miles; then eastward, about 28 miles, to Inverurie; and then south-east, about 20 miles, to its outlet in the North Sea at Old Aberdeen. Its whole course is about 76 miles. In the Grampian district, it is called the Dee.

The Trinity is lime, it in flows, here stdl is Aberdeen.

The From and Inverury and is but about the the of.

The Ugie is formed by two streams, of which the North Ugie rises to the south of Aberdour and flows south-west by the kirk of Strichen; the South Ugie rises between Strichen and Marykirk, and thence flows north-east, and enters the Dee to within a little above Elgin. The first and the last two are each about eight miles long, but the middle one is much too little. The Don rises in a peat moss: in the upper part of its course it is a very rapid river, shallow, and subject to inundations, of which that of 1829 was very destructive. The total length of the Don is about 70 miles, and the area of its course, and at the manse of Strathdon is 70 feet wide: it affords excellent angling for small trout. At Keig, midway between Kildrummy and Inverurie, it is 140 feet broad; but still very shallow. At Inverurie it receives the Urie or Ury, which is important, and another small stream, westward. The Don therefore has a course of about 5 miles, south of it, and then enters Aberdeen. Its course now becomes circuitous, first turning eastward and then northward, till after flowing for about 13 miles through Aberdeen (in which, near the town of Humlit, it receives on the right the north-eastern branch of the Dee), and also three smaller streams, which flows northward 17 miles by Achindore, Keazn, and Garty kirks), it returns to the border. The remainder of its course, about 23 miles first eastward and finally northward, is partly in the county of Banffshire, the whole length is about 51 miles. It is a rapid stream, flowing for a considerable part of its course through a deep, narrow valley, and is subject to serious floods. Both the Bogie and the Deveron contain excellent trout; pearls of trifling value are contained in the river, and there are some valuable fisheries, near the town of Ernie,

A considerable salmon fishery is carried on. The burns of Turriff and King Edward (13 miles and 9 miles long respectively), which join the Deveron on the right bank, belong to Aberdeen; the more impotantly on the right bank. The whole length is therefore 31 miles.

Of smaller streams, the Cruden, about 8 miles long, flows into the North Sea between the Ythan and the Ugie; and the Rathen, which rises in Caimhul. It enters by Kinnaird's Head, near the town of Fraserburgh. Aberdeen does not contain any lakes of importance. Dhu-loch, and Lochs Muick, Cannor, Dawan, Drum, and Tom in the county of Banff, have been already mentioned in our notice of the river Dee.

The only canal in the county is the Aberdeen canal, which begins in the harbour of Aberdeen and runs up the valley of the Don parallel to the course of the navigable near to it on the right bank, and terminates at Port Elphinstone in Kintore parish, but close to the town of Inverurie. This canal was formed under acts obtained in 1793 and 1796, and was opened in 1807: its length is 184 miles; its width originally 17 feet and its depth 3 feet, but these dimensions have been enlarged, so that it is now from 21 to 23 feet wide and 34 feet deep. Another statement gives the breadth as averaging 25 feet, the depth 34 feet. The expense of the construction of the former work was about £35,000, and the latter £5,000. A lock is placed at Inverurie, and there are two other locks, the greater number of which are at the lower end of the canal within 3 or 4 miles of Aberdeen. The total fall is about 133 feet for water mark in Aber- donna harbour. The trager of the canal has been on the whole increasing: lime, coal, dung, bones, and bark are carried up, and stone, slates, grain, and meal brought down. A passage boat runs daily from Aberdeen to Port Elphinstone.
Aberdeen up the valley of the Dee by Peterculter, Drumoak, Kincardine O'Neil, Beauchief and Maybole, Braemar; and from thence southward across the Grampians to Blair Gowrie and Perth. From Peterhead by Longside and Old Deer to Banff.

Soil and Agriculture. — The soil of the county varies much. Considering it is a part of the west of Scotland, it is heavy and clayey in the northern parts, and sandier and lighter in the southern; but there are considerable tracts of the western part of the county which are well drained, and whose soils, though of a light nature, are worked to considerable advantage. The clay in the eastern part of the county is very much inferior to the yellow clay found in the south of Scotland, and it does not afford good pasture. The eastern part of the county is well watered, and the streams are generally navigable. The western part of the county is covered with oak and beech, and the eastern part is covered with pine and fir. The forests of the county are well laid out, and are worked with great advantage. The county is well supplied with timber, and the timber is of good quality. The forests are well managed, and the wood is cut in a systematic manner. The forests are well stocked with game, and the hunting is excellent. The county is well supplied with water, and the water is of good quality. The county is well supplied with coal, and the coal is of good quality. The county is well supplied with iron, and the iron is of good quality. The county is well supplied with lead, and the lead is of good quality. The county is well supplied with silver, and the silver is of good quality. The county is well supplied with gold, and the gold is of good quality. The county is well supplied with copper, and the copper is of good quality. The county is well supplied with tin, and the tin is of good quality. The county is well supplied with zinc, and the zinc is of good quality. The county is well supplied with lead, and the lead is of good quality. The county is well supplied with silver, and the silver is of good quality. The county is well supplied with gold, and the gold is of good quality. The county is well supplied with copper, and the copper is of good quality. The county is well supplied with tin, and the tin is of good quality.

The united parishes of Braemar and Crathie, containing about 200,000 acres, or 312 square miles, comprehend the highlands about the source of the Dee. This district has a variable but healthy climate, and is watered by a number of mountain-streams, affording a level and healthy pasture to the deer. The prevailing winds are from the south, and the forest of the month is, for size and quality, the first in the British Islands. This forest is well stocked with red-deer and roes: it affords also good pasturage. The quantity of culivated land is very small, but the landlord is much interested in the prevalent breed of sheep; and the small black-bred horned cattle of the county. The adjacent highland parish of Strathdon (about 67,300 acres, or 105 square miles) has less natural wood; and the land is chiefly birch. The soil in the strath or valley of the Dee, in the eastern part of the county, is generally composed of clay, sand, and gravel. The tops of the hills are covered with meadows of considerable extent. The quantity of arable land is about 4500 Scotch acres, and there are 3500 acres of plantation, chiefly larch and Scotch fir. Agriculture has been conducted in the county with much energy and success for many years; and much land has been brought into cultivation by trenching and drainage. Lime is the general manure, and an abundance of it is good quality dug in the parish, and each farm has commonly its lime-kiln. The usual rotation of crops occupies seven years; oats are grown for two successive years, and are succeeded by turnips or some other green crop; the green crop is followed by bear or bigg, and hay; and the land is used for pasture for the two remaining years. No wheat and but little English barley is grown; the Angus and Scotch barley oats, and the green and red topped yellow turnips, are the favourites. The turnips are excellent: the soil suits the potato, but the danger of rot to the crop from the early frosts prevents the cultivation of it. Losses are generally for nine years in ten, but sometimes as great as 40 per cent.: small crops are generally of a superior description, built of stone and lime, with slated roofs. There are several threshing-mills in the parish, in which water is the moving force.

Glasgow, Kinross, Kinclaven, Alford, and Tough occupy a considerable district between the Don and the Dee, midway between the sources of those rivers and their outfall. The area of these parishes may be stated in round numbers at 50,000 acres, probably more; of which 16,000 acres, or about two-fifths, are under the plough, and about 6300 acres are occupied by plantations. The principal farms are held on lease for nineteen years; and the rent of arable land may be stated at an average of from 14s. to 21s. per acre, according to the quality of the soil, and the offices are generally of a superior description, built of stone and lime, with slated roofs. There are several threshing-mills in the parish, in which water is the moving force.

The general phenomena of the county are the result of the climate, the soil, and the geology. The climate is mild and temperate, with a moderate temperature of heat and cold, and a moderate rainfall. The soil is of various kinds, consisting of clay, sand, and gravel. The geology is of various kinds, consisting of sandstone, limestone, and coal. The county is well supplied with water, and the water is of good quality. The county is well supplied with coal, and the coal is of good quality. The county is well supplied with iron, and the iron is of good quality. The county is well supplied with lead, and the lead is of good quality. The county is well supplied with silver, and the silver is of good quality. The county is well supplied with gold, and the gold is of good quality. The county is well supplied with copper, and the copper is of good quality. The county is well supplied with tin, and the tin is of good quality. The county is well supplied with zinc, and the zinc is of good quality. The county is well supplied with lead, and the lead is of good quality. The county is well supplied with silver, and the silver is of good quality. The county is well supplied with gold, and the gold is of good quality. The county is well supplied with copper, and the copper is of good quality. The county is well supplied with tin, and the tin is of good quality.
London market, and the consequent increase of stock; and this extended cultivation has been aided by the introduction and general use of bone-dust, which is found to answer admirably as a manure for light soils that have been long under cultivation, and has contributed, as far as the clayey soils, and on the lighter soils in combination with bone-dust. The kinds of turnips grown are the green-top and red-top, with yellow bottoms; the rats bags, chiefly for feeding in May and June; and a few tankard turnips. The measures of cartage have been increased, and Manchester, and the in-lands parish. The breed of horses has been improved by the introduction of superior Clydesdale mares and other west-country broods. The cattle were formerly chiefly of the black Aberdeen breed, and Angus. In the latter half of the 18th century the Teeswater short-horned cattle have been gaining ground, being valued as attaining to earlier maturity and greater size. Sheep-farming is not much attended to. The farm-houses of modern erection are generally of two stories, built of stone and lime and covered with slate, neatly finished and comfortably fitted up, approached by smooth roads of easy ascent, in place of the steep and rugged tracks that formerly led to them. The formation of new turnpike-roads and the improvement of other roads have been important aids to the general advancement of agriculture.

Division, Towns, &c.—The county comprehends the five antient districts of Mar, Formartine, Buchan, Garioch, and Strathbogie, which are not at present recognised for any administrative purposes. The county comprehends that part of the county which lies south of the Don: it is subdivided into Brae-mar, Mid-mar, and Cro-mar. It gives the title of earl to a branch of the family of Erkina. Formartine is comprehended in the burgh of Aberdeen on the south coast between the Don and the Ythan and extends inland up the right bank of the Ythan to the border of Banffshire; it gives the title of viscount to the earl of Aberdeen. The district of Buchan comprehends that part of the county which lies north and north-east of the Ythan; but the eastern part of Buchan appears to have also included Formartine. The title of earl of Buchan still belongs to a branch of the Erkina family. Garioch is an inland district, about the Urie and its feeder's notches as of Kildrummy and as the modern designation of the ancient parish of Garioch. Strathbogie is an inland district, comprehending, as its name indicates, the valley of the Bogie, one of the affluents of the Deveron, and also including part of the valley of the Deveron itself near the junction of the Bogie. At present the county is divided for administrative purposes into the eight districts of Aberdeen, Alford, Deer or Buchan (comprehending only a part of the more antient district of Buchan), Ellon, Garioch (more extensive than the antient Garioch comprehended by the crown in 1568 than the older Strathbogie), and Strathbogie. These modern districts are nearly coincident with the several presbyteries of the same name. The population of these districts at the enumerations of 1831 and 1841 was as follows:

<table>
<thead>
<tr>
<th>District</th>
<th>1831</th>
<th>1841</th>
<th>Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aberdeen</td>
<td>96,778</td>
<td>79,938</td>
<td>17,840</td>
</tr>
<tr>
<td>Alford</td>
<td>11,923</td>
<td>12,091</td>
<td>170</td>
</tr>
<tr>
<td>Deer or Buchan</td>
<td>30,475</td>
<td>34,345</td>
<td>3,870</td>
</tr>
<tr>
<td>Ellon</td>
<td>19,831</td>
<td>14,418</td>
<td>5,413</td>
</tr>
<tr>
<td>Garioch</td>
<td>15,797</td>
<td>16,082</td>
<td>285</td>
</tr>
<tr>
<td>Kinrardine O'Neill</td>
<td>15,413</td>
<td>14,987</td>
<td>426</td>
</tr>
<tr>
<td>Strathbogie</td>
<td>9,716</td>
<td>9,572</td>
<td>144</td>
</tr>
<tr>
<td>Turriff or Tuffell</td>
<td>11,730</td>
<td>13,994</td>
<td>2,264</td>
</tr>
</tbody>
</table>

The county contains the city and royal and parliamentary burgh of Aberdeen, the population of which, in 1841, within the parliamentary boundary, was 68,286 [Aberdeen]; the royal and parliamentary burghs of Inverury, Kintore, and Peterhead; the towns of Formartine, Alford, Ellon, Aberdeen, and Inverury; the barony of Charleston, Fraserrgh, Huntly, Old Meldrum, Rosehearty, and Turriff.

Inverury is in the district of Garioch, 16 miles north-west of Aberdeen, on the left or north bank of the Don, in the angle formed by the junction of the Urie. There is a substantial modern bridge over each. The town consists of a long straggling street, running from south-west to south-north. The church, built in 1775 for 700 persons, is insufficient for the increased population; and a new church of Gothic architecture, sufficient for more than 1,000 persons, was in 1842 in course of erection: there is a neat Episcopal church, built in 1842; and places of worship for Independents and Methodists. The population of the burgh, which includes the town and the suburb of Port Elphinstone (which is in Kintore parish), was, in 1841, 1619; that of the whole parish (including Port Elphinstone), 2059, having been quadrupled within the present century; the burgh had 289 houses, namely, 274 inhabited, 10 uninhabited, 5 building. The opening of the Aberdeen Canal has much promoted the prosperity of the place. It has twenty large horse, cattle, and sheep fairs in the year, held every fortnight in summer and in winter. The town and its privileges were renewed by a novadomas, A.D. 1558; and it was made, in 1868, head of the earl of Mar's regality of Garioch. The burgh has a provost, three bailies, a dean of guild, a treasurer, and three councillors. It is included in the Elgin district of Parliamentary boroughs, and had in 1832-4 a constituency of 78, and in 1839-40 of 94. There are in the parish, the parish school, with about 50 scholars on the average; and five other schools, chiefly kept by females, for reading, sewing, and knitting. There is a savings-bank.

Kintore is in the district of Garioch, 12 miles north-west of Aberdeen, in the peninsula formed by the Don (which here flows in a very winding channel to the south-east), the burn of Tuach, which joins the Don on the right bank, and the Ythan, which, on the left bank of the Don, consists chiefly of one street, running from a bridge over the Tuach burn from east-south-east to west-north-west. There is a bridge over the Torry burn, and two bridges over the river Don. The burgh will accommodate 700 persons, stands in the town, and there is a town-house, a respectable building. The burgh, which comprehends the town, contained, in 1841, 102 houses, namely, 98 inhabited, 3 uninhabited, 1 building; and a population of 464 persons; the whole parish, of which the greater part is farmed by a provost, the smaller part being a grant. The population of the parish is 1299, including the population of Port Elphinstone (112 persons), which is in this parish, though comprehended in the burgh of Inverury, and the population returned with it. The town of Kintore has been excavated, and a new bridge is being made close to the town, and upon which there is a wharf: lime is brought up from Aberdeen, and granite carried down. There are several good shops in the town, and at Port Elphinstone are a number of grain-mills, two saw-mills (one moved by steam, the other by water), and some granaries, timber-yards, and storehouses. The burgh is very ancient: tradition states that it originated in the time of Kenneth II., but this is utterly unlikely: there is a charter of confirmation by the burgh from Robert II., 1318, and its ancestors had, before the Burgh Reform Act (which did not affect this burgh), held the provostship for a century and a half, and paid all the burgh expenses. Kintore is a contributory borough to the Elgin district of Parliamentary burghs, and had in 1832-4 a constituency of 78. There are a parochial school and several private schools in the parish: a school at Port Elphinstone has a school-house built by government, but no endowment: in all the schools together there are about 200 scholars, two in thirteen of the whole population. There are two Sunday-schools, one at Kintore and one at Port Elphinstone. There are a circulating library and a savings-bank at Kintore.

This title is given to the title of earl to a junior branch of the Keith family. The earl was created a baron of the United Kingdom in 1858. Near the town on the south are the remains of Hall-forest Castle, said to have been built by King Robert Bruce, and to have been a hunting-seat of the kings of Scotland: there is a buildings in the place. In the vicinity there are traces which show that it was once of larger dimensions.

Petershead is in the district of Deerness, on the east coast, 32 miles north-west of Aberdeen, on the peninsula running south-eastward into the North Sea, on the south side of the mouth of the Ugie: the two harbours, the New North Harbour and the South Harbour, are near the south-eastern extremity of the peninsula, in opposite sides of which they are separated or otherwise forming by a neck of land. The North Harbour is the oldest, having been formed in 1773, according to a plan of Mr. Smeaton, afterwards extended by Mr. Rennie, and covers about six and a half standard acres; the New North Harbour was formed in 1836, from a piece of Mr. Telford, and includes almost eleven acres: both harbours are furnished with quays and protected by piers. The town occupied, in 1840, a
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seventy acres; and had, in 1841, within the
include the suburb of Ronheads and the
inhabited chiefly by fithennen),
yiUige of Bucnan-haven, both
7s7nouiei, namely, 767 inhabited, 21 uninhabited, and 7 buildgte 0/ about
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burgh wat 4686, and that of the
(which hat an area of above 9000 acres) was 7619.
The ftreets of the town have been much improved of late
with dressed
yean, and hare side-paths, paved in some parti
The houses are genegranite: they are lighted with gas.
which is quarried near the town. The prinrally of granite,
town-hall.
The market-cross is a
cipal public building is the
The church (built in 1808)
granite pillar of the Tuscan order.
entrance of the town on the west or land side,
it near the
and has a spire of granite 118 feet high : there is a large
Epucopalian chapel (a Gothic building erected in 1814), and
there are smaller places of worship for the A associate Seceders,
There is but little manufacIndependents, and Methodists.
ture carried on : some woollen cloth and some cordage are made,

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the chief exports are
the town is considerable
the
grain, meal, butter, pork, herrings, codfish, pork and eggs
imports are lime, wool, timber, salt, flour, and general mercustom-house has been lately established. The
chandise.
number of vessels belonging to the port on the 1st of January,
1837, was 82, with an aggregate tonnage of 11,122 tons.
The whale fishery employed, from 1820 to 1826, 16 or 16
vessels belonging to this port, but since 1826 the number has
The herring
gradually decreased, and in 1836 was only 11.
fishery, which has grown up since 1820, has gone on steadily
The
There is a salmon fishery in the Ugie.
increasing.
herring and cod and general fishery is also carried on at the
Brick-earth is dug
village of Boddam, 3 miles distant.

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and two antient halfa weekly market on Friday
Peterhead is a burgh of barony,
yearly markets or fairs.
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erected by charter of the Earl Marischal in a.d. 1693.
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Burgh Reform Act the municipal government

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choose from their own number a
Peterhead is a parliatreasurer.
mentary burgh in the Elgin district: the constituency in
There are a
1836-6 was 207; in 1839-40 it was 241.
parochial school, and an endowed school, called 'the town
school/ taught in the town-house, and several private schools
there are several Sabbath-schools which are numerously attended, particularly by females
there are also a ' Reading
Society,' with a library of 1600 volumes, a Scientific Associain

who

a council of twelve,

provost, three baillies,

and a

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tion,

a news-room, and

several charitable societies.

A

part of the parish has been formed into a separate parish
' quoad
sacra ;' connected with .the church of which is a congregational library of 240 volumes.
Peterhead is frequented
as a bathing-place: it has several mineral-springs of some
reputation.
Near the town are the remains of two antient
castles, Ravens'-crag and Boddam
the former is the more
antieat.
The Pretender landed at Peterhead in disguise in
the rebellion of 1716.
Charles town or Charleston, distinguished as Charleston of
Aboyne, is in the parish of Aboyne and Glentaner, in the
district of Kincardine O'Neil, near the Don, 20i miles west
of Aberdeen. It is a very small place, having, in 1841, 66
houses), namely, 61 inhabited and 6 uninhabited, with a population of 260: the population of the whole parish was 1138.
The Tillage has a few shops, a commodious inn, and a postoffice : there are five great markets in the year, held on a
green near it. The church is about a quarter of a mile west
of the village, and will hold above 600 persons. Near it is a
suspension-bridge over the Don, erected by the Earl of Aboyne
at bis
expense, in the place of one destroyed by the great
floods in 1829 : the suspension part is 230 feet long, and there
are two trussed iron arches of 50 and 60 feet span respectively
and two stone arches of 20 and 30 feet. The parish school
had, in the winter of 1841-2, 140 scholars. There is a pretty
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parochial library.

Broad sea, was, in 1 841, 725, of which 714 were inha7 uninhabited, and 4 building (he population was 8289,
or including Broadsea 36 1 5. The town was not, in the return,
distinguished from the rest of the parish
Many of the houses in
the town are comfortable and even elegant. The town-house,
the market-cross, and the tolbooth (the last now falling into
ruins) were all erected by Sir Alexander Fraser mentioned
above.
The cross to a stone pillar, 12 feet high, erected on an
hexagonal base, and is surmounted by the British arms and the
armorial coat of Fraser of Philorth. The parish church is in the
middle of the town
it was built in 1802, and will hold 1000
people it has a spire. There are an Episcopalian chapel and
an Independent meeting-house. The n arbour is formed by
three piers : a north pier 300 yards long, begun in 1807 and
finished in 1 8 1 2 a south pier of the same extent, built under an
act obtained in 1818
and a middle pier erected since, broader
and ' superior to the other two.' The extent of the harbour
is above six Scotch acres
the depth of water at the pierheads six feet at low-water and twenty feet at high-water of
spring-tides.
The bay affords good anchorage. There is a
lighthouse on Kinnaird's Head.
little rope and sail making
is carried on in the town
barley, oats, ana potatoes of good
;
quality, cattle, and dried and pickled cod and herrings are exported
and timber, coals, lime, bricks, salt, and general merchandise are imported.
Eight vessels of from 45 to 165 tons
burden, belong to the port
and there are 220 boats engaged in the nerring fishery, which employs 1600 people.
This branch of industry was first extensively prosecuted in
1815 ; it begins in July and lasts till September ; and during
its continuance the population of the place it augmented by
1200 persons from other parts, and the town and harbour
present an aspect of unwonted bustle.
Some freestone to
quarried in the parish, of which the piers and some of the
houses are built ; and there are mineral-springs, one of which
village of

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some repute as a tonic. There are in the parish the
two antient chapels, one of which, called < the College,' belonged to the Cistertian abbey at Deer. There to also
at the west end of the town an old quadrangular building of
three stories, designed by Sir Alexander Fraser for a college
he had obtained a charter from the crown in 1692, for the institution and endowment of a college and a university ; but the
plan was never carried into effect. All the proprietors of houses
in the pariah are feuars of the borough, of which Lord Saltoun is the superior, with the authority of provost, and the
right of nominating the council and magistrates with the
advice and consent of the existing council.
The burgh
officers are two baillies, a dean of guild, a treasurer, and seven
councillors.
There are in the parish a parochial school, with
an average attendance of 100 scholars, 20 to 30 of them girls
and several day-schools, chiefly female or dame schools:
there are about 600 children at the day-schools, including the
parochial ; or about one in seven of the whole population
and about 300 attend the Sunday-schools, of which there are
eight.
There are a savings'-bank and a parochial library.
Huntly to in the district of Strathbogie, on the south-east
side of the Deveron or Doveran, in the angle formed by the
junction of the Bogie, 38 miles north-west of Aberdeen on the
road to Inverness.
It is a burgh of barony under the earls
(now marquises) of Huntly. The town to surrounded by bills,
and consists of streets regularly laid out and lighted with gas,
the two principal intersecting each other at right angles, with
to

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ruins of

a square or market-place at the intersection. It had, in 1841,
696 houses, namely, 576 inhabited, 18 uninhabited, and 2 building ; with a population of 2731. The population of the whole
parish was 3642.
The parish church, built in' 1806, will
accommodate 1800 persons; and a new church, which will
hold nearly 1000, was erected in 1840 there are Roman Catholic and Episcopalian chapels, and meeting-houses for Independents and Associate Seceders. There are two good bridges,
namely, an antient bridge of one arch, over the Doveran, and a
bridge of three arches over the Bogie: Near the town stands
the now deserted Huntly Castle, built in 1 602, out of the ruins of
;

Fraserburgh is in the district of Bach an, on the north coast
of the county, 42 miles north of Aberdeen, 18 miles north- the more antient Strathbogie Castle adjoining to it. There to
north-west of Peterhead, and 22 east of Banff, to all which also Huntly Lodge, now enlarged to a handsome house, and
places there are excellent turnpike-roads. The town is built occupied by the Dowager Duchess of Gordon. There are in
on the western side of the small bay of Fraserburgh, bounded or near the town a bleach-field, a tanyard, a distillery, and
on the south-east by Cairnbulg Point, and on the north-west by three banks. There to a weekly market on Thursday. ButKinnaird's Point. The parish was originally called Philorth, ter, eggs, cheese, pork, poultry, and game are sent from the
a town and harbour having been built, and a burgh of town and neighbourhood. There are about 12 yearly fairs or
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condition.

u„ sir Alexander Fraser of great markets : those at Whitsuntide and Martinmas, for
The town hiring servants, are the largest: the other fairs arc for horses,
cattle, and other things.
There are in the town the parish
streets crossing at right angles, clean, and in good
The number of houses in the parish, exclusive of the school, which has about 140 scholars at the most favourable

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time of the year, the 'new school' connect with the new church, with 128 scholars, an infant-school with 80 scholars, and a sewing-school with 30 scholars. The church is a pulpitless building erected for educational purposes by the Duchess of Gordon. There are besides an excellent girl's board-school with 40 pupils, and several other private schools chiefly kept by females. There are 80 children enrolled in the term, or nearly one in five of the population. There are also several Sunday-schools in connexion with the Established churches, or with the Independents and Roman Catholics. The county parts of the parish are not so well provided with schools; the only church school is in the district of the Duke of Richmond, who is proprietor of nearly the whole town; a farmers' agricultural library, an evangelical subscription library, a coffee and reading room supplied with one or two periodicals. There are two savings-banks, a savings' bank, and a friendly society connected with the total abstinence society.

Old Meldrum is in Meldrum parish, in the district of Garioch, 16 miles north-east from Aberdeen on the road to Boddam. The parish had, in 1841, 427 houses, namely, 420 inhabited, 6 uninhabited, and 1 building; with a population of 1875. The town is not distinguished in the return from the rest of the parish. Old Meldrum was erected into a church in 1821. There are two magistrates and 14 sworn or unsworn officers now. The town-house and the town-hall are respectable buildings. The parish churcb is close to the town: it was built in 1710, and has been since enlarged so as to hold 700 persons; but it is still too small for the increase of population within the last 20 years. There is a remarkable burial-ground, an Episcopalian and an Associate Secession meeting-house. There are a distillery and a brewery in the town, and two weaving-shops for cotton goods, rented by manufacturers at Aberdeen, in which some of the young people are employed at handloom weaving. There is a second distillery in the parish. There is a good weekly market for provisions, and a corn and cattle market every fortnight in winter and spring. There are a parochial school in the town, and three private schools, one of them for girls, in the village. The average income is about £371. There is a savings'-bank. On a farm called Chapel House, in the parish, there are the remains of a Roman Catholic chapel standing in a burial-ground, which has only been disused within living memory. The traces of a small Roman camp have been obliterated lately.

Rosebearty, in Pitalo Parish, in the district of Buchan or Deer, is on the north-east coast of the county, about 4 miles west of Fraserburgh. It was created a burgh of barony by royal charter in 1581. Mr. Dingwall of Bucklaw and Corriodar, who is the landlord, is superior to the burgh, but the burgh has no magistrate or public officer, and the tolbooth has become private property. There is however some property belonging to the burgh, which is managed, with the assistance of four burgh officers, each an individual and holder of a debt of 200L. The church, built in 1634, is a spire, and will hold about 500 or 600 persons. It is not stated whether it is within the burgh limits: but there is a meeting-house for the Associate Seceders in the burgh. The burgh in 1841 had 188 houses, namely, 182 inhabited, 3 uninhabited, and 3 building; with a population of 750. The population of the whole parish was 1592. There is a good harbour for vessels not exceeding 70 tons. It has 9 feet water in nap at spring tides, and three vessels belong to the port, besides fishing-boats. The herring fishery employed, in 1838, 40 boats with five men each, or four men and a boy, besides seven vessels to attend the fishery. Cod, ling, haddock, skate, saltry, pollack, and a small black fish are also fished. The fish are sent to London, Edinburgh, or Glasgow. In March several of the fishing-boats return to the Isle of Tyree in the Hebrides to fish for cod, and sell their cargoes at Glasgow, from whence they bring back to their burgh 250 barrels (34 tons) of cod liver oil is exported. A fishing-harbour has been lately formed at Sandhaven in the parish east of the burgh. There is a weekly market at Rosebearty on Saturday, and a post-office, a branch of that at Fraserburgh. The parochial school has a little chapel and a cell, but it is not attended. There are parish six other schools (five of them taught by females), with an average of 30 scholars each. There are several friendly societies in the town.

Turriff is about 11 miles south of Buchan, on the Turriff burh, which joins the Dovenan. In 1841 it had 312 houses, namely, 306 inhabited and 6 uninhabited; with a population of 1859. The whole parish was 3146. The parish church, a handsome structure, was built in 1794, and has been since enlarged. The remains of the old church, which was built before the Reformation, is still there. The present building is separated from the burial-ground by a wall, and the burial-ground gate are the vaults of an ancient tower. There is an Episcopalian church and an Independent meeting-house. A cross of considerable antiquity stands in the principal street, and is supported by classical steps rising to a height of 20 feet from the ground. There are several considerable mansions in the neighbourhood, especially Delgatie Castle and Towie Barclay; and there are two bridges, one close to the town, over the Turriff burn, and one over the Dovnan, both built by the burgh. Some lead mines are worked, but not so extensively as formerly. There is a small woollen cloth manufacture: some silk and woollen dyeing are done; and some worsted stockings are knitted. There are some good shops. There are a settlement of fishermen, a post-office, and a local post-office. There are eight yearly fairs for corn, cattle, sheep; and feasting markets at Whitesundae and Martinmas for hiring servants. Turriff was created a burgh of barony by charter in a.d. 1511, with a grant for markets and fairs. The parochial school has generally more than 100 scholars, and there are several dame or other private schools. There are about 400 children, or one in eight of the population, at school. There are five Sunday-schools, three in the town and two in the parish, with 100 subscribers and 600 volumes, an agricultural library, and a small savings' bank. The sheriff's office holds a small debt court quarterly, and there is a small lock-up house for temporary confinement. The first blood drawn in the great civil war of Charles I. was in the parish of Turriff, when the Royalist nobles and gentry in 1649 dispersed 'the committee of the tables' assembled in the town.

The following villages may be briefly noticed. Ballater, in Clunie parish, north-east of Aberdeen, on the north bank of the Dee, is of recent origin, and is much resorted to on account of the beauty of the situation and the mineral springs of Pananick in the neighbourhood: the houses are regularly built and neatly fitted up for lodgers, and amounted to 94 in 1841, 74, namely, 37 inhabited, 10 uninhabited, and the population was 371. The parish church is in the village, and there is a post-office. The springs or wells of Pananick, about two miles east of the church, are four in number, all dyable, and the water there is lodgings at the wells, also hot, cold, and shower baths. The resort of visitors in the summer is very considerable, and it is at present the most fashionable bathing-place in the north of Scotland. Two stone bridges of five arches, over the Dee, have been carried away by the floods in the last half century by the floods to which the river is subject; the first was destroyed in 1799, the second in the great floods of 1829: at present there is a neat substantial wooden bridge of four arches. Boddam or Boddan, the village, is 4 miles north-west of Peterhead parish, in the district of Buchan, is near Buckie, and is a lighthouse of granite 118 feet high. It was built a.d. 1824, and has a flashing light. This lighthouse is on an island connected with the mainland by a beach of round stones, separating the north and south coast-barbour of Boddan; the south barbour will receive ships of a moderate draught of water. The population (626 in 1841) of Boddan consists chiefly of fishermen and their families. Newburgh, in Foveran parish, in the district of Ellon, north-east of Aberdeen, in 1841 had 94 houses (namely, 91 inhabited, 2 uninhabited, and 1 building), and a population of 393. The New Statistical Account of Scotland makes the houses 120 and the population 450. Several of the houses are substantial and commodious, with chimneys and windows. The village stands on the banks of the river Ythan, which runs past the village, and is a mile and a half wide. It was the ancient capital of the Ellot tribe. The village stands on the banks of the Ythan, the mouth of which forms the port of Newburgh, to which vessels go, with an aggregate tonnage of 646 tons, 767 long tons, 256 short tons, 505 tons of coal, and 13 tons of lead. There are several fisher boats. 12 of them are bone-mills, several granaries, a savings'-bank, and a shipmasters' friendly society. Newbyth or New Byth, in the parish of King Edward and the district of Turriff, is 1 mile south-west of Ellon, a hollow village, with three roads meeting one another near the right angles. It is the centre of a quoad sacra parish, which in 1841 had 326 houses, namely, 310 inhabited, 10 uninhabited, and 6 buildings; with a population of 1809, of whom there are 1721 persons. There is a chapel of the establishment, a subscription library, two inns, and a distillery: there are three fairs in the year. Strichen, Mormond, and New Leods are in the parish of Strichen, in the district of Buchan. Strichen is well built, and has a neat
town-house, a commodious church, a branch bank, a savings' bank, and a post-office. There are five yearly fairs; one was established for the sale of yarn, but the cultivation of flax and the sale of yarn, formerly extensive, have much declined. Mormond was laid out in 1764, and is regularly built with a number of large and handsome houses. In 1836, the population of New Leeds was 7,203; that of the other villages was not distinguished in the return. Sturfa, or Stewartla, in the parish of Couvinnedale, in the county of Banff, was burnt in 1832, and now consists of a mere village, namely, 174 inhabited and 8 uninhabited; and a population of 614. Several persons are employed in the manufacture of linen yarn in the village; and in it or in other parts of the parish are lint-mills, mills for making woolen cloth and yarn for the worsted trade, fulling-mills, &c. In the parish there are five fairs in the year, two of them horse and cattle fairs, whose consequence, the other three are unimportant.

Divisions for Ecclesiastical and Local Purposes.—The county is for the most part included in the jurisdiction of the Synod of Aberdeen, which comprehends, in addition, nearly the whole of Banffshire and part of Kincardineshire. The Synod of Aberdeen comprehends the following eight presbyteries: Aberdeen, which includes that portion of Kincardineshire that is built in a substal; Alford, which extends into Banffshire; Deor, Elkin, Fordyce, which last is wholly in Banffshire; Garioch, Kincardine O'Neil, which extends into Kincardineshire, and Turriff. The Presbytery of Strathbogie, which is under the lordship of the earl of Buchan, is partly in Banffshire, partly in Kincardineshire, and wholly in Banff. The number of parishes wholly or partly in this county according to the Population Returns of 1841 is 90. These are parishes both for ecclesiastical and civil purposes. There are besides 14 'quoad sacra' parishes, where also the administration of the church is vested. There are about 30 churchyards and constituted distinct parishes for ecclesiastical purposes alone; 10 of these quoad sacra parishes have been formed in the city of Aberdeen. Dissenters from the establishment are secure, and are chiefly in and about Aberdeen, and in the districts and presbytery of Deer or Buchan; in other parts they are not numerous; they consist of associate or other seceding Presbyterians, Episcopalian, Independents, and a few Roman Catholics and Unitarians, the last in the city of Aberdeen, with a town and a parish.

There are two universities, namely, King's College in Old Aberdeen, founded in the fifteenth century, by Bishop Elphinstone; and Marischal College in New Aberdeen, founded by George Comyn, fifth Earl Marischal, in the sixteenth century.

[ABERDEEN, P. C.]—The shire is well supplied with schools; nearly two hundred are enumerated in the table given at the end of the county in the New Statistical Account; but this amount is far below the truth, as the whole city of Aberdeen, and about twenty-six parishes in other parts, are omitted in it.

There are a county prison and a bridewell at Aberdeen. There are small hugh prisons at Old Aberdeen, Old Mel-drum, and Old Tarland, as Pethead, but these are used only occasionally and for very brief confinement. There is a new prison at Peterhead, which town is the seat of a sheriff court; but the prison had not been completed at the time of the Fourth Report of the Board of Directors of Prisons, presented to parliament in 1848. It was then in the contemplation of the Board to provide small prisons at Fraserburgh, Huntly, and Tarland, as the small hugh prisons were not under their direction. The gaol of Aberdeen is situated in a healthy situation, it is secure, clean, well ventilated, and dry; it contained in 1836 ten day-rooms and sixty cells. The discipline and management at the time of the First Report of the Inspectors of Prisons (1836) were not satisfactory; but considerable improvements have taken place since then, and the separate system, for which the building affords opportunity, has been carried out successfully. The hewdewell of Aberdeen is a substantial building, in an apparently healthy site; it affords a sufficient number of sepulchral monuments, the separation of the cells is not such as to render the separation perfect; the management at the time of the Prison Inspectors' Second Report (1837) was decidedly good.

P. C. S. No. 2. A cause of crime, is believed not to have increased in proportion to the population, though it is still prevalent. The police about Aberdeen has been much improved.

(Reports of Inspectors of Prisons, especially First and Second, and of Board of Directors of Prisons.)

The county of Aberdeen was annexed to the parliament by the Act of Union (1707). The number of electors of all qualifications was, in 1835-36, 2986; in 1839-40, 3181. The city of Aberdeen returns one member; the constituency in 1835-36 consisted of 2242; in 1839-40, of 2775. The county of Aberdeen was included in the Elgin district of burghs, which returns one member; the other burghs of the district are Elgin, Cullen, and Banff. The constituency has been already given in our notice of the burghs.

History and Antiquities.—At the earliest historical period Aberdeen was occupied by the Taesali (Taealbas) of Ptolemy. The promontory of the Taesali (Taebalos) of the same writer may be probably identified with Kin-naird's-head near Fraserburgh; its rivers Celnias (Kildonan) and Deva (Dyaxia), with the Doveran and Dee respectively; and his city Devana (Dovrea) has been identified by General Roy with Old Aberdeen, and by others with Norman Dykes on the Dee, a few miles above Aberdeen. The south-western part of the county was probably included in the territory of the Vescamag (Oseumagis) of Ptolemy; as Tames (Tama), one of the towns which he ascribes to them, is by some identified with Castletown of Braemar. The Ituna of Ptolemy is probably identified with the town of Frondyce, and his position Ad Iunam with some place on its banks.

Of the most antient period of its history Aberdeenshire contains various monuments; such as Cairns, barrows, Druidical stones, and the structures sometimes called Picts' houses. Some of these remains are of ancient date, and are supposed to be Roman. A singular monument called the Maiden Stone is found in Chapel of Garioch parish. It is a stone pillar, ten feet above ground, and supposed to be imbedded six feet below the surface, by two parallel dikes forming a square, one thick, marked with hieroglyphic or other characters, supposed to be Danish. Its name is connected with a tradition which ascribes the origin of the monument to a love tragedy of the middle ages. There are in the parish of Aberdour and Montrose remains of the Picts' houses. Another Pict's house is marked by stones regularly laid without cement, and partly imbedded in the rock. The enclosure, which is 83 feet in diameter, is on the top of a hill called Knockbeg; this monument is connected with others of a similar character and forming an enclosed way or avenue, the main line of which may be traced for nearly fifty miles, near the north bank of the Dee; some branches diverge in a direction traversing the river and the Grampian Mountains.

The principal period of the middle ages and of later days were—the battle of Cruden, in the beginning of the eleventh century, between the Scots under Malcolm II. and the Danes under Canute, afterwards king of England. In the early part of the fourteenth century Robert the Bruce, king of Scotland, went to Aberdeenshire to chastise Comyn, or Cumine, earl of Buchan, by whom he was surprised when sike in his camp near Inverrury, but whom he defeated, and whose country (Buchan) he subjected to the most fearless devastation. In 1411, during the captivity of King James I. and the regency of the duke of Albany, the bloody battle of Harlaw, in Chapel of Garioch parish, was fought between 10,000 highlanders, under Donald, Lord of the Isles, and the royal forces (lowlanders), under the earl of Mar, by which the country of Banff, which was completly depopulated. In the great civil war of Charles I., A.D. 1644, Montrose defeated the Covenanters under Lord Burley, not far from Aberdeen, which he entered. Monk occupied Aberdeen in 1651; and the troops of the Pretender, under Lord Lewis Gordon, came into the county, and levied contributions on it in 1745. A detachment of the royal forces, sent from the north by Lord Loudoun to relieve the town, was defeated by the rebels at Inverrury in the latter part of that year. The town of Aberdeen, in 1745, was besiegéd by Prince Charles, when he marched northward previous to the battle of Culloden.

The principal memorials of the middle ages are the ruins of feudal castles. On the north coast, between Fraserburgh and Banff, in the parish of Aberdeen, are the remains of the ancient castle of Fraserburgh, which stands on a promontory, the summit of which rises from the sea to the height of above 50 feet, and is connected with the mainland at high-water only by a narrow ledge of rock. Here Henry de Beaumont, the English earl of Buchan, was besieged by Sir Andrew Murray, regent of Scotland during the captivity of King David II., in 1328.
ABINGER, LORD. [SCARLETT, JAMES.]

ABLAIKt (i.e. the Convent of Ablait), the name of several buildings on the steppe of the Middle Horde of the Kirghiz, about 50 miles from the town of Bokonboz and of Kameno-Karagaskaja, both built on the banks of the upper course of the river Irish. The place is in 49° 20' N. lat. and 83° 6' E. long. These ruins are situated near the base of the former convent, in which the priests of the Buddhist religion were lodged. A smaller building had evidently been a temple, as was proved by a great number of idols, pictures on the walls, and manuscripts, which were found here. The fragments of the idols showed clearly that they had reference to the religion of Buddha. Among them were also found some wooden boards, with raised figures on them resembling some letters in the manuscripts: whence it was concluded that they had been used for printing. Some of these boards, as the tenets of the Buddhist religion was not contained in the manuscripts, were golden letters on black paper, and were of great beauty; others were written on common paper, or on the inferior bark of the bee-cherry. Some of these manuscripts were sent to Peter the Great, but without any information respecting them. It is not known whether they had been used by the Buddhists of Kamenogorskaja, nor whether they knew their contents. Not finding in his dominions a person who was able to understand them, he sent them to Paris, whence he soon obtained a translation, or rather a paraphrase, which, however, on closer examination, turned out to be a fabrication, and it was evident that the translator did not understand one word of the language in which they were written. It was afterwards ascertained that the manuscripts were written in the ancient Tangut language, and referred to the tenets of the Buddhist religion. They were found in a hard brick, and were believed to have been the printing-establishment. This fourth was of a diminutive size, and evidently had been used as a kitchen. All these buildings, though they had no great architectural beauty, were very regular, and constructed of excellent bricks. On two sides the buildings were protected by almost perpendicular rocks, and on the other two sides by a wall about ten feet high and eight feet thick. This wall was entirely of brick, but at the time when the ruins were discovered it was not visible, as there the wall was closed very spacious, and evidently destined to receive a great number of tents or temporary huts. It was ascertained that this place had been built about the middle of the seventeenth century by some friars, or the monks of the Songar branch of the Mongols; and apparently he had destined it to be one of his temporary residences. He soon afterwards (1670) was engaged in a war with the Galdan, the khan of the Proper Oolich (Songara, P. C.), in which he was unsuccessful, and by which he was at last obliged to abandon his country precipitously. The state of the buildings, which still contained much furniture, evidently showed that they had been suddenly abandoned. Ablai and those who still remained faithful to him went westward to the banks of the Uri and Wolga rivers, where he frequently surprised and plundered the Calmuck until he was taken prisoner and brought to Astrakhan, where he lived to an old age. Modern travellers who have visited these ruins have found them in a state of rapid decay.
at Brussels, the houses which are now built in London, and
the grounds which are employed as kitchen-gardens round
the metropolis, would not exist, and the profit derived from
this employment of capital would not exist. It would
be transferred to Brussels and to Belgian capitalists. This
would be the immediate effect of the wealthy residents in
London removing to Brussels. The removal of these residents
to Brussels would be the withdrawal of one of the means of
profit to the Londoners and would be a source of national
wealth. Nor can it be shown that the capital which is
now employed in and about London in building houses and
cultivating garden-ground could be employed with equal
profit in some other way; for to assert this would be equivalent
to saying that in any way possible, the wealthy residents
who are employed under all circumstances in a manner equally
profitable. It may be rejoined, that if all or most of the wealthy residents
of London removed to Brussels, English capital would be required in order
that the British people might provide some of their necessities. This may be
denied, and yet it does not remove all the difficulty, for if the resi-
dents were to remove to various towns of Italy, the employ-
ment of English capital would not be required to the same
degree as if they were all to remove to one place, such as
Brussels.

But this is only part of the question. There are numerous
sources of profit arising from the supply of the ordinary wants of
a man and his family, which accrue to the people who reside in
London: such a man is a resident in London, and the other
retail profits of trade. This is obvious in the case of a num-
ber of families quitting a provincial town to reside in London;
the provincial town decays, and that source of profit which is
decided upon from supply to the trade becomes a source of
profit to the trade of London, and thus affects the trade of
the new place of residence. This, which is true as to one place in England compared with
another, is equally true as to England compared with Belgium
or France. If it can be shown equally the amount of wages
which are paid to domestic servants, this will form a very considerable sum.
The savings of domestic servants in England from their wages are
invested in various ways; and such savings are no small profit to the state of
the rich. It will hardly be maintained that all those who would be
employed as domestic servants in London, if the absentees in
France were to come to live in London, are employed with
equal profit to themselves while the absentees are abroad.
London is supplied with domestic servants from the country,
many of whom would be living at home and doing nothing,
if there were no demand for their services in London; and
everything that diminishes such demand, diminishes the
savings of the family which are accumulated. This argument
forms a part of the productive capital of Great Britain.

Those then who maintain that absenteeism has no effect
on the wealth of the country from which the absentee derives
his income, maintain a proposition which is untrue. Those
who live abroad, and who waste the wealth of their country
is so much clear loss to the country of the absentee,
are also mistaken. There are many ways in which the loss
is indirectly made up; but whatever may be its amount, it
would be wise to check absenteeism by any direct means,
and it is not easy to see how it can be checked indirectly in
any way that will produce good.

Since writing this we have seen ' Five Lectures on Politi-
cal Economy,' delivered before the University of Dublin,
in Michaelmas Term, 1843, by J. A. Lawson, L.L.B., in which
the subject of absenteeism is discussed, though from a some-
what different point of view. Mr. Lawson does not agree
with those economists who think that a country can sustain
as injuries from the remittance of本领works and other
proprietors of revenue. He is of opinion that, so far at least
as Ireland is concerned, absenteeism is an economical evil.
His views on the effects of absenteeism are contained in Lect-
ures on Political Economy, p. 122.

ABSORPTION OF LIGHT is that quality in an
imperfectly transparent body, or at a polished surface, by which
some portion of an incident pencil of light is retained within
the body, while the rest is either transmitted through it or
reflected from it.

The different colours exhibited by bodies in ordinary light
are caused by the transmission, or reflection, of such of the
rays as give rise to the perceptions of the colours, the other
rays being absorbed. A body absorbing all the light which
falls upon it would appear to be entirely black, or would be
invasive; while a body reflecting unchanged all the light in-
edent upon it would seem to be entirely white. No bodies in
nature possess however the qualities of absorption or reflec-
tion perfectly; for the most opaque bodies known permit
permitted some light to pass through them, though the body
permitted some to be reflected from them: while those which appear
be the most white, or the most transparent, absorb much of
that which falls upon or enters them; and the same body,
when in different states, absorbs or transmits light with dif-
f erent degrees of absorption.

When light enters into a homogeneous medium, it is pro-
able that its Intensities, at depths which are in an arithmec-
tical progression from the surface of incidence, decrease in a
decreasing geometrical progression; for it is reasonable to imagine that,
in indefinitely thin portions, proportional to its intensity to that surface, the quantities absorbed will bear nearly a con-
stant ratio to those which enter. With this assumption, let
\( a \) represent the quantity of light which falls on the surface
of a body, and let the quantity absorbed be \( \frac{1}{n} \) of that which
enters; then, \( \frac{1}{n} a \) being absorbed in the first portion, the
quantity which emerges from thence will be represented by
\( a - \frac{1}{n} a = \frac{n-1}{n} a \). Again \( \frac{1}{n} \) of this quantity being ab-
sorbed in the second portion, there will emerge from thence
a quantity represented by
\( \frac{n-1}{n} a - \frac{1}{n} \left( \frac{n-1}{n} a \right) = \frac{n^2 - 1}{n^2} a \)
and so on, the emerging quantities being thus represented by
\( \left( n + 1 \right) \frac{n-1}{n} a \); and this, when \( n \) is made indefinitely
large, represents the quantity of light which is absorbed in the
absenteeism of the media. The rays entering through green
branch become more homogeneous; and those which pass
through glass which, of a certain thickness, is yellow, appear
as the plate is successively thicker, to be green, brown, and
red.

In Polarization of Light, P. C., it has been stated that
when common light passes perpendicularly through a
plate of tourmaline (a doubly refracting crystal) whose sur-
faccs are parallel, the emergent light, which is represented
by one of its refracted pencils is partly and the other almost
wholly absorbed; and it follows that the emergent pencil has
less than half the intensity of that which is incident on the
plate. Dr. Wollaston was probably the first who discovered
this effect (Phil. Trans. 1775) although he states, that a wedge in
which the edge is parallel to the axis of the crystal had a colour different
from that of the light which was transmitted perpendicularly to
that axis; and: M. Biot (Traité de Physique, tom. iv. 1818),
having inferred from the ordinary image of a white object,
transmitted through the thinner part of a prism of tourmaline,
observed green, while the extraordinary image is white, that
the difference of colour did not arise from the different
coloured rays being unequally divided between the two pencils,
since the colours of the two images should be comple-
mentary to one another, concluded that the blue and violet
rays which are wanting in the ordinary image are more easily
absorbed in the crystal when they are polarized parallel to its
axis than when polarized perpendicularly to it. Previously
however to the publication of Biot's work, Dr. (Sir David)
Brewster had discovered like phenomena in plates of quartz,
in mica, and in carbonate of barytes. (Phil. Trans. 1814.)

The quantity of light absorbed in tourmaline depends upon
the thickness of the plate, and it is found that the absorption
takes place gradually, as the pencil passes through; for if
a plate of tourmaline be ground to the form of a wedge, whose
sides make with each other a very acute angle, and whose
edge is parallel to the axis of the crystal, then looking
through the sides of the wedge at a candle it is observed that,
neat the edge, the images produced, both by the ordinary and the
extraordinary refraction, have nearly the same degree of bright-
ness and tint; then, on moving the wedge so as gradually
to bring the thicker part between the eye and the candle, the
ordinary image diminishes as gradually in intensity, and at

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roughness allow it to pass off more abundantly than those which are smooth or polished; and the experiments of M. Biot show that the propagation of caloric along a rod of iron does not extend to a distance from the heated body greater than about one thousandth of an inch, and a half that is indetectable by the thermometer. The conducting power differs however in different substances; and, among metals, that which possesses it in the highest degree is silver: below this, in order, are copper, brass, platinum, iron, tin, zinc, and lead. Among non-conducting bodies, such as wood, bitumen, horn, ivory, mother-of-pearl, ivory, hard rubber, bone, ivory, and glass. The conducting power of gold is not well known: by Franklin it was found to be less than that of silver and copper; while, from the experiments of Despretz and De la Grange, for the metals of similar density, that of gold is less than that of any other metal. Count Rumford has proved that the imperfection of the power in solid bodies depends in a great measure on the quantities of air contained within their interstices. He moreover ascertained by experiment that lint, sheep's wool, raw silk, beaver's fur, and hare's fur, were successively lower than each other in conducting power.

Liquids are very imperfect conductors, yet heat passes through them with considerable rapidity. This arises from the freedom with which the particles of a liquid move among one another, and from their expansion by heat, in consequence of which they become lighter; thus, being easily displaced by the colder particles about them, they rapidly carry with them the caloric which they have received from their surroundings. It was shown by Count Rumford that, on mixing with water different substances by which its fluidity, or the freedom of motion among its particles, was diminished, the velocity with which the heat was propagated was increased. For the same reason, when the fluid is regarded as the motion of the particles of liquid was more impeded. For reasons similar to those which have been mentioned, heat is rapidly transmitted through the atmosphere and other aéiriform fluids, though these, as conductors, are probably less perfect than liquids, and are situated in a critical position.

The experiments of Sir David Leslie established the fact that surfaces from which heat radiates with the greatest freedom absorb it most readily; but the late Dr. Ritchie contrived, by means of differential thermometers, the admission by this experiment, of a thermometer enabled to prove that the power of radiation from any surface is exactly equal to that of absorption at the same surface. A hollow air-tight cylinder of tin, having one half of its exterior surface bright and the other covered with lampblack, was fixed in a vertical position at each extremity of a bent glass tube containing a coloured spirit; and midway between these was placed a vessel similar to the others, and like them coated on half its surface. The vessels were then filled with boiling water; then the bright side of one of the first-mentioned cylinders was turned towards the coated side of that which contained the water, while the coated side of the other was turned towards the bright side of the latter, and the two were ratched in caesium or other kindred bodies. Subsequent to the difference in the brightness of the tube, in consequence of the heat absorbed by them, was proved to be equal to the coloured spirit remaining stationary in the tube. (Journal of the R. Inst. No. V. December, 1831.)

It is evident, here, that if the quantity of heat which radiated from the bright side of the middle cylinder were represented by \( n \)th of that which issued from the coated side; the bright side of the cylinder at one extremity of the tube absorbed \( n \)th of the latter quantity, while the coated side of the cylinder at the other extremity absorbed the former quantity, which was the result of the first experiment.

ABUTMENT, in machinery, is a term applied to a fixed point from which resistance or re-action is obtained. In an ordinary steam-engine, for example, each end of the cylinder acts alternately as an abutment for the force of the steam, and it is against this, being kept fixed, that the pistons of the rigid, fixed obstacle, i.e., the end of the cylinder, expands the whole of its elastic force in the opposite direction, against the movable obstacle, or piston. In like way the breech of a gun forms an abutment for the expansive force of the ignited powder; although in this case, the abutment not being absolutely a fixed point, its recoil occasions some loss of power.

Even a rotary steam-engine, with a continuous circular action, must have an abutment to render the force of the steam effective, though in the primitive rotary steam-engine of Hero of Alexandria, which is described by Lardner and most
writers on the history of the steam-engine, especially by Staudinger, who in the 'Histoire de la Machine a Vapeur et des Travaux de la Machine a Vapeur,' p. 12, quotes the original account from 'Heronis Spiritualium Librae Commandioso,' Amst. 1680, p. 66), and in some modern machines on the same principle, the air is made to supply the necessary resistance; as also must all mechanical combinations in which power is transmitted by means of screws, in which it is sufficient to cite as an example the nut in the fixed head of an ordinary screw-press. [Screw-Press, P. C., p. 51. In all these cases an angle may be traced with the use of the term in architecture, explained under ARTICULT, P. C., p. 51. With a similar meaning it is applied in carpentry to a joint in which two pieces of timber meet so that the fibres of one piece run in a direction oblique or perpendicular to the joint, and those of the other parallel with it.]

ABDYNEUS ('Ἀβδυνεύος'), also called Athienus by Eusebius, a Greek historian who is known to us only as the author of the table-land on the Red sea of Assyria ('Ἀσσυρία'), which is lost, with the exception of some fragments preserved in Eusichius, Cyriillus, Synceclus, and Moses of Chorene. From the manner in which these writers mention Abydineus there appears to have been considerable authority. The time at which he lived is not certain: he must however belong to a later period than Beoruss, who lived about a.c. 250; for in one of the fragments still extant, Abydineus mentions Beoruss among his authorities. For an account of his works and of the sources on which he bases his information, see C. Bär's work, 'De Edemotandiae Temporum,' and more completely in J. D. G. Richter, 'Beroii Chaldæi Historiae quae superstunt,' &c., Leipzig, 1826, 8vo, p. 38, &c. and P. C.

ABYSINIA. Since this article was written in the P. C. of Abyssinia has been visited by many Europeans, who have entered it partly by the road previously known, which leads from the Red Sea at Massow to the table-land of Tigré, and partly over the land of Tigré, on the Gulf of Aden. From the gulf of Aden the route has been to Sh Oslo, which route was pointed out in this work twelve years ago as that by which the southern ports of Abyssinia might be reached without much risk [Abyssinia, P. C., p. 57]; and so it has turned out. The accounts of these travellers have thrown a new light on the physical geography of this country, and though there are some large portions which have not been visited, we can now form a tolerably correct idea of the great natural features of Abyssinia.

The eastern part of Abyssinia is a large tract in Eastern Africa. The greater part of it is drained by the principal branches of the Nile. It lies between 8° 30' and 15° 40' N. lat. and between 35° and 40° E. long.

Abyssinia is an elevated table-land. The greater part of it is more elevated above the sea than the general level of the table-land of Anahace in Mexico. The north-eastern edge of the table-land is directed towards the Red Sea, and is from 30 to 60 miles from its shores. Those who navigate that sea observe an apparently uninterrupted chain of high mountains from the harbour of Massow (15° 40' N. lat.) to Cape Rackmeh (15° 40' N. lat.). These mountains form the dividing line of the table-land on the Red Sea. Isolated peaks are also seen from Cape Rackmeh to the Straits of Bab-el-mandeh, but they appear to belong to a ridge which descends on both sides to a low country. From Cape Rackmeh to the edge of the table-land runs westward, but we are not acquainted with its actual position, as the countries through which it runs are inhabited by tribes which are among the most inhospitable in Northern Africa. In the vicinity of Lake Halik (near 11° 25' N. lat. and 40° E. long.) the edge of the table-land descends rapidly, but over it is not so steep as along the Red Sea, but rises with a gentle acclivity or a considerable tract until it reaches the watershed between the rivers that flow eastward to the Red Sea, and those that run westward to the Abil. From the Lake Halik it runs into the sea, divided into a dextral and sinistral river, neither of which has a channel for the discharge of its waters. This tract is very unhealthy, and uninhabited. The country between this swampy country and the edge of the table-land is called Hamasien, and constitutes the most northern and the narrowest portion of Tigré.

Abyssinia may be considered as lying at the base of the table-land on the south. At the north the table-land is crossed by the road leading from Tadjourah to Ankōsar, its level is about 2200 feet above the sea. As its course is not rapid, it is probable that the swamps in which the Hawash originates are not more than 5000 feet above the sea. From the Hawash to the western coast of Abyssinia there are many watercourses. The narrowest of these, which is called the Great Hawash, is a very remarkable length in Abyssinia, since it rises above the Red Sea, and falls to the sea, as an ordinary river, without overflowing any considerable distance.
South of 15° N. lat., the hills which are on the edge of the table-land occupy a much greater extent in width, or rather they form two ranges, which enclose a longitudinal valley. The western range, which runs from north-west to south-east, may be called the Debra Dome range, from a similarity of its general form to the western recesses of this mountain and most inaccessible summits. This range does not appear to rise in general more than 500 feet above its eastern base, though a few summits may attain even 1000 feet, but it consists principally of the sandstone, and Antalo, which indicate that it is more the product of a series of long and rather steep descents by which it is entered from the south. This descent is known as the Pass of Atbara, and lies near 17° 8. lat. and 40° 25' E. long. The difference between the level of this pass and that of Antalo is probably more than 1000 feet, for Rüppel estimates the elevation of the summit of Kikirri, which lies on a hill of some elevation, at 6348 feet above the sea; and he observes that the Harramat Mountains are at least 1200 feet above the level of the plain. Fevers also observes that the natives, in ascending this Pass to say that they pass from the warm into the cold country. This plain, which, from the name of one of the provinces it contains, may be called the Plain of Temben, extends from the base of the Harramat Mountains to the Takkazie, from past by north to west by south, more than 60 miles, and continues along the northern banks of the river for at least 30 miles farther, so that the whole length is about 100 miles. It is narrower at the base of the mountains, and grows broader towards the north, and it is so at its highest, so that it may cover a surface of 3000 square miles. It occupies the whole space between the Pass of Atbara and the towns of Asum and Adowa. This large plain is in general not fertile. At the base of the Harramat Mountains is a tract of land which is entirely covered with sandstone; and nearly the whole of it is under cultivation. There is another rich agricultural tract near the heights over which the Pass of Atbara passes, where wheat and barley are extensively cultivated; and two or three small rivers, which can be irrigated; but these tracts are not extensive. The greater part of the plain consists of low sandstone hills, and the soil is sandy and unfit for cultivation. In other places there is clay slate, usually in perpendicular strata, and these strata are less well covered, and appear to rise and fall with the strata. Trees do not occur, and in most places only shrubs and bushes of stunted growth are found, among which the Ephorbia canariensis is common. In the middle of the plain there is an extensive annually which constitutes a fine pastoral country, and is interspersed with trees. Here and in some lower depressions cultivation is also carried on to some extent. The beds of the rivers, which generally contain water even in the dry season, are considerably depressed below the surface of the land, and even the bottoms are wooded, but these bottoms are very narrow. In approaching the river Takkazie the level of the plain lowers by steep and long descents, which constitute several terraces. These are particularly low at the village of Cali, situated near at the most southern part of the plain, Rüppel found the level of the Takkazie 3084 feet above the sea.

North of the Plain of Temben are those of Shiré and Serawé. They are more elevated than the first-mentioned plain, and at the base of the ascent by which they are reached are situated the towns of Asum and Adowa. The first place is 7092 feet and the second 6216 feet above the sea-level. Hence we may conclude that these portions are more than 9000 feet above the sea. The southern-western portion is called the Plain of Shiré, and the north-eastern that of Serawé; but we are not acquainted with the line which separates them from one another, nor with their extent to the north and west. The first appears to extend to the country of Bari, or Shangalla, and the last to the swampy region of Maleb. The Plain of Serawé is celebrated in Tigré for its flowery meadows, shady groves, and rich valleys. That portion of it however which was traversed by Rüppel, and which extends along the banks of the Takkazie, is not more than 10 miles long, and 20 miles wide. From the banks of the river, which is at Shalt 8775 feet above the sea-level, one long and steep ascent brings the traveller to the plain, whose surface is composed of sandstone, and on which a certain portion of the river bed rests. The country, consisting of the decomposed volcanic matter, is partly covered with low bushes, between which there is a fine turf that makes excellent pasture. In some places there are trees, and among these date-trees. One of the volcanic hills, called Alape, rises 200 feet above its base. The western portion of the
Plain of Serawé, or that which is contiguous to that of Shiré, does not differ much from it in aspect. On the plain, which is generally level, and consists of sandstone, several ridges of basaltic hills, and a few isolated cones composed of volcanic matter, give a small mountainous character to it, and render it slightly more interesting to the traveler than the country about. The greatest part of the plain is covered with bushes, between which there are excellent pasture-grounds. The hilly ground along the western coast is composed of bushes and the Euphorbia canariensis. The eastern part of the Plain of Serawé, or that which approaches the mountains with which the edge of the table-land of Tigré is crowned, is somewhat different from the interrupted plain which it replaces. The surface is either bare sandstone or a thin layer of poor soil. Between the table-lands are some valleys, from half a mile to a mile in width, which are partly used as pasture-grounds and partly cultivated.

The Plain of Serawé is separated from the Hararam Mountais by a hilly tract about 50 miles in length by 30 wide. At this tract constitutes the principal part of the province of Tigré, which has given its name to this great division of Abyssinia, it may be called the hilly region of Tigré. The rivers which originate in it run westward, and form by their union the Mareb. This tract presents a great variety of surface and productive powers. Hills and short ridges are numerous; but, except one or two, they are not of great height. Some of them are sparsely wooded by stunted trees, or covered by bushes, and are partly cultivated; but others are composed of sandstone or clay slate, and are nearly bare or only covered with low stunted bushes. Some of the plains extend over a mile in width and are in a state of high cultivation, whilst others suffer from want of water, and are not inhabited except in the rainy season. The valleys resemble the plains.

The southern part of Tigré, or that which is south of the Plain of Antialo, has a mountainous character. Our information respecting these countries however is scanty, as they have only been traversed by a few travellers in haste and under unfavourable circumstances. This part of Tigré comprises the extreme western end of the river Affaru-Abba, one of the affluents of the Tảkázii. Near the source of the Tazzii the watershed between the rivers which flow north and south, and at some distance from it, probably on the watershed, are two large lakes, of which the larger is called Tazdo Bala or, the great lake of Ashangi, and is three days' journey is circuit; the smaller is called Gual Ashangi or Machath. The country surrounding these lakes and the source of the Tazzii must have a great elevation above the sea-level. Peacock and vulture are in evidence in the beginning of October, and Kaffa reports this tract densely forested, with stunted trees, and with some grass, which also occurs in Shoá, but only at an elevation of from 8000 to 10,000 feet. Both travellers complain of the cold that they experienced. The country is a complete wilderness, and there is no use of any wild beast except the fox. It suffers extremely from want of water all the year round, and produces only, at a few places, kolqual (Euphorbia caudata) and thorny acacias. The numerous hills which are dispersed over it are composed of sand. To the east of this central table-land of Abyssinia extends a mountainous country, of which we have no information. It is inhabited by the Raia or Azabo Gallas, who are described as the most savage of all the tribes of Africa. It is certainly a remnant of the ancient Cynocephali of the Yeô and have not the intercourse with them, and were unable to give the least information about them and their country to Kipaf. To the east of the mountains inhabited by the Raia lies a country called Zoló; it is said to be a fine country, well wooded, and producing grapes, olives, limes, cedars, and other fruits and trees; but, in consequence of long wars, it is now uninhabited. It is said to have remained in this state since the time of Mohammed Gragne. In the south of Zoló, a faithful Kaffa, who was sent through Zohul to attack Adal, the soldiers dropped a quantity of durrah, which has since continued to grow without cultivation. Zoló is contiguous to Adal. (Adal, P. C. S.)

The country surrounding this mountainous country may be spoken of as the Tazzii low and its affluents are represented as resembling a sea agitated by a gale, rising in numerous hills like waves, with large spaces of lower ground between them. The hills as well as the depressions are covered with sand and almost without vegetation, except some kolgal-trees and thorny acacias. For the greater part of the year it is almost destitute of water, which is only found in wells, which are dry during the summer. In these wadies there are only a few pasture-grounds and cultivated spots. Dr. Béke is of opinion that this tract is not so high as the basin of the Takkazie, which is also a mountainous country. But this has no foundation. The basin of this plain is between 6500 and 7000 feet above the sea; but as in the northern part of Tigré, Lazia is considered a very cold country, it is probably higher than the Plain of Antialo, it is certainly uninhabited, and constitutes the natural boundary between Northern and Southern Tigré.

The Takkazie is the second river in Abyssinia in size, the Abâi, or Nile, being the first. It originates near 12° N. lat. and 39° E. long., and its upper course in Abyssinia is to the north, until having received the waters of the Tassar from the east, and those of the Béllega from the west, it turns by degrees to the south-west, and then to the south, and the south-eastern portion of the basin of the Nile, and all the volcanic matter brought down by their rapid currents is thus carried to the Nile. Rippeil, who has seen the greatest part of the course of the Nile, is decidedly of opinion that to this volcanic matter mainly, if not entirely, the great fertility of the soil is to be ascribed, the deposits in its lower course during the inundations. If we consider that the countries lower down on both sides of the river have either a sandy or rocky soil of very moderate fertility, and are frequently divided by a dividing ridge which appears to be well founded. The bottom of the Takkazie is very narrow compared with the size of the river, and there is frequently no bottom at all, the rocks rising immediately from the water's edge to a considerable height, and attaining at a distance of a few miles an elevation of from 2000 to 4000 feet above the river.

The western and southern part of the table-land of Abyssinia is called Amhara, from a province of that name situated near in the middle of it. The southwestern portion of this large country bears the name of Shoá. Under the name of Amhara we shall describe the country which is divided by the Takkazie from Tigré, and extends southward on both sides of Lake Tana or Zaâ to the most southern bend of the Nile. It is divided from the last-named river by the Abar leben a great river and a line beginning on its banks at a place called Broken Bridge and terminating at the source of the most southern affluent of the Takkazie.

The Table-land of Tigré contains the highest mountain-range in Abyssinia. This range in the most eastern portion of the country is close to the banks of the river Takkazie in the province of Samen or Simien, whence it is called the Mountains of Samen or Simien. This range begins in the south with Mafi Gagra, a mountain, which runs from north to south and lies near 12° 30' N. lat. and runs nearly due north to near 13° 30', so that in length it extends about 70 miles. The most elevated summits are towards the northern extremity of the range, where the peak called Abba Yaret rises to 10,000 feet and that which bears the name of Bâbâat to 14,364 feet above the sea-level. The two high summits are only a few miles distant from one another, Abba Yaret to the east and Bâbâat to the west. Their northern declivity is usually by a ridge, over which runs a mountain-pas called Sekli. This peak is 12,696 feet above the sea-level. Between the two
summits is a deep depression, in which a river, the Mashada, which rises on the ridge of the Selki pass, runs southward. Another river runs northward, the basin of the Best, and its highest point is only about 450 feet below the summit. Rippl found, in July, the upper part of the summit, to a distance of 1500 feet below the summit, covered with snow. This portion of the range is composed of plutonic rocks, lava, and basalt columns, and the bed of the Best, and the highest portion of the range and the river Takkazie is about 30 miles in width, and is covered with mountains, which grow lower as they approach the river. The greater number of attentions and studies of the more are the plain which are composed of lava. Near the river the sandstone is nearly bare, and only here and there covered with thorn-bushes, but in ascending the steep valleys the sides of the hills are clothed with trees or fine grass, and the bottoms are either meadows or fields in which barley is cultivated and yields good crops. Agriculture is favoured by the climate, which all the year round resembles the spring in Europe, by abundance of rain in every month of the year, and by the absence of locusts, which frequently lay waste the corn-fields in other parts of Abyssinia. In the higher region the mountains, up to the parts which are covered with snow, are pasture-ground equal to the famous Alpine pastures in Switzerland, and the scenery is also very similar, except that in these regions there is almost no cultivated plant is a palm, which resembles the palm: it is called gibara (Rhynchoscopatum montanum), and its peculiar shape makes a very pleasant impression on the observer, when it stands near tracts cultivated. Here are also seen, with the leopard and hyenas, two inhabitants of the European Alps, the mountain-goat (Capra ibex) and the lammergeier (Gypaetus barbatus).

The western declivity of the mountains of Semien is less broken, and terminates about ten miles from Mount Bushat at the Plain of Entetquab, which is about 10,000 feet above the level of the sea. This plain extends for seven miles westward, where it is interrupted by the valley of Shoda, which is at least 4000 feet below its surface, and is traversed by a river called Bellega. The plain has an undulating surface, and is entirely destitute of wood, except those clumps of trees which surround every church in Abyssinia. The soil however is good, the pastures abundant, and the barley yields rich crops. The whole plain is available for some of these purposes. Rippl passed the months of July, August, and September, 1852, in Entetquab, and observed the thermometer four times every day. The results of his observations are—

<table>
<thead>
<tr>
<th>Day</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>July</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6-31</td>
<td>46°44′</td>
<td>56°23′</td>
</tr>
<tr>
<td>Aug</td>
<td>54°52′</td>
<td>58°05′</td>
</tr>
<tr>
<td>Sept. 1</td>
<td>45°05′</td>
<td>54°22′</td>
</tr>
</tbody>
</table>

The temperature of Entetquab was therefore in July and August eight degrees lower than in London, but in September only a little less than two degrees. The weather was very foggy and rainy. The wind blew in the evening and mornings, from south-west, or south-west-south, and during the day from west-south-west, or from the plains.

The small table-land of Entetquab is separated from the large table-land of Woggghera by the Vale of Shoda, which is at least 4000 feet, as already observed, lower than Entetquab. It is from three to four miles wide at the top, and more than a mile wide at the bottom. The bottom is partly swampy, and only used as pasture-ground, but on the gentle ascent much barley and some fias are cultivated. The table-land of Woggghera extends 15 miles from south to north, and nearly as much from north to south. The greater part of it is about 8500 feet above the sea-level. Near the vale of Shoda its surface presents low hills and depressions; but farther on it is almost a dead level, with a few isolated hills dispersed over it. They are all of volcanic origin and of conical shapes. The highest of them, called Waaken, has only an elevation of about 800 feet above its base. There are many watercourses, but they are deeply depressed below the general level, and in summer they are totally dried up. As the body of the table-land are of volcanic origin, the soil is rather fertile, and produces good crops of barley, which however is only cultivated in a few places. The incessant civil wars from which this country has suffered for ages has driven away the husbandman, and his place is supplied by wandering herdsmen, who go with their herds and flocks during the dry season to the low country on the lake Zana. The pasture-grounds are very good: the descent from the table-land to Gondar and the country surrounding Lake Zana is gradual, and passes through several valleys, whose declivi-
great extent from east to west. Though only about 400 feet lower than the 5th mentioned pass north of Gondar, or 5000 feet above the sea-level. Its soil is somewhat swampy, partly covered with canes more than ten feet high and partly with fine trees. Several rivulets pass through it, though the flow is the head of the small lakes. This low country is uninhabited on account of the bad air. Through want of vegetation the vapours rising from the surface, which is covered with water during the rainy season, are less damp, so that it is inhabited by persons without contracting a malignant fever. It is the haunt of numerous wild animals of the largest size. Buffaloes (Boo caffer) and elephants are met with in herds and flocks.

There are also rhinoceroses with two horns, and various species of reptiles and doer of very large size, especially Antilope defassa, Rippel.

We come now to that depression of the table-land of Ambara, the lowest part of which is occupied by Lake Zano, called also the Lake of Dembas. The surface of the lake is 6110 feet above the sea-level, and from its shores a flat country extends on all sides to the high lands which surround it at different distances from the lake. From the mountains including the plain of the Upper Teke, there are several lower ridges run westward and approach the shores of the lake: the northern, on its north-eastern bay, opposite the island of Mraxa; and the southern, north and south of the efflux of the Abdi from the lake. These two offsets separate from the plain of Dembas, the eastern, western, and southern sides of the lake. These plains derive their names from the provinces in which they are situated. The northern is called the Plain of Dembas, the eastern the Plain of Dinka, and the western the Plain of Gondar. The Plain of Dinka, which is also called the Plain of Gondar, from the capital of Amhara, which is built on hilly ground at the north-eastern extremity of the plain, extends about 20 miles from north to south, and 40 from east to west. Its surface at Gondar is 7420 feet above the sea, so that its descent is rather rapid: for in 20 miles it sinks 1300 feet lower. Near the surrounding hills are numerous low volcanic hills, mostly overgrown with bushes; and in their vicinity the soil is fertile, and part of the country is under cultivation. At a distance of three or four miles from the heights the hills disappear, and are replaced by an undulating surface, whose soil, being composed of disintegrated volcanic matter, is a black mould of great fertility, but very little of it is under cultivation. There are no trees, except round the churches. Bushes are frequent, but occur only in patches. In the dry season, from October to April, the country is almost covered with herds of cattle, which, when the rains begin, enter the forest, and the intervening plain is then nearly converted into a swamp. Even in the dry season those tracts which are near the lake are marshy, and only inhabited by fishermen. The plain is drained by many small streams, the course of which is destroyed, and the exception of the largest, named the Aby, which passed six months and a half at Gondar, and made meteorological observations four times every day. The result of these observations follows:

<table>
<thead>
<tr>
<th>Month</th>
<th>Days</th>
<th>9th.</th>
<th>15th.</th>
<th>21st.</th>
<th>28th.</th>
<th>Mean.</th>
<th>Max.</th>
<th>Min.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oct.</td>
<td>1-31</td>
<td>554</td>
<td>564</td>
<td>569</td>
<td>729</td>
<td>729</td>
<td>688</td>
<td>687</td>
</tr>
<tr>
<td>Nov.</td>
<td>1-30</td>
<td>562</td>
<td>563</td>
<td>728</td>
<td>728</td>
<td>686</td>
<td>686</td>
<td></td>
</tr>
<tr>
<td>Dec.</td>
<td>1-12-30</td>
<td>548</td>
<td>549</td>
<td>725</td>
<td>725</td>
<td>683</td>
<td>683</td>
<td></td>
</tr>
<tr>
<td>Jan.</td>
<td>1-31</td>
<td>575</td>
<td>662</td>
<td>747</td>
<td>747</td>
<td>678</td>
<td>678</td>
<td></td>
</tr>
<tr>
<td>Feb.</td>
<td>1-31</td>
<td>574</td>
<td>658</td>
<td>781</td>
<td>781</td>
<td>694</td>
<td>694</td>
<td></td>
</tr>
<tr>
<td>Mar.</td>
<td>1-31</td>
<td>599</td>
<td>696</td>
<td>786</td>
<td>786</td>
<td>791</td>
<td>791</td>
<td></td>
</tr>
<tr>
<td>April</td>
<td>1-30</td>
<td>617</td>
<td>715</td>
<td>798</td>
<td>798</td>
<td>759</td>
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It would be very interesting to compare those observations with those made at Mexico, especially as the difference of elevation is small, Mexico being 7476 feet and Gondar 7420 feet above the sea, but the difference of climate is less than seven degrees. Mexico being situated in 19° 26' and Gondar in 12° 36' N. lat. The meteorological observations however respecting Mexico, which have been published, do not hold over, but contain the months of January, February, and March, because the extreme season of climate had not been ascertained. For October it was 61° 52', for November 59° 52', for December 56° 56', and for April 57° 54'. From these data we may conclude that the temperature of Gondar is from two/thirds to two-thirds of that of Mexico, which appears to be more than could be expected from the difference in latitude. The annual quantity of rain at Gondar is very great, which is not generally the case on elevated table-lands and perhaps it is due to the circumference of the town being built in a wide depression of the table-land, and partly surrounded by heights which rise a thousand feet above its level. The annual quantity in 1770 was 35-5 inches, and in 1771 it was 41-9 inches. In January the height is nearly six inches; in February and March, in April and May there is more rain, but the rainy season properly commences in June and lasts to October. In July and August the rains are very heavy, and the height of the rain in a month sometimes attains a value in two months. In September the rains become moderate, and in October they cease, with the exception of a few short showers which fall in November and December. During the day from the morning from north-east, but it turns before nine o'clock to the east, and at noon it blows from the south-west. In the afternoon it turns to north-west, where it remains until it becomes calm after sunset.

The narrow strip of low country which lies west of Lake Zano is a part of the Plain of Dambas, and is included in the province of that name. The adjacent heights do not rise to a great elevation above the level of the lake. Their declivity is very slight, and their surface is covered with a fine soil, from which a considerable quantity of gum-arabic might be collected. At the base of these heights the country is fruitful, and a considerable portion of it is under cultivation; much durra is grown. This tract is considered one of the granaries of Gondar. In the south and west of it there is a tract of country, which is watered by the Abdi, and is covered, the whole being used as pasture-ground and meadows. The deep black soil is very favourable to vegetation, and is usually covered with high grass. Cattle are very numerous. In the north, the slopes of the low hills are covered with little terraces, which, with the exception of the great plain of Dambas, which have a sluggish current. The village of Dingelabar stands on a rock which forms the extremity of a ridge that projects from the heights on the west, and which the river runs through. In the south, there remains only a narrow place on its shores, through which the great road passes which leads from Gondar to Miecha and Gojum. The table-land which is west of the tract just now noticed is that of Kuasa and Ras-el-Feel, of which the first-named province forms the southern and Ras-el-Feel the northern part. Kuasa has never been visited by a European, but Bruce passed through Ras-el-Feel, which he describes as a fertile and level country with a rich black soil. The surrounding surface is mostly covered with marshy tracts, where the hay is cut in the spring, and spelt is grown. A grove of trees. Cattle and horses are numerous; but honey, horses, and gold, which is here found in larger quantities than in any other part of Abyssinia, are the principal articles which are sent from Ras-el-Feel to the other provinces and to Sennar.

The Plain of Bignemider, which lies on the eastern side of Lake Zano, extends from near Ethos on the north to the banks of the Abdi or Nile, nearly forty miles in length. Its width, from the low shores of the lake to the high mountains-masses which inclose the upper basin of the Takkazie on the west, is nearly thirty miles. The mountain-masses rise from the plain with a steep ascent, except where their edges are broken down by the torrents and rivers, which originate in the higher land and tumble in cascades to the lower plain. The elevation of these mountains of Bignemider is estimated by Dr. Beke at between 7000 and 8000 feet above the sea, and the last-mentioned elevation being assigned to the heights of Châmana Marigna. As the level of Lake Zano is 6110 feet above the sea, the mountains of Bignemider rise only from 1500 to 2000 feet above their bases, or rather less, as the plain has a gradual rise from the shores of the lake to the foot of the mountains. The western part of this region, called the Reb, where the plain is not so wide, consists of two tracts of different characters, a lower one skirting the shores of the lake for several miles, which in the rainy season is inundated and in the dry season covered with a sand or fine grained soil, and a more elevated part which has an undulating surface, and is covered with low bushes. No part of this district is under cultivation, but both supply pasture. On the declivity of the sandy country there are extensive orchards which produce fine grapes. From the river Reb to that of Fogata, and even farther to the south, the country is a dead level, and the soil
This consists of a fine black mould of great fertility, which is the deposit of the earthy matter brought down by the rivers Reb and Gumara. There are no springs, but good water may be found by digging to the depth of a few feet. There are also a few springs near the river-bed. Only a small portion of this fine tract is at present cultivated; but the numerous traces of the canals for irrigation show that formerly it was a corn country, which has been reduced to its present low state by the want of water. Numerous herds of cattle find pasture during the dry season, but when the rains have converted the whole into a swamp, the cattle are taken to the high land on the east. Near the banks of the rivers are extensive fields, in which lupines and vetches are cultivated. The river canals in the plains have been raised more than five feet below the level of the plain. This country is better peopled than the adjacent provinces of Abyssinia. The most southern district of the plain of Bonga, or that belt of land between the Abai (Nile), at its efflux from Lake Zana, has a very broken surface, being traversed by several ridges of rocky hills which detach themselves from Mount Chamma Manfarga, and run westward to the lake and south-westward to the Abai. These ridges are covered with fine forest-trees, and as the depressions are extensive and wide and watered and have a fertile soil, cultivation is carried on to a great extent. As in approaching the banks of the Abai the country becomes more broken and the ground rises higher; and though only five miles from the river, is at least a thousand feet above its level at the bridge which is here thrown over the Abai. The hills which skirt the banks of the river are composed of volcanic rocks, and show great fertility in the vicinity of the Abai, which is three times as wide as the Tana. The lake is covered. From the efflux of the Abai from Lake Zana to the vicinity of the cataract of Alasa, the river runs through a wide bottom which is covered with the finest grass.

The Plain of Mischka is a part of the Peninsula of the Abai. This peninsula forms a part of Amhara, but as it is naturally separated from the other divisions of the country, and constitutes by itself a well defined system, it ought to be noticed here. The river Abai extends from the lake, on the north, west, and south, and its western limits may be tolerably well defined by a line drawn from the banks of the Abai where it is joined by the Jamna to the village of Dingolbor on the shores of Lake Zana. Thus limited, the peninsula extends from east-south-east to west-north-west 150 miles, with an average width of about 100 miles, so that it covers an area of 15,000 square miles, or more than half of Ireland.

This great branch of the Nile is uniformly called by the inhabitants of Abyssinia, rises near 11° N. lat. and 37° E. long., at the foot of Mount Gish, in a swampy tract. The source of the river is 8700 feet above the sea level, and the summit of Mount Gish about 9700 feet. After running about 20 miles, or about 60 miles from the Abai descends from 8700 feet to the level of Lake Zana (6111 feet), or about 2500 feet, or more than 43 feet a mile; the current is of course extremely swift, and forms a kind of continuous cascade, as the falls are innumerable. This has been visited by Bruce, who found its perpendicular height 16 feet, and he heard of another. The Abai enters Lake Zana on the south-west side and leaves it on the south-east side. Accordingly to Bruce this lake is 56 miles broad in the widest part, from east to west, but it decreases in width towards the extremities, where it is sometimes not above 10 miles wide.

Its greatest length, according to the same authority, is 94 miles. Bruce and Rüppel, the two travellers who have had an opportunity of viewing this lake in the same shape on their maps. That on the map of Rüppel is much more regular. The number of rivers which the lake receives from all sides is very great, those which join it from the north and west are dry during a great part of the year, but that from the east contains water all the year round. The immense supply of water which the lake receives during the rains, raises its level sufficiently to lay under water the low country on its banks to the distance of two miles. There are many islands in this lake; Rüppel has laid down eighteen in his map. The greater number of them are inhabited. The largest, called Dock, is low, but of considerable size. To the east of it is the lake of the same name, which is a continuation of the one. Fish is abundant and of various kinds, most of which are of the family of the Cyprinidae, and are taken in great quantity. The hippopotamus is common in the lake, but the crocodile is not found there. The Abai river leaves Lake Zana north of its south-eastern corner, and after running south-east for about 15 miles it forms the cataract of Alasa or Tis Eset, where the river descends about 100 feet perpendicularly. Below the cataract, the river is constricted, and leaves a great flat rock, which at one place is hardly more than two yards wide. We may form a notion of the rapidity of this part of the Abai, from the fact that at the Broken Bridge, which is about 40 miles from the mouth, the current sends down in two hours more than 3852 feet above the sea. In 40 miles therefore the river has fallen 2259 feet, or about 66 feet per mile. From the Broken Bridge the current abates. North of the Mietta Ford, which is north of the place where the Abai is joined by the Abab, and which is one of the most severe on the river, the river is still 2936 feet above the sea. In this space therefore the Abai has fallen not much more than nine feet per mile. At the Mietta Ford the river begins to turn westward, and by degrees numerous gibbous spurs of the central Kilimandzaro. From forth, 60 miles lower down, the elevation of the Abai above the sea-level is 2815 feet. In 60 miles therefore it has fallen 111 feet, or not quite two feet per mile. Where the Abai leaves Abyssinia it is joined by the river Durm.

The interior of the peninsula of the Abai is traversed by a mountain-range whose general direction is from west-north-west to east-south-east. It may be called the Talha Waha mountains, though that name is properly applied only to the section of the range from the most westerly point of the Abai to the 37° 50' E. long. This range begins on the western border of Abyssinia with Mount Esbit, and runs eastward to Mount Bari, Mount Atazab, and Mount Gisch, where the sources of the Abai are. Mount Gisch, as already observed, rises to 7700 feet above the sea, and is the highest of the eastern group. Mount Lichema, which is still higher. East of Mount Lichema there is a depression in the range of a considerable extent, but then the range attains its greatest elevation, as it is supposed, for the elevation of no part has been accurately measured or in any other way. This portion is called Talha Waha. Where it begins to decrease in elevation east of 37° 50' it is crossed by the great commercial road leading across Mount Yakan. North of this the Abai descends from 7700 to 4575 feet, and is therefore no longer a mountain pass through which the road runs is about 11,000 feet above the sea-level; and Mount Geola, which is near and on the northern side of the range, is 8751 feet high. East of the mountain-pass just mentioned, the range subsides and has only a moderate elevation above the general level of the country; at the same time it changes its direction, and runs to the north-east. As it approaches the banks of the Abai it rises again to a considerable elevation in the mountain mass of Mount Yakan. A considerable portion of this range may be included in the system of the Talha Waha mountains. It does not appear that any summit of this range is always covered with snow, but the higher portion is cold from November to March. This range is in general covered with forests of large trees, but there are also a number of extensive fields or agricultural grains that are cultivated in Europe. The higher region is dotted with heaths and fenns, and the most elevated is an extensive level producing stunted grass, interspersed with numerous small river beds. One of these is the base of the Talha Waha mountains lie the Plains of Mischka and Gojam. The first extends northwards from their base to the shores of Lake Zana and the Plain of Gojam from their southern foot to the banks of the Abai. The descent towards the lake terminates at 611 feet above the sea-level, but that towards the Abai at 2815 feet, this being the elevation of the river at Melka Kuki.

The country which extends from the northern base of the Talha Waha mountains, and extends to the range of the Abai, is the district of Mischka (Maisha, Matche), from a province of that name, but this name properly applies only to the low country which extends from the Pass of Dingolbor along the south-western shore of the lake to its most-southern corner. Between these two districts is a plain of about 20 miles in extent, and which when the Abai river it is 20 miles wide, extending from the lake to the confluence of the Abai and of the Kelti. A line drawn from this point to the village of Karaguna, on the river of that name, which is about 50 miles distant, appears to indicate the low plain of Mischka from the hilly tract that lies south of it and extends to the base of the Talha Waha range. This plain is very fruitful, the soil being an alluvium composed of
the 'detritus' brought by the rivers from the higher country, but as it is entirely flat, it is not well drained; the currents of the rivers are stagnant at the close of the dry season, especially in January and February, and many pools are left by the inundations. This renders the country unhealthy; as bowels distemper and small pox are prevalent, and there is now no cultivation. Almost everything is well cultivated, and produces abundant crops of every kind of grain. A narrow tract near the lake is too swampy for cultivation, and is partly used as pasture-ground, but the greater part is covered by bushes, especially a large kind of rushes, which are for want of wood are used for the construction of small boats by which the lake is navigated. There are no trees or bushes on the plain, except near the base of the more elevated tract south of it, where there are some low stands of Johnson grass. The banks of the rivers are usually more than 25 miles in width along the banks of the Abdi to its confluence with the river Jamma. Its surface is diversified with several low and rocky ridges, between which are small plains. The courses of the rivers, which are rather rapid, show that the descent of this tract is considerable, and this prevents stagnation, and renders the country healthy. The soil is chiefly composed of decomposed volcanic matter, and is fertile. Those tracts which are not cultivated are generally covered with woods of acacia, which attain a considerable size, and those tracts which are destitute of trees and bushes are overgrown with wild oats and wild lupines. This tract contains abundance of water, and is very healthy. Between it and the mountain range of Abyssinia lie two churches, which may be owed to Lijamberra and Amidambit, rise to a great elevation, but between these and other ridges are many tracts of more level ground, which are partly cultivated notwithstanding the gullies and beds of torrents which intersect it and sink deep below the surface. The northern slope is generally gentle and the mountains are covered with berbega and acacias, and higher up are forests of different kinds of trees. The pastures on these mountains are excellent. Even in the vicinity of the source of the Abdi large quantities of barley are raised. Along the eastern bank of the Abdi is a marshy plain, several miles in length and bounded by high hills, which is partly used as pasture-ground. The eastern part of the Plain of Mileasa, or that which borders on the banks of the Abdi below its efflux from the Lake, is covered with a rich growth of melia, which has a somewhat different character. Its general level is much higher than the low part of the plain before mentioned, but it is tolerably even, except that it is furrowed by numerous deep valleys, in which the watercourses lie; towards the Abdi its descent is generally steep and difficult. The soil of the level grounds is of moderate fertility, and partly cultivated and partly used as pasture-ground.

The Plain of Gojam is surrounded by the Abdi in the form of a crescent, and the east begins at Mount Yekandach, and terminates on the west at the mouth of the river Zingini. The middle region is a table-land from 2000 to 3000 feet above the level of the river. This table-land is also a marshy plain, and the continuation of the broken country which lies between the plain and the river. Between the plain and the highest part of the Talba Waha Mountains is a mountaneous tract somewhat less than 20 miles in width. Thus the average width of the whole region is about 60 miles. The ascent from the river from the Ford of Miotta (some miles north of the mouth of the Jamma) is formed by a succession of bluffs which rise in terraces. Near the river the whole is thickly covered with jungle, and no part of it attains a considerable size; but higher up the jungle is less dense, and occasionally intermixed with cultivation. Towards the level country the ascent is more regular, the country rising with a slight and continual slope. Here the jungle alternates with grassy tracts, but even here cultivation is rare. The watercourses run in beds deeply depressed below the surface, and with great rapidity. The ascent from the south from the ford called Melka Kuki and Melka Furi is more irregular and steep. About seven or eight miles north of the ford, the river has a large and almost perpendicular wall, which in the lowest part is from 500 to 800 feet high, but in some places crowned with peaks that rise several hundred feet higher. Between this wall and the river, but nearer the river, is another terrace, whose descent is very steep. It is formed by the river, which from the higher terrace occasionally advance nearer to the river, where they appear like bills. The banks of the river are rocky and precipitous. Above the highest of the terraces is a level tract several miles in extent, which rises regularly but slowly to the north. This tract contains the large towns of Yejidjib and Yaush, and the market-town of Bado; and the country is almost entirely under tillage, except towards the north, where it approaches the last steppe or terrace, and is there used as pasture-ground. The last steppe, which is more than 20 miles from the river, is formed by a slope of moderate acclivity, and reaches an elevation of about 2000 feet. This extremity of this region is the ford called Melka Abro, and the ascent occupies only about 12 miles in width, and is more moderate as it rises gradually and is only interrupted by solitary hills. On this slope the country is cultivated, but only to a small extent. All the watercourses that traverse these ascents run in very deep beds, and the sides of the heights which border them are clothed with jungle or trees. The table-land continues across the south-eastern part of the western districts. The eastern district is the plain of Gojam and the western that of Danom. The Plain of Gojam extends westward to the banks of the river Godibe, an affluent of the Bir, and comprehends somewhat more than one-half of the table-land. Towards the mountains of Talba Waha it is almost a perfect level, through which the rivers run with a sluggish current; but while where it approaches the descent to the Abdi the rivers sink much deeper below the general level of the country, the current is quick, and at some places interrupted by rapids and cataracts. In these parts there are also a few hills on the high grounds between the watercourses. No trees are found in this plain, except the plantations round the encampments which are sometimes clothed with shrubs covered with grass, and are very little cultivated and inhabited; but where the ground is somewhat broken, cultivation is carried on to a greater extent. The Plain of Danom, between the river Godibe and the Zingini, rises and sinks alternately with the surrounding ridge on which it is situated. This is a perfect level, overgrown with gigantic grass: as we approach the descent to the Abdi, it exhibits some signs of cultivation. In some places the grassy plain is interspersed with swamps. It is stated that this part of the plain could be cultivated with advantage, but for the frequent inroads of the Galla tribes which inhabit the southern banks of the Abdi.

The country which extends from the bank of the Zingini to the western boundary of Abyssinia, may be called the Volcanic Region of Abyssinia. The name derives from the fact, that it is connected by continuous chains of volcanic rocks and extinct volcanos. The name is also derived from a nation, the Agos, who differ from the other inhabitants of the country. The river Zingini runs in a bed of volcanic rocks, and the adjacent country exhibits unconvoluted signs of volcanic action. The surface is generally formed by the disintegration of volcanic rocks, which in some places protrude through it. The surface is much broken. Such is the country between the river Zingini and a continuous ridge of high hills which, on the north, is connected with the western and lower continuation of the Talba Waha Mountains at Mount Barf, and thence runs in a south-west direction towards the banks of the Abdi. This ridge consists of a mass of volcanic cones or high-pointed domes; the Peak Fut, which stands nearly in the middle of them, rises to a considerable elevation above its base. From the west of this elevated mass several lower ridges run off to the westward to the distance of several miles, when they terminate with bluffs in the adjacent plain. This tract has a heavy argillaceous soil, which is cultivated, and by means of irrigation yields abundant crops. In some places the volcanic rocks peep through the soil. The plain, which extends farther westward, is of indifferent quality, and chiefly covered with brushwood, with here and there some patches of open grassland, which originate at the foot of the volcanic ridge run westward and fall into the Durra, an affluent of the Abdi, which constitutes the boundary-line between Abyssinia and the country of the Shangallas, a tribe of negroes. Where this volcanic ridge approaches to the Talba Waha Mountains it is less fertile, though there are some fine plains between the high hills and mountains, which are largely cultivated, and covered with numerous villages: there are other tracts which are only used as pasture-ground, but they are covered with excellent grass, and filled with herds of cattle.
Dr. Besse, who in 1841 and 1842 passed a whole year in the region, gives an account of the seasons. The rains are more heavy and continual in the peninsula of the Abdi than in the Plain of Gondar. It was only during the month of January that no rain fell. In February slight rains only were experienced on ten days, and in March on nine days. In April the weather became more regular, and the rainy season commenced in June. Rain fell more or less every day, with the exception of five days, and continued through July and August. On the 11th of July the Abdi had risen so much as to be no longer passable. The rains continued to be heavy till the 19th of September, and then began to decline, this being the end of night and sometimes in the day. Heavy rains were experienced up to the 7th of October, when for the first time none fell. It was stated that the rainy season had commenced sooner and continued longer than usual. So, notwithstanding this duration of the rain, the rivers had fallen considerably, and in the middle of September the Abdi was crossed by the Gallas, who brought cloth and cotton to Basso market. The rain fell for several days in October, but in November it fell only on six days, and slightly. In the beginning of December only showers were experienced, but after the middle of that month heavy rains fell on several days.

4. Shoa, as a political division, extends only over the southern part of Abyssinia. It is bounded on the north by the tributary of the Hawash, which divides it from the independent Galla tribes, to the Berko, which falls into the Hawash (near 12° N. lat.), and the Wanchet, an affluent of the Jamma, which joins the Abdi near the town of Takkazie. To the south it is bordered by the Takkazie and the central table-land of Wolfa, though they are in possession of independent tribes. The Jamma is the largest tributary which the Abdi receives on the table-land of Abyssinia. It drains a great extent of country, which extends to the eastern edge of the table-land, and brings a great volume of water to the Abdi. Where it falls into this river its surface is less than 3000 feet above the sea-level. From this place the country descends to the south to the extent that it attains an elevation of between 5000 and 10,000 feet above the sea. On the south the table-land slopes gradually down to the wide plain, which is drained by the Hawash river. But on the east, at the upper branches of the Jamma, it descends with a steep declivity, similar to that with which the table-land of Tigre terminates towards the Red Sea at the back of the harbour of Massawa and Annesley Bay.

The valley of the Jamma appears to be enclosed on the north as well as on the south by high mountains, which rise from 4000 to 5000 feet above its level. These heights however are only the bluffs with which the table-land of Shoa terminates on both sides. The ascent is steep, but there is uncommonly little difference between them. These two terraces on the southern side of the river has a slight slope towards the river, and is generally fertile, and studded with numerous villages which contain a considerable population. The number of rivers which join the Jamma from the south is very great. Though their course towards the interior of the table-land is not rapid, they run with great velocity as they approach its northern edge, and most of them fall precipitously several hundred feet into a ravine, in which they continue to flow till they reach the sea. Thus the rivers are cut by narrow valleys into a great number of comparatively narrow ridges, which give it the appearance of a very mountainous country. This is particularly the case in the western district, where the extent of the villages and of agriculture is not diminished by the account of the Abdi, where the affluents join the principal river at right angles. Towards the eastern edge of the table-land they run nearly parallel to one another, and here the ridges between the valleys are more extensive, at least when compared with the sides of the narrower rivers. These ridges are generally level at the top, except towards their termination between the two rivers, where they approach their junction, and in these parts they gradually grow lower. Though the soil is chiefly rocky, it is of good quality, and produces pulao, tobacco, cotton, maize, and other grains. There are trees about the numerous villages. There are other tracts which are without villages or trees, but they supply pasture to numerous herds of cattle, except towards the west, where the country is overgrown with jungle; some tracts produce only shews and stunted acacias. The steep sides of the valleys are usually covered with jungle, and the banks of the Jamma the table-land takes that form which is expressed by this term. There are a few hills dispersed over it, but in general it stretches away to the water-bed between the Hawash and the Jamma either in a level plain or with an insignificant declivity, which is intersected by several isolated high hills and short ridges again make their appearance, but they do not rise to a great elevation, except the Garra Gorpha ridge and Mount Fintini. But towards the country on the south and south-east the table-land of the Jamma the country is more broken. The greater part of the eastern district of the table-land is destitute of trees and bushes. Some tracts are partly cultivated and partly used as pasture-ground, but others are entirely left to the herds and tribes to graze on. There are several large tribes which have strongholds or enclosures in the table-lands, which are surrounded by their own tracts of land.

The river itself has a length of 2200 miles, and is generally about 30 feet across. It ascends the Drava to the source, and then descends to the river of the same name, which it joins near the town of Takkazie. It then descends towards the sea, and in the course of the year it is fed by the rains, which fall in July and August, and from the rains the country is well watered, and the rivers flow all the year round. These districts are covered alternately with forests of high trees and by grassy plains without bushes. In approaching the sources of the Hawash the whole country is almost one forest, the haunt of elephants and buffaloes.

Our information respecting the southern declivity of the table-land of Southern Shoa is very scanty. But it is known that near the watershed between the Jamma and the Hawash rivers it descends with a gentle slope resembling a slightly rounded hill, with the usual declivity of between 800 and 1000 feet, and the streams in these parts are generally fed by rains only. These rivers descend steeply and furiously till they meet the Hawash stream. But the banks of the Hawash a steep descent may exist, when it is considered that the river at Melka Kuya, where it is traversed by the caravans and mountains, is about 2000 feet above the sea-level, and the current to the sea, and possibly even to 5000 to 6000 feet below that point, or one westward. There are a few high hills or mountains dispersed over the coast, which in the most elevated are Mount Enloto, Mount Sekuia, and Mount Ferrer. Considerable tracts are well cultivated and cultivated with villages, but more detailed information is still wanting, as this part of the table-land has hardly been seen by Europeans. We do not even know if the mountains which extend southward from Ankobar into the province of Bulga constitute only the edge of the table-land, or are a range which on both shores, or one westward, is bounded by a low country along its base. The course of the rivers favour the first supposition.

The eastern edge of the table-land of Shoa, from the town of Ankobar northward to the coast, is about 45 miles wide; it rises with a steep ascent from the low country west of the Hawash river, which is only about 2000 feet above the sea-level, to an elevation of from 8000 to 9000 feet. The ascent is so steep that a happy man must climb ten miles in width; to the west of it the country continues for a considerable distance at the same elevation. The town of Angollala, which is several miles from the edge, is 8564 feet above the sea-level, and surrounded by a plain intersected by several streams. The town of Melka Kuya and Ankobar, which on the straight line is about 30 miles. In the first ten miles from the river the country contains several plains of moderate extent, divided from one another by low hills; the level tracts are generally destitute of grass and water, and the higher parts clothed with jungle, in which sheep and goats find pasture. At Atkonti the country begins to rise, but in the next ten miles it hardly attains an elevation of more than 3000 feet above the sea. These tracts are thickly wooded, and between the two towns the savanna also completely covers the ground. The lower tracts between the hills are cultivated to a small extent. In the last ten miles the country rises to more than 9000 feet above the sea, the town of Ankobar is 400 feet above it; or about 700 feet higher than the city of Mexico, which is 7468 feet above the sea; but Ankobar is on the declivity, and the table-land is 400 feet above it. This steeper part of the ascent consists of a succession of hills and steep hills, which in the dry season are covered with snow. The soil must be rich considering the vigorous vegetation which it shows. The villages are small, but numerous; they consist of a few houses, which have a circular form, with a coral roof, and are produced with little difficulty.

In proceeding northward along the ascent, it preserves the same features, except that from time to time a valley is met with of moderate width, and of superior fertility to the adjacent tracts. There are also extensive tracts which are more wastes; they are generally more level than the other parts of
The ascent, and covered with bushes and herbaceous plants or woods of acacia; in some places there are forests of acacias, kokoulos, and euphorbias. Where these level tracts are at a considerable elevation, or where the soil is stony, in the ascent, they suffer from want of water; and where they are much lower, they are intersected by numerous water-courses and interspersed with swamp. The edge of the table-land is stony and cobbled. It lies almost flat, the depressions the ground is swampy or springy, and here are the sources of the rivers which descend to the east and west. In many places this edge is much higher than the town of Ankobar. It is preceded by the difference in the degree of vegetation, and by the vegetation itself. The southern end of the table-land, opposite to the rock of Massia, consists only of fire, heath, and fern. Some high mountains rise above the ascent, among which Mount Emnuren, a few miles north-north-east of Ankobar, rises to a considerable elevation, but probably not above the general mean level of the table-land, which is about 11,000 feet above the sea-level.

It is not known how far this steep ascent of the table-land continues to the north. It certainly extends from Ankobar to Kok Fare, a distance of about 50 miles, and probably to Antiockia. 35 miles farther, but in the parallel of Lake Haik (10° 22' N. lat.) it appears that the country lowers on both sides of the watershed by a long and gentle slope. Krapf, who passed over this country, does not speak of any difficulties encountered. The watershed lies on the table-land, and that the descent from it is at a considerable distance from it farther to the east; for Krapf expressly states that the climate grew much warmer as he proceeded northward. But he found that several lofty isolated mountains were observed on or near the watershed, among which Mount Sakio rises above the rest.

The country which lies contiguous to the steep ascent of the table-land (from 9° 30' to 11° N. lat.) on the west continues for a short distance to preserve the elevation of the edge, and then slopes gently to the west. The surface is generally level, forming plains interspersed with small hills or short low ridges; these plains however rise in elevation as they proceed northward, and as they approach Antiockia their surface is rather hilly than undulating. The most remarkable feature of this Northern table-land of Shoa is the deep depressions in which the rivers run; for a distance of several miles from the watershed they run in deep valleys, but farther on they fall down in cataracts several hundred feet high into deep basins, and below these basins they continue to flow between steeper and loftier banks; the descent to them is frequently 500 or even 1000 feet. The valley through which the Kachena, an affluent of the Wanchit, runs, is 3000 feet below the upper edge of its banks and the general level of the country, according to the estimate of Krapf. How far this peculiarity of the river-valleys continues westward is not known, although the country to the banks of the Abdi river, which is about 80 miles above the town of Abdi, has never been visited by any European; but as the country near the banks of the Abdi is also several thousand feet above its bed, it is probable that these deep valleys continue through the whole extent of it. Its surface is in the main very well wooded; but the table-lands between them are destitute of trees and bushes, and are only used as pasture-ground, though they have a deep black soil of great fertility, which is proved by the abundant crops which are obtained from the fields at the base and on the declivities of the small hills which occur everywhere, and in some places in considerable numbers. The grains and pulse which are principally cultivated are wheat, barley, pea, and hogs' beans. Cotton, maize, and rice are also grown. The water is very scarce, being in the main supplied by a few springs and shallow wells, which prove the great elevation of this part of the table-land. No domestic animals are so well suited to this country as a kind of black sheep, of which there are numerous flocks.

North of 11° N. lat. the table-land, as already observed, slopes down to the east and west. The scanty information which we possess about this country is not sufficient to give us a general idea of its character. It was traversed by Krapf in the early part of May, who states that the whole country informs us that several high mountains rise on the watershed, but where he crossed it there were two valleys separated at their upper extremities by a ridge of no great elevation. The western valley, called Tobola, from a celebrated market-place there, is intersected by the river Gheredo, an affluent of the Bashi, and on both sides enclosed by a range of hills partly covered with juniper-trees. On these hills there are many hamlets and villages. The valley is wide and well cul-
the greater part of their course in valleys many hundred and even thousand feet below the general level of the country: others are not much depressed in the interior of the high parts of the country, and in the middle of some large rivers they begin to sink deeper: and where they leave it their level is many hundred feet below the contiguous plains. It is probable, from the formation of the valleys, that the waters themselves have scooped out these deep and narrow depressions. We find in other and smaller valleys of the plains the same phenomenon in their quick rise and fall. After a heavy fall of rain the Tatkazie rises five feet in one hour; and when the rains continue, it rises to 20 feet above its common level. But in one or two days the water has run off, and the river fallen to its common level. In June, 1849, the Abdi suddenly rose three feet, in consequence of a violent storm which had happened the previous night; but the following day it fell again to its level. When travellers come to a large river, and find that it has risen so as to be unfearable, they are sometimes puzzled by this circumstance, and are afraid to wait twenty-four hours, or a little longer, when it becomes again fordable. The Abdi is passed at two places by bridges, but there are no other bridges in the country.

The Abyssinian climate varies between the tropics, its productions rather resemble those of the temperate zone, to which its climate, with the exception of the rainy season, bears a great resemblance, on account of the elevation above the sea-level. This is especially the case with the vegetable products. None of the grains of India are found here, with the exception of the negu (Sesamum orientale), a small grain which resembles the raggy of the table-land of Dekkan; but it is scarce. The other grains are wheat and barley, the latter grown most extensively, as it is the only corn given to horses and mules: oats are not cultivated, though large tracts in the Plain of Miécha are covered with wild oats. Indian-corn is grown in many places, especially on the lower parts of the table-land, as in the Plain of Gondar and in the country of the Yejoos; and in some places derrha (Holcus sorghum) and tobutsu, a kind of Eleusine. From this grain two crops are annually obtained as a general rule, especially where the fields can be irrigated. The leguminous vegetables which are most extensively grown are the French beans, the broad and the black leopards, and the skin of which fetches a high price in the country, and is worn by the governors of provinces. There are also lycias, liones, cats, leopard-cats, and the wild cats. There are also hyenas (Herpestes), a species of small cats, and the sable, a species of fox on the table-land of Wofla, and the jacks.

The larger quadrupeds are only found in the wildernesses which lie along the northern and southern boundary of the country. Elephants and buffaloes are very numerous; the two-horned rhinoceros is not so common; and giraffes appear only along the northern border. Shelducks and white pelicans are very numerous on the lakes. There is only one species of antelopes, among which the most abundant is the antelope saltana, the smallest of the horned animals, not larger than an English hare, and the Antilope Summerringii. Two species of hares and several kinds of small animals are common in some of the woods. There are various kinds of quadrupeds, as Cynocephalus baphusus, the Cynocephalus boni, and the Conus Ducoen, Rippet. Of smaller animals there are porcupines, rock-rabbits, ground-squirrels, and weasels, polecats, and beavers.

Fowls are generally kept. There are several species of eagles, the Gypaetus barbatus, and also several kinds of vultures. On the high mountains of Semien are Alpine ravens (Pyrrhocorax graculus). Rippet unites three kinds of parrots, Picaeetus Levallianti, P. Taranta, and P. Meyeri. In Tigré there are herons and hawks. The Egyptian goose and a species of duck, with several other kinds of water-fowl, frequent the swamps and lakes. Guinean-fowls, red-legged partridges, and pheasants are seen in many places, and are raised in the country; among the latter is the Colubma Abyssinica, whose beautiful yellow colour shades off into purple. There is also a beautiful species of muselaps. Horses are reared in the large rivers, where many are killed annually for their flesh and hides. Crocodiles are probably not found in the waters of Abyssinia. Bees are so common that honey is very abundant, and this prevents the importation of sugar. Locusts frequently lay waste the fields, and they are most frequently seen on the table-land of Tigré; other parts of the country do not seem to suffer much from them.

Abyssinia is poor in minerals. Gold has occasionally been found. There is a crop of a grain called woss (Dactyliosperma), which is worked, and appears to be of good quality. The great salt plain which lies between the Red Sea and the table-land of Tigré belongs partly to the sovereignity of Tigré, and immense quantities of rock-salt are annually taken from it and imported to all parts of the country, as it is not only used for culinary purposes, but also as currency. (Adal, F. C. S.) Large quantities of salt, taken from the salt lake Assal, are annually imported from Shoa, as salt is not found on the table-land. Sulphur is worked at Assir (Pop. and Inhabitants.)—Rippet estimates the area of Abyssinia, exclusive of the countries which form the kingdom of Shoa, at about 270,000 square miles, or more than double the area of the British Islands, and assigns to Tigré half a million of inhabitants. The population of this country, however, extends far beyond the Wollo Ghallas and the Yejoos, a million of inhabitants. But this estimate is certainly underrated. He had not an opportunity of seeing the best cultivated and most populous part of Tigré, the Plain of Antelo, nor the most densely peopled portion of Amhara, namely, the peninsula which is surrounded by the Abdi. Looking at the accounts of Dr. Beke, who traversed the last-named country repeatedly and in almost every direction, one would suppose that this part of Amhara alone must contain at least a million of inhabitants. The countries which at present constitute the kingdom of Shoa have an area of about 12,000 square miles. They are tolerably well peopled, owing to the peaceful state in which they live, and a well governed country. They are neither more nor less than those of Europeans, their eyes are lively, their teeth well set, and their black hair is either smooth or slightly curled. They are of a middling stature. They inhabit almost exclusively the high table-land, and are to be found in Amhara, Tigre, and in the south of the western districts of Shoa. The Fali, Jews, Christians, and Agows belong to this race, notwithstanding the different dialects which they speak. An-
other race is found mingled with them: it is more closely allied to the inhabitants of the interior of Afrixa, and is distinguished by a somewhat curved but not pointed nose, thick lips, and lengthened eyes, which are not lively, and by black but curly, and somewhat lost as a whole body. 

They are most numerous in the northern districts of Tigré, especially in Hamazien and the adjacent countries. The third race are the Gallas. Their face is round, their nose straight and short, but not pointed, and divided from the mouth by a deep furrow. Their eyes are very thick, but do not resemble those of the negroes. They have small eyes, which are very lively, but deeply set in the sockets, and their body is rather stout and large. These Gallas constitute the greatest part of the two eight population of Shoah, and the countries west of the Lake Zana and the river Abdi; they are also numerous in the armies of the other divisions of the country. There are no negroes in Abyssinia, except the slaves which are brought from the countries of the Shanggall, who inhabit the border countries to the west of the peninsula of the Abdi. These negroes are the only blacks in the country. The colour of the other inhabitants varies from the darkest black-brown to the clearest light brown, and does not appear to be peculiar to any of the races.

The Abyssinians have a dead language, the Geez or Ethio-
pian language. [ETHIOPIAN LANGUAGES, F.C.] The spoken languages are derived from it, and constitute, as it appears, four dialects, namely, the languages of Amhara, Tigré, Shoah, and Galla. All are written in a alphabet called Amharic, and differ considerably from one another; but the people understand one another and do not need an interpreter. The language of Gondar is considered to be the purest; it is also more rapidly different, and is spoken by the northern Gallas, who inhabit the elevated region which extends from the river Wasshilt, an affluent of the Jamma, on the south, to the Bashele river and farther on the north, and by the southern Gallas, who live on the highest part of the southern table-land of Shoah and other plains contiguous to the Hawsh river. There are also three other languages spoken in Abyssinia, which however are limited to a small number of people. There are two tribes called Falasha and by the Gomant, two tribes inhabiting the Semien mountains and the hilly country west of the table-land of Shoah, and the plains contiguous from the Amhara and Galla languages, according to the statement of Bünjel. He adds to these languages that of the Shanggall Takkaze, who inhabit the wilderness north of Shiré and Waldaqba, and who according to his statement are not the proper language by which is spoken the second race noticed above. But the Shanggalls, who live along the western border of Agoumarid, are true negroes, and speak a different language.

The Abyssinians are Christians, but their tenets differ materially from those of the Roman and Greek churches, so that their religion must be set down as the fourth great section of the Christian community. They are called Coptic Christians, and the heads of their churches, named Abuna, are ordained and set out by the archbishop of Alexandria. Respecting their rites and manners see P.C. vol. i. p. 57 and 58.

A great number of the Gallas, as well along the Wollo as among the southern tribes as far as they are subject to the king of Abdi, are called Wawi, and it appears that in part of Abyssinia there are many Mohammedians. They are numerous among the Yipioos and Wollo Gallas, and their number is on the increase. The Falasah in the Semien Mountains live in the Simen Dors, of which the Simen Mountains and the Simen table-land of Woggabores are a set of hewre, who have adopted a few ceremonies of the Christian community. Many Falasahs are settled at Gondar, where they inhabit a separate quarter of the town called Falashabad. The Gallas who inhabit the banks of the Hawsh are called heiminths, and almost all the Shanggalls. On the shores of Lake Zana live the Waits, who are considered heiminths, but they conform to most of the rites of the Abyssinian Church, except that they do not observe the fast of the Shanggalls, which amount to 129 days in the year, and some other observances of that community.

Political State and Towns.—For more than a century

Abyswinia has been in a state bordering on anarchy. An emperor, or as he is called a Negus, is the sovereign of the whole country, but his authority is only nominal, and his revenues consist of an annual pension of three hundred dollars, and the proceeds of a share of the trade of the market of Gondar. The governors of the provinces usurped his authority in their respective districts and transmitted it to their children. They are almost continually in a state of war with one another, and the stronger expels his predecessor and gets the chief of his rival, who are most in favour with him. The governor in possession of the town of Gondar creates the emperor. How rapid the political changes are, appears from the fact, that a few years ago the town of Falashabad, on which the capital had been transferred, was given to the village of Abdi, and some for only a few weeks or months. The country and population suffer greatly by these wars, to which is owing the destitute state of the greatest part of the country, but especially those parts of Amhara which lie north of Lake Zana, and are usually the theatre of protracted wars.

Under such circumstances it would be useless to attempt to give any account of the political divisions of the country. What was true three or four years ago, is probably not true now. It will also be conceived, that there is hardly a place which deserves to be called a town in our signification of the word. The manufacturing industry is too small to collect a number of individuals in one place, and each usurper chooses a new residence, according to his political views or his business interests. When the dominion of a chief, it acquires importance, but its ruin begins with his death. Thus the town of Antalo in Tigré, under the wire and energetic government of Ras Wellel Selassa, had so many inhabitants, that it was called Falashabad. But it had a population of 8000 inhabitants, but since his death (1810) it has fallen to decay; even Adowa, though a commercial place, is going to ruin. The town of Gondar alone still retains some importance, though it has greatly declined from its condition when the emperors had not yet lost their authority. The most important town in the Peninsula of the Abdi is Burie, the capital of Damot, but as the governor of the province has lately transferred his residence to Gonder, it probably so loses some of its greatness. Other towns of Abyssinia. The towns of Yawash and Yebuji, also in the Peninsula of the Abdi, appear to be considerable places. They are inhabited by merchants, who have acquired some wealth by their business in the neighbouring market-place of Bado.

The kingdom of Shoah forms an exception. Though this state is of modern date, its internal organization appears to have acquired a considerable degree of stability. It has also acquired a powerful authority, and it is able to maintain a numerous and powerful body of slaves, and of their chiefs, and enables it to keep them in check. The authority of the king of Shoah extends over the country north of the Hawsh from its source to its junction with the river Kassam (40° E. long.). From the last-mentioned place the boundary extends, being the western boundary of the empire, to 16 miles from the ascent of the table-land, until it reaches the river Berkona, an affluent of the Hawsh. The Berkona runs along the northern boundary on the east of the table-land. On the table-land itself the boundary is formed by the river Wast, an affluent of the Wasshilt, by the last-mentioned river and its recipient the Jamma. The western border runs along a line drawn from the point where the Jamma falls into the Abdi on the south of the Hawsh. Among the Galla tribes who inhabit the plains along the banks of the Hawsh, and who reside the western boundary, the authority of the king of Shoah has not yet been firmly established, but the other parts of the country are completely subject to his power.

The capital of Shoah is Ankobor. It is situated on the ascent of the table-land, not far from its upper edge, and 8198 feet above the sea-level. This town is built on two wooded hills, which are nearly north and south, the upper poles connected by branches of trees, like palisades, and on the summit is the king’s residence, built of stone, with a thatched roof and numerous outbuildings. The southern hill is cumbered with houses, chiefly of wood with thatched roofs, and they are generally surrounded by a gason, and wind round the cone in a spiral form. The population may amount to between 8000 and 10,000, exclusive of the king’s household, which consists of more than 1000 persons. The climate of this place is compared with a fine spring or autumn in England; the thermometer during August and September never rises above 63° or falls below 45°.
Manufactures.—When it is considered that the elevated table-land of Abyssinia is very difficult of access from the sea-side, and that therefore the intercourse between its inhabitants and foreigners has been very great, we must admit that they have made considerable progress in manufactures. They do not indeed excel in the fabrication of any article, as they have had no instruction from other nations, to which circumstance the manufactures of Europe in a great part owe their perfection. The best articles, or finished skins, and razors are only made at Gondar and at Kirata, a town situated on the eastern shore of Lake Zana, which contains 5000 inhabitants, and is used by the clergy, which circumstance profited it effectually against the evils of war. At Gondar there are guns made, but only by some Greeks, not by the natives. Large quantities of coarse cotton-cloth are made in several parts of the country by women, especially by the Falasabas, and a finer kind with a red or blue border for the more wealthy classes of society. The silk manufactures are limited to some embroidery, made by Mohammedans and worn by their women, and to blue strings, which are worn on the heads of all Christians, a mark of distinction from Mohammedans or heathens. Only a coarse stuff is made from the wool and hair of the black sheep and goats, which is also employed in making a kind of counterpanes. Coarse black pottery is made in every part of the country. Printing has been introduced into Abyssinia, and many scripts of manuscripts forms a distinct branch of manufacturing industry. Rüppel states that they have brought it to considerable perfection. Their handwriting is very fine. They use a kind of pen, and always copy on parchment. These manuscripts are embellished with pictures, which at present are indifferent; but Rüppel saw some which were made eighty years ago, which were much superior. He praises also the tasteful manner in which the binding of these manuscripts is executed.

Commerce.—As Abyssinia does not border on the sea, but is separated from it by the countries of the Danakil and Adal, it has no immediate intercourse with sea-faring nations, but its products are carried either to Massawa (15° 40' N. lat.) on the Red Sea or to Tajurnah (11° 50' N. lat.) built on an inlet of the Gulf of Aden. Massawa is about forty miles from the eastern boundary of Abyssinia, and through this place the maritime commerce between Tigre and Amhara and other nations is carried on. It is accordingly the harbour of these two great divisions of the country. Tajurnah is more than 200 miles from the nearest boundary-line of Shoa, and 372 miles from Kishwar, by the caravan road. The kingdom of Shoa has the shortest and the cheapest road. The unsettled state of the country obliges them to travel in caravans, and they always keep to the same routes. Gondar may be considered as the centre of this commerce, and with the exception of ivory and slaves it has long been engaged in this trade. Two caravans-roads lead from Gondar to Massawa. One traverses the table-land of Weggbera, and the pass of Lulambon crosses the Takkazie in Shiré, and continues through Axum and Adowa to the desert of the table-land. The other, having traversed Wasseha, turns eastward and passes over the Semien mountains by the Selki pass. It crosses the Takkazie at Ber Agow, and continues to Adowa, where it falls into the road before mentioned. Two caravan-roads from Gondar to Babo, which runs along the eastern shores of Lake Zana, crosses the Abá at the bridge which is below the cataract of Alá, traverses the plain of Miecha and the western portion of the Talla Walle range, passes through Dimebha in Danaza, and thence continues to Béa. The other more northerly, which goes through the commercial town of Dérita, which has not yet been visited by Europeans, and the market-place of Bada, whence it continues over the broken Bridge on the Abá to Mota and then to Pasaba. From these several others which by the interior commerce is carried on. There are a certain number of Austrian dollars circulating in Abyssinia. Rüppel thinks that they do not amount to a hundred thousand. The Abyssinians carry casks of pieces of coffee, weighing between 19 and 20 ounces. They are taken from the great salt plain, which properly lies in Adár, but partly belongs to Tigré (Adal, P. C. S.), and are carried by the merchants of Antidó to Sóctoa in Wæg, whence they find raw cotton and pepper, blue red and cotton-cloth, the threads of which are unrevelled and woven into the borders of the cloths of native manufacture, raw silk dyed blue, white camels, and some quantities of carded wool and common Turkish carpets. From Béa are imported bottles of a peculiar shape, of which large numbers are used in Abyssinia, and a large quantity of Persian tobacco.

The Abyssinia manufacturers have probably consumed there, but some of them find their way into the interior of Africa to supply countries and nations with whose names we are hardly acquainted. They are exchanged for the products of these countries. Béa is a market-place (a town) situated in Gojan, 15 or 18 miles from the most southern bend of the Abá river and a few miles from the towns of Yejñibi and Yauh, where many merchants reside. Dr. Beke has given some account of this trade. The market is held weekly during the harvest season, from April to October, during the other four months the river cannot be forded. The merchants bring from the southern countries slaves, ivory, coffee, civet, gold, cloth, iron, and cattle. While Dr. Beke does not mention the spice called "khito," which Rüppel enumerates among the articles of export from Massawa: Rüppel states that it is imported from Enarea. On comparing the imports from these southern countries with the export trade of Abyssinia, it is evident that most of the exported articles and also most of the imported are not of Abyssinian growth, and that this country produces very few articles for foreign commerce. Nearly all the merchants who come from these countries are engaged in slaves. Lord Valentia and Rüppel have given some account of the trade of Massawa. Rüppel stayed there nearly eight months, and got the following information about the exports:

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<th>Articles</th>
<th>Value Asat. doll.</th>
<th>2000 slaves of both sexes</th>
<th>180,000 or 24,000</th>
<th>150 hens or musk or civet, at 30 ounces, 2 dollars per ounce</th>
<th>300 pieces elephants' teeth of different sizes, at 20 dollars each</th>
<th>700 hundredweights of wax, at 20 dol.</th>
<th>100 hundredweights of coffee, from Enarea and Kaffa, at 10 dol.</th>
<th>Tunned leather and skins, to count 1,000 or 200</th>
<th>2000 hundredweights of butter, at 8 dol.</th>
<th>Hair, wool, other kinds of grain, at 1,000 or 200</th>
<th>Gold, about 2000 ounces, at 20 dol.</th>
<th>40,000 or 5,000</th>
<th>Kafi, a spice which grows only in Enarea, and which goes in considerable quantities to India</th>
<th>1,000 or 200</th>
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All articles imported into Massawa go to Abyssinia, with the exception of a large quantity of rice from India, d’bours (Holcus sorghum) from Yemen, and dates from Béa, which are consumed in the town. The articles sent to Abyssinia are...
their way to the southern provinces of Abyssinia. These pieces of rock-salt are called zemole.

**History.**—There is a tradition in Abyssinia, generally credited, that one Lihime, a king of the country, in the 27th century before the Christian era, was converted to the Jewish faith, and that the founder of the first dynasty of their kings was Menilek, a son of Solomon and a queen of Saba. The Abyssinian tradition seems to be based on the fact that, at one time, the Emperor Constantine by some missionaries sent from Alexandria. At that time the capital of Axum was the seat of the empire, and most of the antiquities which still exist at that place must be ascribed to that period. The power of the empire seems to have been fast declining, and they got possession of the low country which divides the table-land from the Red Sea, and at present forms the country of Adal. In the sixth century they had so increased their power that they were able to send an army to Arabia and to conquer a part of Yemen. This was the period of the greatest political power of Abyssinia. Seventy years afterwards the Abyssinians were deprived of Yemen, probably by the Arabs, whom Mohammed had inspired with the zeal of propagating his doctrines, and who soon attacked Abyssinia itself, and though they did not succeed in conquering it, they took possession of Adal, and converted it into their own possession. They then retired for many years and doubtless crept into the internal affairs of the empire, for in the year 925 a Jewess, called Sague, overthrew the reigning dynasty and destroyed Axum. The descendants of the royal family fled to Sho. For more than three centuries that country remained a distracted state, until the Emperor Iqon Amlaq recovered the whole kingdom, about 1255, aided by the abilities of an ecclesiastic named Tecla Haimanot. In the following three centuries the power of her principal phases, of an improving state, and even to have acquired a part of its former power, as in the thirteenth century it is said to have again possessed the southern part of Adal, which however it lost soon afterwards. Towards the end of the fifteenth century Pedro Covimenes, an agent of the court of Lisbon, visited the country, and this circumstance saved the empire from destruction; for in the beginning of the sixteenth century, or perhaps even earlier, a salam of Hurur, or Adal, had, like Gengis Khan, succeeded in gathering under his banners the nomadic tribes of Dankali and the Gallas, and made frequent incursions into Abyssinia. The emperor sent an ambassador to Lisbon to get aid from the king of Portugal, at the same time promising unqualified submission to the pope. Four hundred soldiers, a considerable supply of arms, and some gold were sent to aid, but the emperor and the ecclesiastics opposed this innovation. For some time the matter was managed with prudence, but the ill-timed zeal of some Roman Catholic missionaries brought about a crisis: the people rose in rebellion, and the empire was transferred from Sho to Gonder. The mission of the Portuguese ecclesiastics however appears to have laid the foundation of that unsettled state of the country into which Abyssinia has sunk, and the intervals of its recovery are but the phases of a country which we have already noticed. It has been stated that after the defeat and the death of Granie, the southern provinces were not recovered; but it seems that in the eighteenth century, Ayine, and the region south of it, formed a possession of the Emperor of Ethiopia. All the most interesting and most ancient sites, such as the table-land, are in the elevated regions that border on the steep ascent from the table-land, and that these chiefs considered themselves dependent on the emperors. One of them, however, called Negosa, obtaining authority, and became the founder of the kingdom of Sho. It was not till the fourteenth century that it is stated the country had not yet had time to acquaint us with the history of its dynasty. Kraef however states that the present sovereign is the seventh king from Negasi. It would therefore appear that Nagasi lived at the end of the seventeenth or the beginning of the eighteenth century. His successors began to enlarge their territories; and the second of them took the name of Kraef, and expanded his dominions by a little more than a hundred years, and they have extended their authority over a country covering at least 12,000 square miles, and the order which they have introduced into the administration and the army, and the spirit of enterprise and energy which have been shown in their wars with the neighbouring Galla tribes.

(Bruce, Travels to discover the Source of the Nile; Lord Valentia, Voyages and Travels to India, Ceylon, the Red Sea, Abyssinia, and Egypt; Salt, Voyage to Abyssinia and its Provinces, and to the Red Sea, etc.; Arends and Adventures, by Hall; Bobat, Journal of a Three Years Residence in Abyssinia; Réppel, Reise in Abyssinien; Izenberg and Kraef, Journals, detailing their proceedings in the Kingdom of Sho; Gobat, Journal of a Visit to the Empires of Axum and Harwa to Ankobor, in the 'London Geographical Journal,' vol. xii.; Beke, Communications respecting the Geography of Southern Abyssinia, and his Route from Ankobor to Derwa, in 'London Geographical Journal,' vol. xii.; Beke, Continuation of Routes in Abyssinia,' in 'London Geographical Journal,' vol. xiv.)

**ACANTHODEPSMA.** A fossil genus of fishes from Glaros. (Agassiz.)

**ACANTHO'DES.** A genus of fossil Gnathostome fishes, established by M. Agassiz. The species occur in the carboniferous strata near Edinburgh. (Agassiz.)

**ACANUS.** A fossil genus of fishes, from Glaros. (Agassiz.)

**ACCELERATION AND RETARDATION OF HIGH-WATER.** The high-water at any place from which would be observed if the tides occurred after the lapse of a mean interval. The interval between the culmination of the moon, or the occurrence of high-water, and the time of high-water, is also called the retardation of the tide.

The tides are caused by the attractions exercised both by the sun and moon on the waters of the earth; but the effect produced by the moon exceeds that which is produced by the sun, and the difference is such that the phenomena of the tides depend principally on the former. The mean interval between two consecutive returns of the moon, above and below the pole, to the meridian of any place, is 24h. 50m. 28s. 22; and since, neglecting all causes of irregularity, two lunar high-tides occur in that time, the mean interval between two consecutive lunar tides should be 12h. 25m. 14' 16s.; while the mean interval between two consecutive solar high tides should be 12h. Hence, if at the time of a high-water, or at the highest point of the sun and moon, the high tide which is produced by the actions of the luminaries separately were coincident, the next lunar tide would be retarded with respect to the next solar tide, by 25m. 14' 16s., that is, by the excess of half a lunar high-water above half a solar high-water. Now, if the sun and moon are in conjunction, or in opposition, at the summer or winter solstice, the retardation is equal to 40m. 51' 59s., and at the time of the equinoxes 37m. 35' 15s. Again, when the sun and moon are in quadrature, the retardation is 24h. 27' 49s., and at the time of the equinoxes 1h. 25m. 16' 34s.

If the earth were a solid of revolution, and were covered by the sea, the high-tides produced by the sun and moon separately would, at any place, occur at the instants when those celestial bodies were at the meridian of the place; but such is not the fact in the actual condition of the earth; and local circumstances produce, at different ports, great differences in the intervals between the culmination of the sun or moon and the time of high-water. Even these, however, are not in conjunction or opposition. The interval between the instant that the sun passes the meridian of a place and the occurrence of the solar high-tide, is found to be greater than the interval between the transit of the moon and the occurrence of the lunar high-tide. The latter is called, of the lunar tide, with much probability ascribed by Dr. Young to a difference in the resistances experienced by the waters on account of the different velocities which are

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communicated to them by the separate actions of the sun and moon.

It should be observed however that at Greenwich the time of high water above that of the morning for the day varies slightly as the moon passes the meridian of that port; and both at Glasgow and Greenock the high-tide generally precedes the transit (Mr. Mackie's Report, at the seventh meeting of the British Association); but such phenomena are of rare occurrence, and in some particular cases the high-tide occurs some time after the moon has culminated.

From a series of observations continued during sixteen years, at Brest, La Place, taking the excesses of the height of the evening tides above that of the morning for the day, is directed to the high-syzygy, for the day preceding it, and for four days following it, has ascertained that at the syzygies which occur about the vernal and autumnal equinox the highest tides at that port take place 1490 minutes after the conjunction or opposition of the syzygies; and at the syzygies which occur about the summer and winter solstices they take place 150684 days after conjunction or opposition. Again, taking the excesses of the height of the morning tides above that of the evening for six days, as above, he ascertained that at the quadratures which occur about the equinoxes the highest tides take place 150964 days after the instant of quadrature, and at the solstitial quadratures 151299 days after such instant.

H. C. Frayer ('Tides and Waves, etc.' Metro.' observeth that these retardations cannot be accounted for by delays in the transmission of the tide-waves, since no cause for such delay can be imagined to exist in the Southern Ocean, where the waves are formed; and it is known that the time of high-water is retarded by from fifteen hours at 57º South to 1h. 1m. at the Cape of Good Hope: he conceives therefore that the retardation must be ascribed to friction. By taking the means of the daily retardations of the morning and evening tides at Brest, La Place found that at the equinoctial syzygies the mean retardation was equal to 37m. 38s.; at the solstitial syzygies, 40m. 52s.; at the equinoctial quadratures, 83m. 16s.; and at the solstitial quadratures, 76m. 27s.

From a series of observed heights of the tides, Sir John Lohum was first to determine that the highest tides occur at London on the 3rd of March after the conjunction or opposition of the sun and moon; and at Liverpool, 1h. 66h. (Phil. Trans. 1831, 1835). Also, from the observed heights, Dr. Whewell has found that the highest tides occur at Bristol 1h. 66h. days after the syzygy; and at Dundon 1h. 69h. days. (Phil. Trans. 1838, 1839.) On the assumption that the mean retardation of the tide at London at the times of syzygy is 2h. 45h. days, Mr. Airy has computed the moon's true hour angle west of the meridian at the time of high-water, for every half hour's difference in the time of her transit; and from the table it appears, that when the moon passes the meridian of London at noon, the angle is, at the time of conjunction, that angle, in time, is the highest; and if it passes at the angle of 10m. 45s.; at 6 h. m., or at quadrature, oh. 41m. 17s.; and at 9 h. m., 1h. 55m. 29s. The hour angle is the greatest at 10h. 35h. when it is equal to 2h. 9m. 56s.; and at 1h. 59h. m., or nearly at the time of opposition, it is 3h. 3m. 6s.; all these times are found to agree very nearly with the results of observation. From such results it is ascertained that, on the days following the times of syzygy and quadrature, the intervals between the time of the moon's transit and the instant of high-water are nearly equal; but from conjunction to the first quarter, and from opposition to the third quarter, the intervals are less than on the days of syzygy and quadrature, or the time of high-water is accelerated; while from the time of the first quarter to that of full moon, and from the third quarter to the time of low-water, the interval is less, and of high-water is retarded. The time first mentioned (1h. 57m. 17s.), is that which is called the Establishment, at London; but Dr. Whewell recommends that the mean of the times (1h. 58m. 32s.), which is only to be deduced from the observation of the moon's transit, or, when that is not possible, from the establishment, should be used in preference, because it differs less, on any day, from the vulgar establishment.

From Dr. Whewell's paper in the 'Philosophical Transactions' for 1836, we find that at Liverpool, when the moon passes the meridian the time of high-water is 11h. 18m. 16s.; when the hour of transit is 6h. 3m. 10h. 40m. 52s.; and when it is 11h. 35m. 30s. The mean, or correct establishment, is 1h. 58m. 35s.

The acceleration and retardation of the times of high-water must evidently depend on the distance of the moon from the earth, and they are presumed to be proportional to the difference between the actual and the mean horizontal parallax of the luminaries: this is called the parallax inequality of the tides; and La Place has determined, for the lunar tides, that the error in this respect is about 0.0112 of the mean value of the parallax, and in perigee, is nearly 0.0279 to 0.099. He estimates the variation at 9m. 26h. 4s. for a change equal to one minute in the moon's apparent semidiameter at the times of conjunction and opposition, and at one-third of this quantity at the time of quadrature. Correlation is in this case, but less amount, take place with respect to the solar tides.

ACIDENTAL COLOUR is a name given to that which an object appears to have when seen by an eye which, at the time, is in a state of excitement caused by incapable sensations, or by the loss of one or more of the pure colours. In this case, there is a passage in one of the chapters of the 'Trattato delle Pitture' by Da Vinci, in which, as a reason why, on a white wall, the shadows produced by the setting sun appear to be blue, it is stated that the reflection of the azure tint of the sky is on the walls, and that the light of the sun, on which it falls does not receive the red light of the luminary. The variations produced by causing the colours observed in the shadows of small objects to fall upon one another were noticed by Buffon, and Dr. Jurin (Tractatus de indirecte vision, in Smith's Optics) described the apparent images produced by looking intently, for a time, at a black object on a white ground and at a white object on a black ground.

But Buffon was the first who made a series of observations on the accidental colours of various objects, and the object which he acquired a perception when the eye had been for some time directed to an object of some particular colour; and it is he who gave the name of accidental colours to those which we so perceived. In a 'Mémoire' presented to the Académie des Sciences in 1743 he gives an account of his observations, the substance of which is, that when the eye had been, for a certain time, directed steadily to a square spot of one of the following colours, red, yellow, green, blue, black, the object being placed on a white ground, there was seen about the spot a fringe or border of one of the colours in the following series: green, blue, pale purple, pale red, white, which, in order of the circle of the colours, were visible, one after another, in the former series. Immediately afterwards, on directing the eye to a different part of the white ground, there appeared upon it a square spot of the same accidental colour, the white spot being considerably brighter than the ground.

The subject of accidental colours was pursued by the Jesuit Scherffer ('Institutionum Opticarum partes quatuor,' 1775), and he recommended that, except when the object viewed was black, that object should be placed on a black ground; in order that, with less fatigue to the eye, the accidental colours might be more vivid when the eye was directed to the white ground on which they were to be perceived. Scherffer made observations with coloured spots on grounds of different colours, from which he ascertained, at the same time, the accidental colour of the eye. He observed, in direct contemplation of a red square placed on yellow paper, and then turning the eye to white paper, he found that the latter was of a blue colour, and that on it appeared a square coloured green. But Buffon subsequently observed that, if the eye during a longer time than was necessary to produce the border above mentioned, observed that the colour of the spot itself became less vivid, that the spot subsequently took the form of a cross, and, finally, that of a narrow rectangle, which was directed parallel to the long axis of the eye, and in perigee, is nearly 0.0279 to 0.099. He estimates the variation at 9m. 26h. 4s. for a change equal to one minute in the moon's apparent semidiameter at the times of conjunction and opposition, and at one-third of this quantity at the time of quadrature. Correlation is in this case, but less amount, take place with respect to the solar tides.
or springs, fixed in tubes, and acted on by the breath of the performer, which is in common use with the people of that extraordinary country. An engraving of it is given in the 

**ACCOUNT STATED.** This is the title of the common count in an action at law for the amount due upon a balanced account between the parties, the form of which is that the plaintiff shall, the plaintiff or his agent, a certain sum of money found to be due from the defendant to the plaintiff upon an account then stated between them, and in consideration thereof promised payment. This form should always be taken by the defendant upon a simple contract for the recovery of a pecuniary demand.

It is not essential in support of this count that there should be reciprocal demands between the parties, or that the account should relate to more than a single debt or transaction. The original demand need not have been one recoverable at law. It may have been equitable, as in the case of a claim against an executor to recover a legacy to which he has assigned, or in that of a member of a copartnership, who, though he cannot in general sue his copartner at law for his share of the profits, may do so after an account has been stated between them and a balance struck in his favour. It is necessary however that there should have existed some claim against the defendant, or some previous transactions in respect whereof, for which the account is stated, the defendant thereby made. This is in form upon a mere agreement to pay a sum of money.

It is usual in support of this count to give evidence of an original demand or a prior transaction, and of a balance struck thereupon, which may be sufficient to prove an admission by the defendant to his agent, that a certain sum was then due, without showing the origin or nature of the claim, or proving the specific items constituting the account. The account must have been stated before the action is brought. The defendant, in order to charge a defendant upon an account stated, must be positive, unconditional, and contemporaneous, and must not merely the admission of a debt, but either expressly or by reference thereto, have provided a sum by which he is liable in cases in a representative character, as in that of executor or assignee, he must show that the admission was made to him in that character. The statement of an account is it seems only presumptive evidence against the party who admits the balance to be against him, and does not prevent him from showing by clear evidence the existence of error in the account; unless in the case of an account actually settled by payment, which cannot be opened except upon proof of fraud. (Chitty on Contracts, 5th ed., c. 18, p. 466.)

In order to support this plea the statement of the account must be shown to have been final, and to have been in writing; but it is not essential that it should have been signed by the parties, and it will be sufficient if the account has been compiled for any purpose, and demonstrated to afford legal presumption of a settlement. A general release not under seal may be pleaded as a stated account. A plea of this kind must aver that the account is just and fair, whether error or fraud is charged by the one or other party.

In answer to a plea of a stated account the plaintiff may show either the existence of fraud, which will be a sufficient ground for opening the whole account, or that the account contains specific errors, which will enable him to surmount the objections on the ground of error. The plaintiff is entitled to show that a demand has been made, or other accommodation for the account, and that the demand was refused. The plaintiff may be called in by a trader to investigate his accounts and to ascertain the state of his affairs. The collection of debts or rents, and the winding-up of affairs of persons deceased, or who have given up business, are matters often put into their hands, and auctioneers and auctioneers frequently act as accountants. An accountant has no legal status, like a notary or an attorney or appraiser, who perform certain duties which none but they are allowed by charter to perform; but in the Chapter Act (5 & 6 Vict. c. 129) official assignees must be selected from persons in trade, or who have or have been 'merchants, brokers, or accountants.' The
The simplest case in which there is such an accumulation of power is that of a heavy body, like the rammer of a pile-driving machine, which descends by the action of gravity during a certain time and impinges upon some object. At the moment of contact the body might be supposed to move, the velocities of all the particles, which had gone on continually increasing during the descent, are destroyed, and thus a shock is produced immensely greater than that which would result equally from the instantaneous exertion of a master ram of the antients, when, being suspended from some fixed point, it was allowed to swing by the action of gravity till one of its extremities struck the face of a wall, produced its effect in like manner by the power accumulated in it during its motion. In all such cases the effect, if measured by the magnitude of an impression or indentation produced in the object struck, is, by mechanics, directly proportional to the mass in motion and to the square of the velocity at the instant of impact. The acceleration produced by the suddenly exerted action of gravity, when a body has not far to fall, is commonly increased by that of a quantity of motion obtained by an exertion of muscular power. Thus a smith, when he would strike on an anvil with the greatest force, adds to the power of gravity on the hammer the accumulation of velocity arising from a whirling motion, in a vertical plane, which he gives above his head to the hammer before he allows it to descend.

In the old coining-machines, which, like those that present the most perfect and closest analogy to the mechanism of a screw, a great accumulation of force was obtained by causing a number of men to turn the horizontal bars attached to the vertical shaft which carried the screw: by the pressure of the men against the bars, while several revolving cylinders were in motion, there was an accumulation of motion during that time took place; and the accumulation was instantaneously spent upon the metal, in aid of the power arising from the power of the screw alone. The like accumulation of force is obtained, but far more efficiently, in this coining-machines, and a present day by means of its fly-wheel: the reciprocating motion of a piston connected with a steam-engine communicates, by means of a crank, a continuous circular movement to the fly, and at the same time a rapid digging movement to the fly-wheel, a cylindrical shaft (the stamper) on which the screw is formed. With half a revolution of the fly-wheel the stamper is lifted up, and with the other half it is forced down upon the metal. When a fly-wheel is set on by any prime mover, as wind, water, or steam, its motion continually accelerates, and a corresponding acceleration is induced in the wheel-work, in rollers, or in the stampers with which it is connected: the resistance to be overcome at what is called the working point destroys however this acceleration, and when the movement is uniform, if it were not for the temporary accelerations or retardations which are caused by variations in the intensity of the moving power, or in the amount of the resistance; and these are almost wholly counteracted by the accumulated power, which is produced by the former and is exerted in a radius, and W the weight of the wheel; the effect at a working point, when the latter is connected with the axis of revolution at a distance from it represented by r', being, to the effect at the circumference of the wheel, as r to r', we should have \(\frac{r'}{r}\) to represent the effect at such working point.

Consequently, the place of the working point being given, it should follow that it is more advantageous to increase the diameter of the wheel, or its velocity, than its weight: but in practice, there are certain limits both to the magnitude and the velocity of the wheel, which must not be exceeded, lest the centrifugal force arising from the revolution should destroy the cohesion of its parts.

ACERATHE'RIUM. Some fossil Rhinoceratae have been thus named by Kaup.

ACELIUM, A, a genus of fossil Madyrphyllia.

ACHILLEUM, a genus of fossil Spondiophiæ, of which two species occur in the cretaceous strata of England. (Goldfuss.)

ACIDASPIS, a genus of fossil Crustacea, of the group of the Trilobites, found in the Wenlock limestone. (Murchison.)

ACONITUM (Monshahod, or Wolfehne), Medical Properties of—The botanical characters of this genus of Ranunculaeae plants have been already given. [F. C. vol. i. p. 88.]
The species merits the preference as a medicinal agent, is a greatly controverted point. The London and Dublin Pharmacopoeias, following the notions of Decandolle as to the identification of his Achomine, the Aconitum Napellus officinalis, figured by Steck in his 'Libellus de Stramonio, Hysocyamino, Aconitó,' Vindobon. 1762, have given that as the official one, while the Edinburgh College has retained the common A. Napellus. The preponderance of evidence in most cases, however, precludes the opinion of the former, and the almost impossibility of procuring the plant indicated by the two former, since it is only a rare inmate of botanical gardens, it is substituting a considerably less potent for a more potent plant. The Aconitum varieties are of the glands in the root of the plant possessed of great acrimony, while A. paniculatum has scarcely a perceptibly acid taste. The official parts are the root and leaves, but the seeds might be added with propriety. Every part of the plant has a narcotic-acrid property. The live plant, when crushed, produces a fluid resembling that of the pot-herb, while the dried plant is only a tar of an astringent nature. The great difference is that while the root of A. Napellus has bitherto been published, though Pallas analyzed the root of A. Lycocyatum, and Bucholz the leaves of A. Medium, Schrad. It is probable that all the species contain similar constituents, differing only in degree, the most powerful being the A. Ferox (Wallich, Fl. Asiatic, Rariores, i. t. 41) or Blask of Northern India. The most important are the alkaloid aconitine, aconitic acid, a fatty oil, and perhaps a volatile acid principle. The latter probably results from the decomposition of aconitic acid by the action of heat. Almost all ranunculous plants have an acrid principle, which is very easily driven off by heat. Much care is therefore requisite in drying the root or leaves of aconitine, as the volatile tincture is volatile. The essential oil is required in forming the extract or in aspirating the juice. A knowledge of this fact leads to the most convenient and effectual antidote in cases of poisoning by these plants, viz., causing the patient to drink very warm water till vomiting is excited, or washing the eye with warm water, by which it could be used as a pot-herb, by merely boiling it, and adding a little fat or butter. (Linnaeus, Flora Leopponica, p. 187, ed. Lond. 1792.)

The evil oil is destructive of the sensibility of any part to which it is applied, but whether from inherent powers or from having aconitine dissolved in it is yet unknown. The alkaloid is regarded as the efficient principle when aconite is used medicinally. The forms of administration are various. Powder, Roots, Leaves, Oil, and sometimes in solution. This further varies with the period when the leaves are collected. The best time to gather them is immediately before the flowers wither, when the seeds advance to maturity the sooner. It is also probable that the more juicy and fresh the plant is when the seeds are intended to be collected, this should be done just before they are perfectly ripe. The root should be taken up before the flowers expand; it must be carefully, yet speedily, dried. It is sometimes dried in the sun, but this is not the best mode and its activity is impaired, while a high temperature quite dissipates its valuable properties. The watery extract is a worthless preparation; and the infusium of the London Pharmacopoeia, improperly termed an extract, is also objectionable, being a mixture of the leaves, or an alcoholic tincture of the root made by distillation. The insufficiency of the watery extract and infusium has led to statements in some popular treatises that it may be given in the dose of twenty grains, a quantity which would probably foul when the extract is prepared with alcohol. Of this latter it is rare that two grains can be given with safety: a quarter of a grain is serviceable to begin with. Possessing a toxic-acrid property, the action of aconitine on the human frame is different according to the quantity used. In small medicinal doses its most obvious action is purely local; in larger, its action is both local and remote. Thus a small portion of it is absorbed by the local effect of its power by numbness of the lips and tongue; increased secretion of saliva also occurs. Minute doses taken into the stomach cause augmented secretion both of the mucus membrane and saliva, and if taken in sufficient quantity, the appetite is often markedly increased; while tingling of the extremities, with heat, is often felt, and either perspiration or increased action of the kidneys. The effect on the pupil is variously stated. Geiger affirms that aconitine produces dilatation of the pupil. Dr. Feit, in his German article on 'Aconitum officinale' in the Materia Medica, that the external application of it produces contraction; while in his experiments with the extract of the Aconitum ferox (recorded in 'Edinb. Journ. of Natural and Geographic Science,' July 1830, p. 255) he distinctly affirms that while the animal continued alive the pupils were 'much dilated,' contraction taking place only after the animal was apparently dead. Large doses cause redness and inflammation of the parts brought in contact with it; but the intellectual and emotional effects are voluntary, or it becomes an overstimulation. Sir B. Brodie thinks that it occasions death by destroying the functions of the brain. ('Phil. Trans.' 1818, p. 186.) For this effect do not consider absorption necessary; there is separated from it an alkaloid which, by increasing the intensity of its remote action on the nervous system is in proportion to the absorbing powers of the part to which it is applied (loc. cit. p. 242). The susceptibility of the heart to aconitine is greatly increased by it. When first introduced into medical practice it was recommended in many diseases; but it is now almost entirely restricted to painful affections of the nerves, and to rheumatic complaints, particularly when they are complicated with fever. For these effects it is not injurious. The stomach is affected more externally than internally, but this last mode is to be commended at the same time. An ointment is formed with one or two grains of the aconitine to one drachm of linseed. A small portion of this is to be applied frequently to the part affected. An eruption sometimes appears, especially if the ointment be strong. The internal use of aconitine is scarcely to be advised, one-fiftieth of a grain having endangered the life of an adult. The very high price of this article is an obstacle to its extensive employment; but ingenious chemists are endeavoring to simplify the process of extracting it. To obtain it perfectly pure it is almost essential to use sulphure ether in the preparation of it, which necessarily increases the expense. The incidence of chronic rheumatism, and even in some cases of acute rheumatism, should poisoning occur, attempts must immediately be made to empty the stomach by emetics or the stomach-pump. No brandy or other form of alcohol should be given, nor vinegar, till all the benefit removed from the, in Materia Medica, which coffee with vinegar is very useful: venesection sometimes may be required.
properties of some of the Aracem. The Acoruc calamus is a British plant, and has slightly aromatic properties. (Lindley, _Nouveau._) [Acorus, P. C.]

ACQU, the name of one of an administrative division of the Sardinian States, situated on the northern side of the Ligurian Apennines, the ramifications of which run northwards until they slope down into the great valley of the Po. The Bor- nida, the Po, the Tanaro, and other rivers, or torrentes, which rise in the main ridge of the Apennines, flow between these offsets until they all join the Tanaro, which is the greatest affluent of the Po on this side. The province of Acqui is called the Piglio or Upper Monferrato, being part of the Montferrato of that name which was annexed to the dominions of the House of Savoy. The country produces some corn and much fruit. The lower hills are planted with vineyards, from which good wine is made, known and sought after by the name of Monferrato wine. The mountains are partly covered with chestnut-trees, which supply an article of common food for the peasantry. The rearing of silkworms is an important branch of industry. A considerable quantity of cattle, especially borred cattle, is bred in the province.

The province of Acqui is bounded on the north by Alessandria, east by Novi, south by Savona, and west by Alba. Its length is about 40 miles north to south, and its greatest breadth is about 30 miles. The population is distributed among 73 communes. The head town of the province is called Acqui, and is a bishop's see. It is built partly at the foot and partly on the slope of a hill on the left of which stands the castle of Borinda, with a handsome façade, several other churches and convents, a royal college, a clerical seminary, and a town-hall, some other remarkable buildings, and about 7,800 inhabitants. The old walls of the town have been pulled down since the last peace of 1815. The old castle stands on a hill outside the town, and is used as a prison. The town has some manufactories of linen and some tanyards. Acqui is much frequented by invalids from Lombardy and from Geneva for its hot sulphur springs; the establishment for bathing is about a quarter of a mile out of the town, on the opposite or right bank of the Borinda. The buildings have been restored and enlarged by the late king, Charles Felix. The 'fangio,' or mud formed by the sediment of the water, is applied in many cases of local complaints or old wounds, and is considered very efficacious. The town derives its name from its springs, which were known to the Romans by the name of Aquae Statii, Statiiell being the name of a tribe of Ligurians who inhabited this region, and who being joined by other tribes were defeated in a great battle near Carthage by the consul M. Popilus Licinius, 173 a.c. The consul raised Carthage to the ground, devastated the whole country, and sold many of the inhabitants. His severity was considered excessive even at the time. In the 18th century, Borinda was born a second time against the Romans until the other Ligurian tribes made a gathering in their territory, where they were attacked by the consul. The senate ordered the captives to be restored to liberty and the land was ceded to the Romans in so-called, 'the chase;' gracing its resolution by the well-sounding moral, 'that the splendour of victory consists in subduing an enemy in arms, and not in oppressing those who have submitted.'

The decree however was eluded for a time, and Popilus in the face of it again attacked the Statiiell in the following year, and killed ten thousand of them. At last the senate and the people joined in reproving the conduct of Popilus, who was summoned to Rome to answer for his conduct, and his brother C. Licinius, consul for the year, was ordered to execute the former decree and liberate the surviving Statiiell, several thousand of whom were released from slavery, and settled on some grounds which were assigned to them north of the Po. M. Popilus Licinius applied before the priest, C. Licinius, who being taunted with it by the friends of the accused, put off the matter to the Ides of March, when the new magistrates came into office, and Licinius retired into private life, by which means Popilus came off unpunished. "The cause," says Livy, "by an old saying, tricked the rogation concerning the Ligurians was eluded." Afterwards the mineral springs above mentioned having attracted the attention of the Romans, the place became known by the name of Aquae Statiiell, and there are inscriptions remaining which relate to the caro taken of the thermal, or warm baths, by the local officers.

In the early part of the middle ages Acqui was a countship, one of the early counts of which was a certain Alermannus, whose history has been interspersed with wonderful tales by the chroniclers; be fought valiantly against the Moors or the Saracens, and invaded Liguria. He married a daughter of Berengarini II, son of Otto I, and made a marquis, and died a.d. 993. He was the progenitor of the Marquises of Monferrato and of the Marquises of Saluzzo, who figured for centuries afterwards in the vicissitudes of the Sardinian States.

The other towns of the province of Acqui are—1. Nizza della Paglia, called also Nizza di Monferrato, situated in a pleasant district on the banks of the Belbo, with about 3,500 inhabitants, situated between the provinces of Alessandria, and Genoa, from which it is divided by the torrent Monferrato and a small town, known for its good wine. A number of small villages, or hamlets, from 200 to 2,000 inhabitants, are scattered throughout the province.

(Casali, _Dizionario Geografico, Storico, Commercial, degli Stati di S. M. il Re di Sardegna; Demania, Quadro dell'Alto Italia; Calendario Sardo._)

ACRE, SAINT JEAN D', the celebrated fortress on the coast of Syria, was taken by the united English and Aus- trian squadrons in 1840, after a bombardment which was short, but so effective as to form one of the most memorable events in the career of Napoleon. It was the first attack on Syria, Prussia, Russia, and Turkey, having concluded a treaty at London on the 15th of July, 1840, for the purpose of driv- ing the Egyptian troops out of Syria, and restoring this coun- try to the Moslem inhabitants, the sultan wishing to have an Austrian fleet attacked and took the Syrian seaports. On the 2nd of November, 1840, this fleet arrived off Acre: it con- sisted of seven English line-of-battle ships, four war-steamers for throwing shells, and some smaller vessels, commanded by Admiral Sir Robert Steph, who was commander-in-chief of the united fleet, and under whom Sir Charles Napier acted as commodore of the English squadron; and two Austrian frigates, the Medes, on board of which the Austrian admiral, the Marquis de Bans, had hoisted his flag, and the Guntz, commanded by Captain the Archduke Frederick of Austria. The attack began on the following day, the 3rd of November. The ships had some difficulty in taking their positions, as the officers had no good chart of the coast nor plan of the fortress, which, through the care of the pasha of Egypt, Mehemet Ali, had been made almost impregnable, except to troops and officers who combined the most consum- mate skill with the utmost bravery. After a heavy firing of two hours, which was well answered by the Egyptians, the grand magazine blow up with a tremendous explosion, pro- bably ignited by a shell from one of the steamers. Two entire regiments of infantry, which were standing in battle array near it, were annihilated, as well as all vessels crowded with marines and other troops, and beams of the building was thrown into the sea. The whole command nevertheless continued to defend the town, but the fire of the ships was so effective that it was discontinued at sunset, and the admiral prepared for a storm on the following day. This lasted three days, and the Austrians and Turks had not disturbed the fort during the night of the 3rd of November with the feeble remnant of his garrison, the force of which was from 4,500 to 6,000 men before the action. On the 4th the Anglo-Austrian force took possession of Acre: they met some men by a second explosion, the blowing up of a magazine of loaded shells which had been covered by the rubbish of the grand magazine, under which fire was smouldering. The allies lost eighteen killed and forty-one wounded. Lieutenant-General Sir B. H. Disraeli, commanded the British forces. After the fall of this bulwark of Syria, Ibrahim Pasha evacu- ated that country and retired to Egypt. Acre has since been restored to the Turks, and some care has been taken by them in rebuilding the fortifications, but the whole is still but little more than an indefensible heap of ruins. (Sir Charles Napier, _The War in Syria._)

ACRO'CLULIA, a fossil genus of Gasteropoda, allied to the Neritacea. It occurs in Paleozoic strata. (Philipson, _Dict. Nat._) [Acroclulius,] is a species discovered and described by M. Agassiz. The species occur almost exclusively in the liss and oolite. One British species (A. minima) is referred to the keuper series by M. Agassiz. It occurs at Aust Cliff in the Wiltshire Down. The others abound at Lyme Regis, Bath, and Stonefield.

ACRO'GASTER, a fossil genus of fishes. (Agassiz.)

ACRO'GNATHUS, a genus of fossil Cylindoids fishes, found in the chalk of Sussex. (Agassiz.)
ACROPLEIS, a genus of fossil Gondwanian fishes, found in the magnesian limestone of Durham. (Agassiz.)

ACROSALENIA, a genus of fossil Echinoderms. (Agassiz.)

ACROTEMNUS, a genus of fossil Gondwanian fishes. A fiba is found in the chalk of Sussex. (Agassiz.)

ACTA SANCTORUM. [Bollandists, P. C.]

ACTING: [Phil. Trans. 1842, p. 175.]

 ACTIONS must be made at stations differently elevated above the general surface of the earth or sea. It may also be employed to determine the diminution of heat which takes place during eclipse of the sun.

ACTION (at Law). [See P. C. vol. I. p. 106, for Actor, definition of; general object of; general principle respecting: three kinds of; general outline of proceedings in.]

ACRITARCH. [Baj. and Lyc. Ph. 1865.]

On this head there were many remarkable discoveries proposed by the late Mr. Miller of Bristol, upon the supposition that the species which he ranked in it had true alveolar cavity or phragmacone. The correctness of this view is doubtful. The space shown to be the crestaceous strata. [Delem. E. P. C.]

ACTINOCERAS, a genus of Cephalopoda, recently discovered by the vessel Siman, off the coast of Brazil. It is noticed under the word THERAPODIA.

ACTINOMETER (from deriv, a sunbeam; and pipos, a measure) is an instrument employed for the purpose of ascertaining the intensity of heat in the direct rays of the sun.

ACTINOMETER (from deriv, a sunbeam; and pipos, a measure) is an instrument employed for the purpose of ascertaining the intensity of heat in the direct rays of the sun. It is a highly delicate thermometer, having a large cylindrical bulb filled with ammoniac-sulphate of copper (a deep blue fluid), and a capillary tube, to which a graduated scale is applied. It was invented by Sir John Herschel, who gave a description of it, which was read before the Royal Society, on the 9th of June, 1835 (vol. iii.). The construction of the instrument and the manner of using it are noticed under the word THERMOGRAPH, P. C., p. 350.

The indications of heat afforded by the actinometer depend evidently upon the magnitude of the beam of light which falls upon the bulb and upon the bore of the tube, within which the heat rises from the effect of the beam. The area of a longitudinal section through the axis of the cylindrical bulb, which is also the area of a transverse section of the beam of light incident on the bulb, is taken for the former; such sections, in different instruments, being proportional to the semi-cylindrical surfaces which receive the beams; and the volume in the interior of the capillary tube, of one of the spaces corresponding to the length of the tube, measures the expansion of the fluid produced by a portion of the heat. This volume is found by measuring the volume of mercury which would fill a given length of the tube, and it should be determined by the maker of the instrument before its parts are put together.

The length of a degree on the theromometric scale is at present arbitrary, and the relative values of the degrees on the scales of different instruments are determined by comparing together the indications made in like circumstances. For this purpose, different persons may make observations simultaneously with the instruments, or the same person may make several observations with two instruments, exposing them alternately to the sun, in order to see if any difference in the results obtained by the different instruments is to be observed. The indications given by two instruments may therefore be adjusted by means of a comparison of their indications, or by means of the corrections to be applied to their indications. The indications given by two instruments may therefore be adjusted by means of a comparison of their indications, or by means of the corrections to be applied to their indications.

APPARENTLY "ADCA", ACTINOCERAS, a genus of Cephalopoda, recently discovered by the vessel Siman, off the coast of Brazil. It is noticed under the word THERMOSTIC.
operation of law. Thus the rights of action of a bankrupt or insolvent pass (with certain exceptions) to their assignees; and upon the death of a number of the parties between whom a cause of action has arisen, the right of maintaining such action survives in general to or against his executors or administrators. But in respect to suits which are founded on the violation of person or property, in case of an action that is that they die with the person, and by the common law this extended to every case of tort; but it is now no longer the rule as regards torts committed in respect of property. (4 Edward III. c. 7, and 3 & 4 William IV. c. 49, s. 2.)

7. The report of acts of an action at law are:—1, the process, or those proceedings which have for their object the compelling the defendant to appear, that is, to admit that he has a general intimation of the suit, and is ready to receive more particular informations of ground and cause; 2, the pleadings, 3, the trial and evidence; 4, the judgment; 5, the writ of error (where the judgment is supposed to be erroneous); 6, the execution. 8. By the stat. 2 Will. IV. c. 39, and the rules of court founded upon it, and by statutes 3 & 4 Will. IV. c. 67, and 1 & 2 Vict. c. 110, it is now provided that all personal actions shall be commenced by writ of summons, which is a writ issued out of the court in which the action is brought, directed to the intended defendant himself, and which, without setting forth the particular cause of action, but merely describing the action as one of debt, trespass, or the like, commands him to cause an appearance to be entered therein within eight days after the writ shall have been served upon him; 9. As to the passing of the above-mentioned statute a plaintiff might commence an action of debt by arresting the defendant where the alleged subject of dispute was a debt to the amount of 20l. at the least. Arrest on mesne process, that is, the first stage of the action, is now abolished.

(Army. P. C. S.)

(For further particulars see references in P. C. Vol. i. Action; and Blackstone, Comm.; Stephen, Comm.; Stephen, On Pleading: Chitty, On Pleading.)

CASE UPON THE CASE. [CASE, ACTION UPON P. C.]

ACTION AND REACTION. [MOTION, LAWS OF P. C.]

ACTION, LEAST, PRINCIPLE OF, is a name given by Lagrange to a law of motion which he has thus enunciated:—In a system of moving bodies, the sum of the products of the masses of the bodies by the integral of the products of the velocities and the elements of the spaces passed over, is always a maximum or a minimum.

The principle, in a limited sense, originated with Mauertus, who, in his Mémoires de l'Académie des Sciences de Paris, for 1749, designating it the Law of Rest, states that when bodies in motion act upon one another, the sum of the products of the forces by the velocities described, is a minimum; and from this principle he deduced the laws of the reflection and refraction of light, and of the collision of bodies. Euler also, in his Traités des Irémpériables Aimables, (1741), showed how to describe curves and lines by means of central forces, the integral of the product arising from the multiplication of the element of the curve by the velocity is always a maximum or a minimum. But the generality of the principle was established by Lagrange, who has extended it to a system of a motion of bodies acting upon one another in any manner whatever; and his first applications of it to the solution of dynamical propositions are contained in the second volume of his Mémoires de l'Académie, S. de France.

The analytical expression of the principle is, that 
\[ f(x) = \sum \frac{d^2}{dx^2} \]

or \[ f'(x) = \sum \frac{d^2}{dx^2} \]

is a maximum or a minimum, or that the infinitely small variation of that quantity is zero. (Here is the case of the velocity of a moving body.)

\[ d^2 = \sum \frac{d^2}{dx^2} \]

is the expression for the active or living force of a finite number of bodies or molecules [Vis Viva, P. C.]; and it follows that the principle of least action is the equivalent of the expression that the integral of the product of the living force of a system of active and passive forces of time, is always a minimum.

The truth of the principle of least action may be readily proved by several general dynamical expressions of velocity, P. C., p. 380, col. 1, the sum of the terms containing \( X, X, X, X \), being made equivalent to \( \sum x^2 \), or to \( \sum x^2 \), conformably to what is shown in the article just quoted; and

the whole being transformed agreeably to the process used in the Mécanique Analytique (sect. iii. No. 30), the use of the principle is only to serve as a rule for forming the differential equations of motion, and these may be obtained at once from the General Equation to which is reduced the whole system.
customary of the debtor. Within a quarter of a year the chattels and lands were to be delivered to the creditor for sale in payment of his debt. If within the second quarter he did not make terms, all his goods and lands were to be delivered, the latter as if a gift of freedom, to the creditor, to hold to the use of the debt, as a substitute for sand, bread and water by the merchant. Precautions were taken against the debtor fraudulently making over his property. Lands given away by feu-fait subsequently to the recognizance were to be void. It is probable that the heirs did not bar the debt; for though the body of the heir could not be taken, his lands were answerable as much as during the lifetime of the debtor. The Jews were excluded from the benefits of the statute. (Stat. of Realm, i. 98.)

But there is another view of the case, which apparently shows that the above statute may be 'considered as contributing to extend the power of alienating land.' Any common creditor by judgment was empowered in the same session to take half the debtor's land in execution, 'but a merchant who had resorted to this security might have the whole.' He adds that 'a recognition acknowledged with the formalities [here] described was in after times called a statute merchant;' and 'a person who held lands in execution for payment of his debt, as hereby directed, was called only occasionally a creditor, or rather Adail. (Obs. on the More Ancient Statutes, p. 119) states that in 1536 an ordinance of Francis I. was issued, which very much resembled the statutes merchant, and shows, he says, 'the more ancient statute merchant.'

ADAIL is the Arabic name of a part of the eastern coast of Africa, and has been adopted by European geographers. Until lately it was applied to the country that surrounds the Bay of Tadjourah, which constitutes the most western corner of the Red Sea, in the month of Sept. 1500 S. lat. 9° 20', from the Bay of Tadjourah to the Strait of Bab-el-mandeb, but of late years it has been ascertained that it is applied to all the countries inhabited by a nation called by the Arabs Danidik: they call themselves Afaan. The name Adail, or rather Adai, is derived from Ad Alli, which is the name of one of the most famous tribes of the Danidik.

The Danidik tribes inhabit the coast from the Bay of Tadjourah to Cape Bab-el-mandeb, and from Bab-el-mandeb along the coast of the Abyssinian territory, for a distance of about 120 miles from the sea. As the highlands of Abyssinia gradually approach nearer to the shores of the Red Sea as they run further north, the territories possessed by the Danidik grow narrower and narrower.

Coast and Islands.—The length of the coast along the Red Sea is above 300 miles. In several places it is studded with rocky islands. With some few exceptions they belong to the same formation. Their surface consists of large fragments of coraline rocks mixed with sand, shells, and the indurated parts of mollusces. These islands do not in general rise more than 12 feet above the sea. In the dry season they appear to be quite bare of vegetation, but in the wet season, which lasts from June to April, the shrubs and trees are covered with leaves, and a scanty grass springs up in some tracts: a few mangroves preserve the moisture longer. No agriculture is carried on. Only a few of these islands are inhabited, and those only by the fishermen who live by their fisheries: many of them are used as pastures for goats, and some antelopes are met with. The largest of these islands is Dhalak. Between these islands and the mainland are several small harbours, but few of them are good; it is however remarkable that the island of Tadjourah, which is the most distant from the coast, has several harbours, even boisterous weather may be in the middle of the sea or along the coast of Arabia: thus the harbours generally afford shelter, especially to small vessels.

The adjacent coast resembles the islands in its formation. It consists of coral rocks rising abruptly 10 or 12 feet above the sea, but on the top it extends in a dead level. Opposite Massowah Bay this level is about two miles wide, but farther south somewhat wider. It is furrowed by numerous watercourses, in which during the rains an immense volume of water rushes down from the adjacent mountains; but when the rains have ceased the beds become dry, and in that state they remain for eight months. There are no springs, and the rain-water is preserved in tanks; but water may also be obtained by digging in the dry beds of the watercourses, where it is generally met with at a depth of 12 feet. The soil consists of some rocky fragments, and of sand and pebbles, and of a sort of soil which has no name, but is so sterile that the whole is left in its natural state, cultivation being limited to a few gardens in which hens (Lusonia inermis) is grown. Full-grown trees are only found along the rivers: in other parts there are only a few isolated mimosa and acacias, a coarse kind of saline plants, and aloe trees. Along the sea are isolated bushes of avicennia (Avicennia alba, Blum.) and tamariskas. Between the Bay of Massowah and Annesley Bay is Mount Takorah, which extends from 5000 to 10,000 feet above the sea. It is isolated, and its upper part is covered with large trees, but there are no springs at its base.

South of this mountain the level plain grows wider, being three miles across. There are dispersed over it a considerable number of conical hills, which rise from 200 to 300 feet above their base. In their vicinity the soil chiefly consists of decomposed lava, and is much more fertile than the other parts of the plain: trees however are wanting, and low bushes appear. A hot and dry season (from July to September) the temperature ranges between 86° and 92°, and in the afternoon it generally ranges five degrees higher. In this season the sky is rarely overcast; but in the beginning of October, when the rainy season on the table-land of Abyssinia is near its termination, the cloudy sky sometimes retards this season of the year, and makes fine grass. Camels, goats, and sheep are comparatively numerous. Cattle are not so common. Antelopes are numerous. Water is generally got by digging a few shallow holes in the surface.

It is a general opinion that the low tracts along both sides of the Red Sea are the hottest countries on the globe. This is also confirmed by the meteorological observations which were made by Rüppell at Massowah during eight months of the year 1831 (from December to April) the temperature ranged between 72°5 and 80° before sunrise, and between 82° and 88°5 at three o'clock in the afternoon. In the hot and dry season (from July to September) the temperature ranged between 86° and 92°, and in the afternoon it generally ranges five degrees higher. In this season the sky is rarely overcast; but in the beginning of October, when the rainy season on the table-land of Abyssinia is near its termination, the cloudy sky sometimes retards this season of the year, and makes fine grass. Camels, goats, and sheep are comparatively numerous. Cattle are not so common. Antelopes are numerous. Water is generally got by digging a few shallow holes in the surface.

Though this low tract produces hardly anything fit for use except fire-wood, the sea supplies substance and articles of commerce to many families. Pearls are found in some places, especially in the vicinity of Dhalak, and also turtle. Among the fishes are whales, probably the Physeter: three kinds of dolphins, of which the largest is a Phoecena; and the dugong, which last three hundred are annually taken by the fishermen of Dhalak.

Physical Geography.—The interior of Adail is only known along the routes which European travellers have followed in ascending from the table-land of Abyssinia. Those who have visited Tadjourah traversed the country south of the harbour of Massowah, and those who visited Shoa deplored from Tadjourah, and reached Ankobar by a southwestern road.

The acclivity by which the table-land of Tigris is ascended occupies a space varying between 30 and 40 miles in width. Its direction is nearly parallel to the sea-coast. The depressions, valleys, or ravines by which it is furrowed generally present the edge to the direction of the mountain mass, but at others they cut that edge obliquely, running from north to south. Near the low tract along the coast the rise is gradual, and the country at a distance of 25 to 35 miles altitude is green and covered with trees above the sea-level; but as it approaches the edge of the table-land the ascent is very steep, for within six or eight miles the rise of the rocky mass generally amounts to between 6000 and 7000 feet.

At the back of the low tract along the sea the rise of the country is very gradual, and the table-land is covered with depressions, in which the watercourses lie. The surface of this tract is sandy, and nearly without grass, but sprinkled with acacias and low bushes; it occupies about three miles in width, and is not inhabited. The junction of the low tract: its surface consists of low hills composed of black rock, and supplies tolerably good pasture in the rainy season. The depressions between them may be called valleys. In winter they are traversed by large torrents, and in summer there is always excellent water a few feet below the surface in the heads of the streams. These valleys are covered with

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bushes and a few trees, of which the acacia is most common. There are many small villages, which are inhabited by herdsmen. In approaching the base of the steeper declivity the rocky masses that enclose the valleys become much more elevated, but the same is not the case with the valleys themselves. The more elevated part of this tract is an inclined plain with a strongly undulating surface. In general the eminences are composed of volcanic matter: in some places lava is found, and at others the surface is covered with a salt efflorescence. The surface is stony; and in many parts there are groves of trees, and the upper country is covered with low and stunted thorn-trees. In the valleys there are acymares of considerable size and nalac bushes (Rhamnus nabal), which are of medicinal and pleasant use. Near the base of the steep ascent some of the valleys are contracted to ravines, but others widen into plains: such is the Valley of Modot, about 25 miles due west of Massowah, which is nearly three miles wide, and extends to a considerable distance from south-east to north-west along the base of the mountain-masses. In this valley, as in other parts of this region, a few spots are cultivated with durra (Holcus sorghum). Cattle are kept; and large quantities of butter are made and sent to Massowah, and thence to Arabia. Between the end of the dry season (from June to November), when the grass in the valleys is dried up, the cattle ascend the higher acclivities of the mountains, and even to the table-land of Tigré. Camael, mules, asses, sheep, and goats are abundant. This tract is the haunt of numerous wild animals: elephants are sometimes met with, which have descended from the table-land. Lions also sometimes make their appearance. There are numerous wolves, hyenas, lyncxes, leopards, foxes, wild hogs, several kinds of snakes among which are the cobras and the gazelle, and harriet. Among the birds are several kinds of parrots (Frimgilla paradisae) and pearl-fowls (Numida peloronoryncha).

The upper declivity of these rocky masses presents a succession of long and steep ascents and sloping terraces of moderate extent. The ravines by which they are intersected contain large trees. Some on of the terraces a little cultivation is carried on, and durra and barley are grown. In this region the crops of barley and durra are increased in abundance and size with the elevation of the mountains. Camael, cattle, and goats find abundant pasture. This region is inhabited by nomadic tribes.

This description applies to the caravan-road from Massowah to the village of Halai, situated on the top of the ascent on the table-land of Tigré, and this road has been followed until lately by all travellers to Abyssinia. It is called the road by the Pass of Tarasa, which name is applied to the highest pass in the Acclivity of the road. The Pass of Halai is 8628 feet above the sea-level; and a resting-place at the base of the steeper ascent, called Mahlo, is only about 2130 feet; but of later years it has been ascertained that there are in some places the two other passes are preferable, because the ascent is less steep. One lies north of the Tarasa Pass, and connects the village of Gara on the table-land with Massowah; and the other is south of the Tarasa Pass, and leads from the village of Tekunda (Degonta) down the declivity to Arboga and Massowah.

We pass to the southern extremity of Adal, to the caravan road which leads from Tashurah to Ankobar, the capital of Shoa. The country through which this road runs is a table-land of moderate elevation, and it may be considered as an intermediate terrace by which the highlands of Shoa are ascended. The surface exhibits a considerable variety. No portion of it is under cultivation; but, with the exception of a few parts, it is not arable. It supplies pasture all the year round; and at the end of the dry season, however, in May and June, it suffers from want of water.

A short distance from the shore on which the town of Tashurah is built, there is a cluster of hills of trachyte formation, the surface of which is covered with basalt. The base of Tashurah is 2000 feet above the sea. This group of hills is traversed by glens, through which a considerable volume of water runs during the rains, but very little is found at the end of the dry season. Between Tashurah and the summit of the hill the ascent is by sandy, deposits covering a stony substratum. Water is obtained from wells: it is pure, but has an unpleasant taste. Grass is scarce, and only goats are kept. There are only shrubs and shrub mimosas, with a few date-trees, near the villages. Of shrubs, melacca, juncus, and leopards are numerous, and various kinds of birds.

The Bay of Tashurah terminates in a shallow lagoon called Gubbat-el-Kharab. This lagoon approaches the base of a table-land covered with lava, which extends westward to the vicinity of Lake Assal. The road lies north of this table-land. It passes through low undulating hills covered with sparse vegetation, and is intersected by several branches of the river Killelu, which runs from the north-east, and about three miles wide. About one-third of its surface is covered with a sheet of salt, about half a foot thick, which resembles ice. The lake is shut in on the northern, western, and southern shores by ranges of high hills, among which is Mount Sivay, which is probably 1500 feet above the sea. On the eastern side is a bed of lava, which, as before mentioned, extends to the Gubbat-el-Kharab, and which contains several deep craters. It is supposed that at this point the lake was, at some remote period, connected with the bay of Tajurrah.

On the south-west of Bahr Assal is a hilly tract. The hills near the lake are precipitous and high, but farther on they are lower and rounded. This region, from Bahr Assal to the town of Gadage, more than 20 miles distant from the lake, is only 270 feet above the sea. The water in this tract is plentiful, but has a brackish taste. Grass is only found at a few spots at the end of the dry season. A few groves of doom palm-trees are found, with small cones, each in a distinct triangle. In the vicinity of Gadage, and lies between high hills running from south-east to north-west. The surface is partly composed of a hardened and cracked alluvial deposit, which is quite bare, and is partly covered with a thin soil overgrown with a jungle of acacia and a species of auburn.

After leaving this plain the country rises more rapidly. A few miles farther to the south-east it is 1200 feet above the sea-level. Further on the country preserves in general the same character as above, with a few changes. The table-land of the eastern part is described as the Tigré, and the western part is the semi-arid table-land of Tigre, which is situated about 670 feet above the sea. The climate at the eastern part of this table-land is generally of a warmer nature, and is distinguished by a peculiar kind of haze, which rises higher than the cloud and is always covered with grass. It terminates at the Wady Kullen, a large ravine bounded by basaltic cliffs from 800 to 900 feet high. At the end of the dry season water is only found in pools, but during the rains it is a large river, which receives the drainage of an extensive tract, and carries it to the Hawash river. The ravine is covered with bushes which are not found in other parts of the table-land, where the soil is very dry.

West of the Wady Kullen the table-land rises gradually till it attains an elevation of 2000 feet above the sea. The soil is here more volcanic, and improves in fertility; but the surface is more broken, and level plains are rarer and of less extent. The vegetation is composed of many kinds of wild plants, and is always covered with a thin layer of soil, which however is covered with a thick turf. But this region is almost destitute of water. On the west of this tract two lofty peaks rise from the plain. These are Mount Maita, which rises to 7054 feet above the sea, and Mount Asal, which attains 6589 feet, and is about 4000 feet above its base and Azolo still higher. They appear to stand in the centre of a volcanic tract, with which sheets of lava have descended on all sides to the plain, forming a field of volcanic matter about 30 miles in diameter. Mr. Kirk counted 21 of such cones. The surface of the lava appeared fresh and glossy. The vast plain adjacent to the
tract is covered with low shrub, and during the greater part of the year it is a sheet of water; but at the end of the dry season not a drop is found on it. As this region contains more wood than those nearer the sea, wild animals and game are more numerous here than in the plains of Ass, asses, wild hogs, zebras, guinea-fowls, quails, and spar-fowls.

South-west of this region the general level of the country is about 2500 feet above the sea. This is the most fertile portion of the country. The inhabitants of this region, being surrounded by all types of country, with the exception of the sea and the river, are far more numerous than the inhabitants of any other part of the country, and it is the centre of communication. The river Dawahi, which is supposed to have been navigated by the ancient Persians, is the most important stream in the country. The river is divided into two main branches, the western and the eastern, which are separated by a range of hills.

The country descends by several short terraces to the banks of the Dawahi river. The average level of the river is about 2500 feet above the sea. This river is divided into two main branches, the western and the eastern, which are separated by a range of hills.

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tag it, but they knew little of any part, except the tract through which the caravan road from Massowah to Tigré lies. This road was also described by Bruce and Salt. In 1839 the English took possession of Aden in Arabia, to facilitate the passage of trade between Bombay and Suez, and this event soon led to a closer connection with the surrounding countries. In the same year the missionaries Isenberg and Krapf, having been obliged to leave Tigré, where they had resided for several years, went from Tadjoura to Ankobar, and, after passing through a desert, returned to Aden as European travellers. In 1841 Major Harris was sent by the British government to Shoa and succeeded in concluding a treaty of amity.

(Brace, Travels to discover the Source of the Nile; Lord Lytton, Voyages and Travels to India, Ceylon, the Red Sea, Abyssinia, and Egypt; Salt, Voyage to Abyssinia and Travels into the Interior of that Country: Rüppel, Reise in Abyssinien; Isenberg and Krapf, Journals detailing their Proceedings in the Kingdom of Shoá; Kirk, 'Report on the Route from Tadjoura to Ankobar,' in London Geogr. Journ., vol. xii.; Dr. Beke, 'Routes in Abyssinia,' in London Geogr. Journ., vol. xii.)

ADDITION. [SIDMOUTH, LORD.] ADEN, moss, AUSTRALIA, P. C. S.] ADELOCRINUS, a fossil genus of Crinoidea, from North Devon. (Phillips.)

ADELSBERG, a town not far from Lübeck, in the duchy of Holstein, consisting of five streets, and celebrated for the great caverns which are in its environs. There are two principal caverns, the cavern of Adelsberg, which is 1250 Vienna klafter, or about 7500 feet long, and the Magdalenä cavern, which has been explored for a length of 200 klafter, or about a third of a mile, of which three layers of the cavern are broken into huge square fragments, which in some places are heaped up by nature so as to resemble a Roman bridge. The most remarkable is the cavern of Adelsberg, the entrance of which, near the ruined castle of Adelsberg, is very narrow, but the cavern soon becomes wider, and forms several spacious grottoes which are from 60 to 80 feet high. Splendid stalactites hang down from the roofs and cover the walls, and present a beautiful appearance when seen by the light of torches. The Pink or Pinka, a little river, throws itself into the cavern, and as it forms several cascades the interior resounds with the uninterrupted noise of the waters. In the innermost corner of the cavern this river disappears through a narrow fissure in the rock, but continues its subterranean course for nearly eighty miles, till it appears again near Mallingrad-Kleinheisél, where it is called Unez. After having flowed through the valley of Planina it disappears once more in the caverns of Laoso, and comes again to the surface near the town of Laoso, which is called the Laibach. In those parts of this river which are subterranean, and especially in the cavern of Adelsberg, the Proteus is found. The Slavonian inhabitants of the country call it Bela Ribá, the Germans Weischen, both of which mean White Fish. It was first noticed by Laurenti in 1768, in his 'Synopsis Reptilium,' and was called the Proteus Anguìlius; but we owe the first and best scientific description of it to the learned Scapoli, a naturalist who paid particular attention to the various animal, botanical, and mineral phenomena of his native country Krajin. Sometimes the Proteus is found in the open parts of the river, though only when the water is high in consequence of heavy rains. [Proxerus, P. C.] Engravings on stone of the fish as it occurs in and near the mouth of the river, as well as of the Laibach, have been drawn and published by A. Schäfer and M. Schäferring, Leibach, 1839, fol.

(Count F. v. Hohenwart, Wegweiser für die Wanderer in den berühmten Adelsberges Grotte, Leibach, 1832; Neueste Conversations-Lexicon; Hamilton, Research in Ain Minor, vol. i. ch. 1.)

ADEN, a town and harbour on the southern shores of Arabia, in 12° 40' 10" N. lat. and 48° 10' 20" E. long. Being the principal port of the coast of Arabia, it was the most remarkable place, consisting of a small number of mud huts covered with mats, and containing about 600 inhabitants. Good water could be procured, but fire-wood, fruit, and vegetables were scarce, and fish was the staple food. In the year 1839 the English took possession of Aden, and burned the town and all its buildings. In recent years they have built a small fort upon it, and the place is now a British naval station. The town is situated at the extreme south of the island, and is surrounded by a mountainous tract, and in the environs of Aden, a village in Bohemia, on the frontier of this country and the silesian county of Graz, in a valley of the Riesen-Gebirge, or Giant Mountains; it lies in the circle of Königrätz. About twelve miles north-west of the town of Graz the traveller reaches the mountain of Reu-
scheuer, which forms the beginning of the rocky labyrinth. The summit of this mountain, or rather winding ridge, is cut perpendicularly like a wall to the depth of from six hundred to twelve hundred feet, and there are only a few paths by which a def. can ascend to the labyrinth below, which consists of masses of rock detached and laid one over another in all directions. Some are as large as moderate houses, and others have the size and shape of churches, pyramids, and similar buildings, or at least appear so to a lively imagination. One spring in particular and a day or two after heavy rain, when the centre of the labyrinth, the traveller passes by means of small crevices through a wall of sandstone of stupendous height, and he then enters a chaos of isolated columns, walls, towers, and other fragments of stone, that it may be said nothing has been left but the description, varying in height from 100 to 200 feet. Some of these rocks are rounded at the top by irregular curve-lines, but the lower parts of their sides are as perpendicular and straight as if they had been cut artificially. The most remarkable is that which is called 'Der Umgangskreuzstock,' or 'The inverted Sugarloaf,' which is surrounded by a great number of pillars, which, though most of them are only three or four feet in diameter at their bases, are as high as the most massive rocks, and appear like a group of lofty chimneys. The width of the paths or winding crevices between the rocks varies from two to twenty feet; they are in many places covered with deep and light sand produced by the fragments of the rocks which have been operated on by the atmosphere and rains; for this sandstone is very friable, and is often an unconsolidated agglomerate of quartzose sand. In the middle of the labyrinth there is a large opening, overhung by the surrounding rocks, covered with plants and grass; and here a great fall in the river, by a chain of cataracts, falls in a cascade from a fissure in the principal hill, on the top of which there stands a ruined Gothic castle. This remarkable spot is annually visited by many travellers, and has especially attracted the attention of geologists. It is generally supposed that the whole, which extends over many square miles, was originally one solid mass of sandstone, which has been split by volcanic action, and afterwards washed out by the waters. Similar groups, though comparatively little important, we would wish to mention, are found in the district of the Middle Weser, and especially in the district of Saxony Switzerland, where volcanic action has left many traces.

(From Langhans, *Das Adersbachische Steingebirge: Neuererer Mittheilungen—Lexicon; The European Magazine, August, 1822, contains an account which seems to be translated from the German of either Zöllner or Weisse; Erich und Graber, *Die Gebirge;* see also, *Geographic.*)

**ADJUDICATE.**—In the law of debtor and creditor in Scotland, is a process for attaching heritable or real property. It is applicable not merely to land and its accessories, but to all rights ' bearing a tract of future time,' as annuities, penalties, and fines; and in general has been extended to all such property as is the subject of bankruptcy or adjudication, as not attachable by the simpler process of arrest. The origin of this process of adjudication is to be found in a very ancient practice called Appraising, by which the debtor who refused to satisfy his creditor, either with money or land, might be compelled to part with so much of the land as the award of a jury found commensurate with the debt. This form was the object of legislation so early as the year 1660, when provision was made for compelling feuars to give the proper inducements to those who had acquired lands by such a title. The debtor who is compelled to part with his lands under the old appraising might redeem them within ten years; but it is said that this privilege was often defeated by delays, and, in order to obviate this abuse, by an act against judicial oppression, the genuine creditor being often defeated by the collusive proceedings of the debtor's friends and, on the other hand, a creditor to a mere nominal amount was enabled to compel the orifice of the orifice itself, that is, to make over to the creditor what had been adjudged to him by the court, to be redeemed within ten years, on payment of the debt, interest, &c. The latter is the alternative universally adopted in Scotland, and is adherent to the absolute property of the orifice at the end of the ten years without judicial interference, in an action of declarator of expiry of the legal,
in the Court of Session or in that of the Sheriff, in the same way as ordinary civil cases. The inferior Admiralty jurisdictions of Scotland were not abolished by the above act.

The constitution of the Court of Admiralty has been affected by two recent acts, the 3 & 4 Vict. c. 65 and c. 66. The first of these acts empowers the Dean of Arches to sit as assistant to in place of the Judge of the High Court of Admiralty, and admits to this court advocates, attorneys, and procurators. The second act vests the Court of Admiralty in all matters and proceedings with the right to make rules of court, and to enjoy all the privileges which pertain to the judges of the superior courts. The Court has power to adjudicate on claims for services and damages, to grant letters of administration to the next of kin of deceased but within the body of a county at the time when such services were rendered. It is empowered to direct issues on questions of fact arising in any suit to be tried before a judge of the superior court of common law, and to direct new trials, or grant or refuse them, subject to an appeal. The 3 & 4 Vict. c. 66, is an act for regulating the salaries and in some respects the duties of the judge and officers of the court. It fixes the salary of the judge at 4000L., with a retiring pension of 2000L. after fifteen years' service, or on becoming permanently disabled. It also prohibits the judge from sitting in parliament. The salary of the registrar is 1400L., without fees. In time of war, or in case of a great increase of business, the registrar's salary may be increased to 2000L. He performs his duties personally; but, if he is out of office, ill or absence, he neglects for two days to appoint a deputy, the judge is empowered to appoint one, and to fix his salary, which is to be paid out of the salary of the registrar. The Acts of 1782 and 1783 changed the commission of the judge. The temporary officers of the court are now separately to be appointed and paid. The fee for accounting to the Privy Council, for the payment of judgments, is 100L. The salary of the principal registrar is 250L., and that of the assistant, 100L. The fees for the court are carried to an account called the fee-fund, out of which all the officers are paid except the judge.

The business and fees of the Court of Admiralty are always much greater in time of war. From 1778 to 1792 Judge Marriott received 4600L. a year, the salary being 800L., and the fees averaging 3700L. a year. On the return of peace his salary was increased to 800L.; and his total income during the peace averaged 1800L. a year. In 1794 the salary of the principal registrar was raised to 250L. for all cases. But in the first ten years of the French revolutionary war, the income of Sir W. Scott averaged 5700L. a year, the salary being 2500L. and the fees 3200L. About a thousand cases a year were determined by the court during the war. (Evidence of Dr. Trench, Admiralty ibid. 1793; and of Sir David Atlay, ibid. 1833; reprinted in 1843, by order of the House of Commons.)

The Prerogative and Admiralty Courts were presided over by one judge on two occasions in the last century, from 1710 to 1714, and from 1722 to 1778. The Parliament Committee of 1833 recommended that the two judges of these courts should sit interchangeably, when occasion may require, either in one court or the other.

ADMISSIONS IN A SUIT are those facts or matters necessary to form a cause of action. They may be in the case of the plaintiff, or of the defend¬ant, in a suit in equity, the necessity of proving which is removed by the opposite party admitting them. Admissions are either, I. Upon the record, or II. By agreement between the parties.

1. The statements in a bill in equity, the truth or correctness of which is distinctly admitted in the answer, become thereby evidence for the plaintiff, and may be used by him to show the extent of the admissions made by the defendant. But when the defendant contains a statement or an instrument of a defeasance, will, and the defendant, while he admits it to be to the tenant and effect act forth in the bill, refers to the document itself for greater certainty, he has a right to insist upon the document itself be read in court. When a bill has been taken pro confesso against the defendant, under the stat. 1 Wm. IV. c. 36, it may be read in
ADMITTANCE. [Corypil, P.C.]

ADULTERATION (from the Latin Adulteratio) is the use of ingredients in the production of any article, which are cheaper and not so good, or which are not considered so desirable for which they are substituted. The sense of the Latin word is the same. (Flax, Act, xxi. 40.) This offence does not consider adulteration generally as an offence, but relies apparently on an evil of this nature being corrected by the discrimination and good sense of the public. The selling of articles most or partly adulterated under most local acts; and is also an offence at common law. In Paris, malpractices connected with the adulteration of food are investigated by the Conseil de Salut public, at the urging of the authority of the prefect of police. In this country, where the pecuniary interests of the manufacturer have been resorted to in order to prevent adulteration. It is not, however, heavy customs or excise-duites alone which encourage adulteration, for the difference in price between the genuine and the spurious article, when both are free from taxation, presents great inducement to the practice. The following is an abstract of the law respecting the adulteration of some of the principal articles of revenue:

Tobacco-manufacturers are liable to a penalty of 500l. for having in their possession sugar, treacle, molasses, honey, commings or roots of malt, ground or unground roasted grain, ground or unground chicory, lime, umbre, oche, or other earths, sea-weed, ground or powdered wood, moss or weeds, and any manures, or mixtures of manures, or grains (manures or plants), respectively, or any substance or material, syrup, liquid, or preparation, matter, or thing, to be used or capable of being used as a substitute for, or to increase the weight of, tobacco or snuff; or to preach counterfeit tobacco or snuff, or who shall sell or deliver such articles to any tobacco-manufacturer, is also liable to a penalty of 500l. (§ 8). The penalty for actually adulterating tobacco or snuff is 500l. (§ 18), and for suffering, knowingly, or by neglect, or connivance, or otherwise, an adulteration which resembles tobacco or snuff, or who shall sell or deliver such articles to any tobacco-manufacturer, is also liable to a penalty of 500l. (§ 8). The penalty for actually adulterating tobacco or snuff is 500l. (§ 18), and for suffering, knowingly, or by neglect, or connivance, or otherwise, an adulteration which resembles tobacco or snuff, or who shall sell or deliver such articles to any tobacco-manufacturer, is also liable to a penalty of 500l. (§ 8).

The ingredients used in the adulteration of beer are enumerated in the following list of articles which brewers or dealers and retailers in ale and beer are prohibited from having in their possession under a penalty of 500l. (66 Geo. III. c. 58, § 2). These articles—molasses, bran, mustard, quassia, cocculus Indica, grains of Paradise, Guinea pepper, and opium—are prohibited. They are used either as substitutes for hops or to give a colour to the liquor in imitation of that which it would receive from the use of the genuine article. The householder is guilty of the same act a penalty of 500l. is imposed upon any chemist, druggist, or other person, who shall sell the articles mentioned in § 2 to any brewer or dealer in beer. The penalties against the former applies in all cases where dealers in beer or other drinks are found in possession. Under 1 Wm. IV. c. 64, and 4 & 5 Wm. IV. c. 85, which acts also contain special provisions against adulteration applicable to this particular class of dealers; and the licence also prohibits the sale of ale, beer, and porter, made otherwise than from malt and hops; or adulterated with drugs; or fraudulently diluted, adulterated, or deteriorated.

Tea, another important article of revenue, is protected from adulteration by several statutes. The act 11 Geo. I. c. 30, § 6, renders a person dealing to a penalty of 100l. who shall counterfeit, adulterate, alter, fabricate, or manufacture any tea, or shall mix with tea any leaves other than leaves of tea (§ 5). Under 4 Geo. IV. c. 14, tea-dealers who dye, fabricate, or manufacture, licenee-leaves, the leaves of tea that have been used, or any other leaves in imitation of tea; or shall use terra japonica, sugar, molasses, clay, wood, or other ingredients, to colour or dye such leaves; or shall sell or have in their possession such adulterated tea, is liable to a penalty of 500l. for every pound of such adulterated tea found in their possession (§ 11). The 17 Geo. III. c. 29, also prohibits adulteration of tea (§ 1).

The adulteration of coffee and cocoa is punished with heavy penalties under 48 Geo. III. c. 20, who deal in, or manufacture, or has in his possession, or who shall sell or give, sensitized, scorch'd, or roasted peas, beans, grains, or other grain or vegetable substance prepared as substitutes for coffee or cocoa, is liable to a penalty of 100l. (§ 5). The object of § 5 of 11 Geo. IV. c. 30, is similar. Chicory has been very extensively used in the adulteration of coffee in this country. This root,
which possesses a bitter and aromatic flavour, came into use on the Continent in consequence of Bonaparte's decrees excluding colonial produce. Coffee with which a fourth or a fifth part of chicory has been mixed is by some persons preferred as a beverage to coffee alone; but in England it is used to adulterate coffee in the proportion of one-half. The Excise has for some time permitted the mixture of chicory with coffee. In 1829 a duty was laid on chicory, and this duty has been increased. But this has also alliterated that the importation of chicory into England is also grown in England, and to prevent fraud it will be necessary to place the cultivation under some restriction, or perhaps, as in the case of tobacco, to prohibit its being done together.

The manufacturer, possessor, or seller of adulterated pepper is liable to a penalty of 100l. (59 Geo. III. c. 53, § 22). The act 9 Geo. IV. c. 44, § 4, extends this provision to Ireland.

The important article of bread there are prohibitions against adulteration, though they are probably of very little practical importance. The act 6 & 7 Wm. IV. c. 37, which repealed the several acts then in force relating to bread sold beyond the city and liberties of London, and ten miles of the Royal Exchange, was also intended to prevent the adulteration of flour, meal, and bread beyond these limits. No other ingredient is to be used in making bread for sale except flour or meal of wheat, barley, rye, oats, buckwheat, Indian corn, or potatoes, and not exceeding in weight one-half of the flour or meal by which they are calculated. There is a penalty for a period not exceeding six months; and the names of the offenders are to be published in a local newspaper (§ 8). Adulterating corn, meal, or flour, or selling flour of one sort of corn as flour of another sort, subjects the offender to a penalty not exceeding 20l. and not less than 5l. (§ 9). The premises of bakers may be searched, and if ingredients for adulterating meal or flour be found, the penalty for the first offence is 10l. and not less than 40s.; for the second offence 5l., and for every subsequent offence half the amount of the fines of the offenders are to be published in the newspapers (§ 12). There are penalties for obstructing search (§ 13).

Any miller, mealman, or baker acting as a justice under this statute incurs a penalty of 100l. (§ 15).

The above act did not apply to Ireland, where the baking trade was regulated by an act (2 Wm. IV. c. 31), the first clause of which, relating to the ingredients to be used, was similar to the English act just quoted. In 1836 another act was passed (1 Vict. c. 28), which repealed all former acts relating to the sale of bread in Ireland. The preamble recited that the act 6 & 7 Wm. IV. c. 37, had been found beneficial in Great Britain; and the clauses respecting adulteration are practically the same in the English act.

The several acts for regulating the making of bread within ten miles of the Royal Exchange (which district is excluded from the operation of 6 & 7 Wm. IV.) were consolidated by the act 9 Geo. IV. c. 106. Under this act any baker who uses alum, or any other unhomogeneous ingredient, is liable to the penalties mentioned in § 12 of 6 & 7 Wm. IV. c. 37. Any ingredient or mixture found within the house, mill, stall, shop, &c. of any miller, mealman, or baker, and which shall appear to have been placed there for the purpose of adulteration, renders him liable to similar penalties.

Other articles besides those which have been mentioned are adulterated to a great extent, and there is scarcely an article, from arrow-root to guano, which escapes; but perhaps the result is not so great as it might have been had it not escaped the notice of those who profit by it, who are less likely to be imposed upon when depending on the exercise of their own discrimination, than if a commission of public functionaries were appointed, whose duty it would be to investigate and detect the presumption of adulteration. The interference of the government in this country with the practice of adulteration, except in the case of bread and drugs [Apotheics' Company, P. 33], has hitherto had no other object than the improvement of the revenue.

Adulteration and the deceitful making up of commodities appear to have frequently attracted the attention of the legislature in the sixteenth century, and several acts were passed for the prevention of it. Thus the act 20 Eliz. c. 8, prohibits under penalties the practice of mixing bees-wax with resin, tallow, tarpine, or other spurious ingredient. The following acts have reference chiefly to frauds in the making up of various manufactured products:—3 Hen. VIII. c. 6; 21 Hen. VIII. c. 17; 1 Eliz. c. 12; 3 & 4 Edw. VI. c. 2; 5 & 6 Edw. VI. c. 6; 5 & 6 Edw. VI. c. 28.
AETH

published by M. Havy in 1787, under the title 'Exposition de la Théorie de l'Electricité.'

Aetius discovered the means of changing a plate of air with electricity, when it is confined between two boards. He appears to have directed his attention to mechanical subjects; for he discovered that the hands and feet, when pressed against the poles of a Leyden jar, in electrifying them, the sum of the forces, decomposed in the direction of the arms, is a maximum.

(Biographie Universelle. The brief notices of the discoveries of Aetius are taken from the works named above.)

Aethanol. A very valuable liquid, as it is a non-poisonous ester of alcohol. The methods of preparing alcohol are there described. Its offensive odour is caused by the concentration of reflected or refracted rays at the angles where they appear to be suspended in the air.

The images which are caused by the reflection of light in the strata of a mirror, are merely third grade, having no objectives. When these strata of the mirror, or other objects, differ considerably in density from the strata above them, have been described under MIRAGE, P. C., and it is intended here to mention only those which are perceived on looking in or towards a concave mirror.

If an object be placed, or if a spectator place himself, directly in front of such a mirror, at a greater distance from it than the centre of its curvature, the penulous light diverging from points on the surface of the object, or from that part of the spectator's person which is turned towards the mirror and is not very far from its axis, will, after reflection, converge to corresponding points between the object and spectator and the mirror, and will constitute an inverted image of either. Now, let the spectator be himself the object; then the rays in each pencil constituting the image are refracted, and if directed inwards in a divergent state on his eye, will produce vision of the image; but those which enter the eye being in this situation few in number, and the eye not being capable of making the reflection, this impression if that which we usually perceive faint and indistinct: in those circumstances also it usually appears to be within or behind the mirror.

But, as the spectator approaches the mirror, the reflected rays which form the image converge less rapidly, and meet at a greater distance from the mirror in its front; the eye at the same time, being nearer the image, receives pencils which are reflected from parts of the mirror at greater distances from the axis, so that the image appears both greater and more distinctly. The observer, and the diameter of the image of the spectator will be seen hanging in the air, in an inverted position, between himself and the mirror.

If, while the spectator is yet farther from the mirror than the centre of curvature, he advance his hand towards the mirror, the hand of the image will seem to advance to meet it; and at a certain place, which is the centre of the mirror's curvature, since there the rays in the pencils which proceed from the hand will be reflected back in a certain line, the hand will seem to be held there. In this position the inverted image of the spectator will be very distinctly seen between the mirror and his hand.

The spectator now advances towards the centre, the image will advance to meet him, but it will become indistinct, and at the greater distance, and on the concave side of the mirror towards the mirror, the reflected pencils will converge to points beyond the centre in the opposite direction, that is, behind the spectator, and the rays of the pencils will enter the eye before they can unite to form a distinct image; the spectator will perceive the reflection of himself in the mirror in an erect position; and the figure will become more distinct as he approaches nearer to the mirror, since the reflected rays in each pencil approach nearer to parallelism, and become equal to the rays from the pencils, or midway between the mirror and its centre of curvature.

AETHERS. The most common of those, with the methods of preparing them, have been previously described in P. C. vol. I. and those, which, though perhaps now unknown, are useful to those who desire to have them, the first to be treated of, taking a general view of the modes of action on the human system, is sulphur ether, which is always understood to be the one intended. It is prepared by the German chemists and therapists designate them sensatia, a term liable to cause them to be confounded with bitumen. Others present the most perfect examples of volatile stimulants, being unequalled for rapidity of action, when immediately after the administration, the effects are immediate, and must be imparted to the muscular system, especially the involuntary muscles, by augmenting the nervous power, and by quickening its development. Whether they effect this by a direct impression on the nerves, or by previous absorption into the circulation, it is very difficult to determine, since most of them are absorbed so rapidly, as almost instantly to mix with the circulating mass. There are two greatest resemblance to alcoholic stimulants; but are distinguished by more instantaneous effects. These however are more transient, and a more frequent repetition of the dose is therefore required. Fatal results are less likely to follow from large doses of ethers of alcohol, than from spirits, which may be accounted for by the excess being more specially thrown out of the system, especially by pulmonary and in some degree by cutaneous exhalations; for the more highly carbonized spirits is the more readily converted. It furnishes the proper guide for the treatment of cases of poisoning by them, viz. placing the patient where he may respire as pure air as possible, and in the light, carrying on the administration of a needful, occasionally dashing cold water on the face and temples, and stopping of respiration or cupping. Transmitting a galvanic current of a moderate force along the eighth pair of nerves is often beneficial. Perseverance in the use of these means for hours is frequently successful. Sulphuric ether is the most powerful of atherial preparations, and therefore of diffusible stimulants. It is distinguished from the others likewise by having less secondary effects upon the system. Hence it is more employed for its primary effects than for both primary and secondary effects. It is of a peculiar, strong, penetrating, rather agreeable odour; the taste is at first cool, afterwards hot, leaving a feeling of dryness in the mouth and throat. Its volatility is very great, and though it does not excite redness of the face, it produces a similar effect; the respiration, which is being quickly changed into vapour by the heat of that organ, causes contraction of its muscular coat, and expulsion of gas, thus acting as a carminative, or it produces most painful discomfiture from the effort of the muscles of respiration, and is followed by slight cerebral excitement, and even a feeling similar to intoxication may be experienced, which however soon passes off, without leaving any marked depression; though a disposition to sleep, and sometimes tendency to give way to delirium. If the patient be placed in a very cool and air free common channel by which it is eliminated; this ether having less influence on the kidneys than other than the other. If spasm, irregular action, or debility of the organs of digestion, which usually follow, is treated by antispasmodic, digestion, and consideration, these generally disappear speedily, or are alleviated by its use. Hence it ranks as an antispasmodic of the highest kind. It is therefore resorted to in all cases of imminent danger, from difficulty of breathing, colic, delirium, and deep depression, such as occur in cholera, tetanus, or the later stages of fever. In relieving paroxysms of asthma it is unrivalled, and may be inhaled along with the vapour of warm water, or by being dropped on a portion of the skin and held between the fingers. Its very effect on the system, that the dose required greatly to be increased. So much as two ounces have been taken by an adult in twenty-four hours. This is hazardous, and the necessity for it may be diminished by administering the sulphuric ether with the aid of the other stimulants. Little known or used in this country, are found very effectual by the German, French, and American practitioners. An increase of our atherial preparations would be a valuable accession to our curative agents. Economy and physiology alike recommend this proceeding. The great solvent power of sulphuric ether renders it an eligible menstruum for the administration of a variety of articles; by these its own powers are heightened. It has also been attempted to take advantage of its power in this respect, by employing it in cases of bilious calculi, not merely to alleviate the agonizing pain, but from a belief that it would dissolve the calculus, and so lessen its bulk. Oil of turpentine is a good addition. It has also been employed for the purpose of discharging the notion that the volatilized ether would greatly annoy the worm, and allow it to be easily removed by a dose of castor oil or other purgative. This is not free from inconvenience and even danger to the feebile persons with whom it is employed. The use of ethers of power is much increased by adding tincture of opium, or a solution of the hydrochlorate of morphia. This combination furnishes the most effectual means of warding off a paroxysm of hysteric fits or epilepsy, if administered promptly. This is especially the object of great moment, as every fit, if allowed to take place, predisposes to a recurrence of them. Externally, ether is applied to the temples to relieve nervous headaches; and also over hernial tumours, in order that by the local application on its evaporation the hernia may contract and be reduced: a

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ortion of thin oiled silk should lie interposed between the aether and the skin.

The marvellous copaiba tree is a rare tree found in the tropics, prized for its chemical properties as a solvent of various substances than with its medicinal properties. Timo however resolves it, particularly if kept in the light, into acetic acid and alcohol. It is found in the semi-tropical region of the earth, often in an obscure place. The spirit of sulphuric ether is only a weaker form, with some aetherial oil, of the pure ether.

Chloric ether is also markedly diuretic. It is a most valuable analgesic in the sinking stages of fevers, and much commended by Dr. Copland (see his Dictionary, vol. i. p. 927) and Charcot, physican.

Acetic ether is a very agreeable stimulant, possessing a grateful odour, resembling Rhine-wine, and a cooling, aromatic, somewhat bittersweet taste. Its action is similar to that of the other aethers, and though not so potent, it is more agreeable to take. Its long continued use however oppresses the digestive organs. Nevertheless it deserves to be employed in acme fevers, its action on the skin renders it very useful for its anti-septic and antiperspirant properties. In very serviceable; also in aphryxia. In some local affections it is of great utility applied in the form of vapour, such as some forms of deafness. (See Fletcher On the Ear.)

Sulphuric ether is a valuable restorative in the paralytic stage of fever.

AESHINA. In this recent genus of Libellulide Mr. Strickland ranks a fossil insect from the lias of Warwickshire.

AETHYPHILUM, a fossil genus of plants from the keuper. (Brongniart.)

AETION (Aetion), a celebrated Greek painter, and, according to Lucian, one of the best ancient colourists; that writer mentions Aetion, Apelles, Euphranor, and Polygnotus as the most successful of the ancient Greek painters in the mixing and laying on of colours. Aetion's exact time is uncertain, although from the manner in which he is mentioned by Lucian, notwithstanding the names he is associated with, he lived probably in Lucian's own time, or at most very shortly before him. He speaks of him as the most distinguished painter of his time. Ilyas, a second-rate painter, once pleaded him in the marriage of Alexander and Roxana, which the painter exhibited at the Olympic games, and which pleased Proxenida, one of the judges, so much, that he gave Aetion his daughter in marriage. 'It cannot be asked,' says Lucian, 'what was there so marvellous in that painting, as should induce a man of such high rank to reward the painter, who was for a stranger, by bestowing on him his daughter?' The picture is still in Italy, and I am able to speak of it from personal inspection. It is a picture of extremely magnificent size, in a noble hall-chamber with a nuptial bed. In it is seen sitting Roxana, the most beautiful virgin that can be conceived. Her eyes are modestly fixed on the ground before Alexander, standing near her. The picture is of such a size, that one cannot at a distance make out all of her, which, above of her behind her lift up the bridal veil from her forehead, and shows it to the bridegroom. Another, in the attitude of a slave, is officiously employed in drawing off her shoes, that she may no longer be detained from lying down. A third, called of Alexander's race, paints him with all his weight towards Roxana. The king presents the maiden with a crown, and beside him stands Hephæstus as a bridegroom, holding a lighted torch in his hand, supported by a wonderfully fine youth, whom I guess to represent the god of marriage, for the work of it is well performed: the two figures are drawn as several more Cupids, playing with the arms of Alexander.

Two of them carry his spear, and seem almost overburdened with the weight of it. Another couple take his mantle, which he spreads upon it, tracing it along by the handles. Another creeps backwards into the coat of mail, where he seems to lurk in order to frighten the two little porters as they come on. 'These collateral incidents,' continues Lucian, 'are by no means the mere wantonness of the artist's fancy, but a wantonness in the means of the marriage, which is on the ground of the marriage of the goddess, and the marital disposition of the bridegroom, and that his love for Roxana had not effaced his passion for arms and military glory.' (Tooke's Translation.)

From this description Raphael is said to have made a design, of which there are duplicates or copies, and it was executed in fresco, in the so-called Villa of Raphael, in the garden of the Villa Borghese at Rome; but the composition is puerile, and does not at all merit the praises which Lucian has given it. It was given several times engraved and etched, or by J. Caraglio, Volpato, and others.

Lucian in the above description remarks, that he resembles a fine youth to represent the god of marriage, as the sacred ostensores. It is a kind ofcombe, which was prevalent among the Greeks, of attaching the names in their pictures to the figures represented; the names in most cases were probably written below the feet of the figure. In the pictures on canvas we find the name sometimes written on the figure, but the practice was not universal. In this case, from Lucian's remark, it would seem that some of the figures had names attached to them, as he speaks of the other characters with certainty, and guesses only at the god of marriage, because the name was not attached. It was a practice, however, seldom if at all had recourse to in later times, and in care of its employment the name was probably so placed as not to disturb the pictorial effect. Sometimes sentences were inscribed on pictures, as for instance Zeno wrote upon his picture of Helen three lines from Homer, celebrating her extraordinary beauty. (Ibid, iii. 156-158; Valerius Maximus, iii. 7, § 3.) There are similar examples on works of the middle ages, and also of much later times: inscriptions below names are frequent.

The circumstance that Pliny has not mentioned Aetion is an additional reason for concluding that he lived about Lucian's own time, or in the early half of the second century of our era, subsequent to Pliny. Another circumstance that the Echion of Pliny and Cicero is the Aetion of Lucian, especially as the former was celebrated for a picture of a bride distinguished for the modesty of her expression; but this implies a great blunder in Lucian, who speaks of him as a painter of his own time, and there is no sufficient reason for such a supposition.

(Lucian, Herodotus or Aetion, De Mercede Conducatis, 42, and Imag. 7; Pliny, Hist. Nat. xxv. 10. 36; Cicero, Brucius, 18; Parad. v. 2.)

AETHIUS (Aetius), of Amida in Mesopotamia, a Greek writer on medicine, who probably lived about the end of the fifth and the beginning of the sixth century of our era, as we may infer from the persons whom he mentions in his work. He studied medicine at Alexandria, then the seat of the most celebrated practitioners in that city, and he exhibited pieces in the form of a treatise on the marriage of Alexander and Roxana, which the painter exhibited at the Olympic games, and which pleased Proxenida, one of the judges, so much, that he gave Aetion his daughter in marriage. 'It cannot be asked,' says Lucian, 'what was there so marvellous in that painting, as should induce a man of such high rank to reward the painter, who was for a stranger, by bestowing on him his daughter?' The picture is still in Italy, and I am able to speak of it from personal inspection. It is a picture of extremely magnificent size, in a noble hall-chamber with a nuptial bed. In it is seen sitting Roxana, the most beautiful virgin that can be conceived. Her eyes are modestly fixed on the ground before Alexander, standing near her. The picture is of such a size, that one cannot at a distance make out all of her, which, above of her behind her lift up the bridal veil from her forehead, and shows it to the bridegroom. Another, in the attitude of
Hindoo-coooh do not run parallel, but converge, they unite in one mountain-mass between 70° and 68° E. long. The country included by these two ranges is called Kafiristan. It includes the northern declivity of the Western Himalaya mountains, the southern portion of the Pamir. What is seen from the plains at their base, these mountains rise in terraces; the northern and higher mountain overtopping the southern and lower, and thus at some places four ridges are parallel. The valley of the Indus joins the Pamir. A considerable portion of these declivities is under cultivation, and the term used to an elevation of 10,000 feet above the sea-level, is overgrown with high forest-trees; near the base and to an elevation of 4500 feet above the sea the forests consist of balouit, a species of oak, but above that line they are mixed with saltoon, a species of olive. The last-mentioned species forms the chief if not the only forest-tree as high as 6500 feet, where it is gradually replaced by the deodars, a species of fir. The Himalaya mountains are the most extensive in Afghanistan.

Near 70° 12° E. long. and 37° 55' N. lat., where the Himalaya already seem to be connected with the Hindoo-coooh, the nature of the mountains changes suddenly. The higher ranges indeed do not end in a plain, but divide into a large number of detached peaks, and the sides of the mountains are destitute of trees. They are almost entirely devoid of soil, and the rocks project in every direction, and the intervening places are strewn with angular débris, very little covered. Some of these are not cultivated, and sustain nothing but arid and thorny bushes, which almost invariably stand alone. Such is the nature of the Hindoo-coooh as far west as 68° E. long., where that high summit or rather mountain-pass occurs which properly and has given its name to the range, and rises to more than 15,000 feet above the sea-level. There are however many other peaks which are always covered with snow. Some of the valleys included in this range are very populous. The best known is that of Panchshir, through which one of the routes passes which lead from Kabool to Kundus, and which at the upper end of the valley traverses a mountain-pass, 13,200 feet above the sea, called the mountain-pass of Khaawack. The valleys of Panchshir, which are numerous, are very wide, and in most places about a mile and a half wide; no part exceeds twice that breadth. The upper part of it, about 25 miles, is not inhabited, probably on account of the severity of the cold in winter, but in the lower part there are seven villages inhabited by Turkomans. One of these is called Khaawack, it is a small village, and is a seat of particular importance, for cultivation only to a small extent, but every foot of it is cultivated. The orchards and the mulberry plantations constitute the wealth of its inhabitants; the mulberries are dried, and yield a good flour, which forms the principal food of the people. Another road, which traverses the Hindoo-coooh and leads to the plains of the Oxus, lies farther west, and runs through a similar valley watered by the river Parwan. The mountain-masses are at least as high as the Pass of Khaawack, about 70° E. long.

The high summit of the Hindoo-coooh above mentioned terminates the range just described. At this point the range changes its direction, running nearly due south between 36° and 34° 30' N. lat., and deserts near the sea. This portion of the range goes by the name of the Mountains of Paghman. It consists of two parallel ridges, and includes a valley more than 10 miles in width, which has a hilly surface, and seldom sinks so low as 10,000 feet above the sea. This valley is used partly as pasturage, partly for cultivation; but it is the favourite resort of the nomadic tribes in its vicinity in summer time, on account of its excellent pastures. The two ranges which enclose the valley are from 3000 to 5000 feet higher than the plains near its head; but in summer, several passes lead over them to the valley of Bameeheen, which is west of the western range and only 8000 feet above the sea. The best known of these passes are those of Oghourund, of Erak, which attains 13,800 feet, and that of Kulloo, which is 12,841 feet above the sea-level.

The Koh-i-Baba range may be considered the commen-
ment of the Paropamisus; north of it lies the mountain-region of the Hazar. The Koh-i-Baba is not a mountain-region, but a single range, which rises suddenly where the Pughismian mountains terminate, and then runs due east. At its eastern extremity it presents an immense mass of rocks, overtopped by three snow-clad peaks. The great mass attains an elevation of about 14,000 feet above the sea, and the peaks rise about 1500 to 1600 feet higher. Patches of snow are found on this range, which extends 130 miles from the eastern end of the Koh-i-Baba. These mountains are barren, for the rocky masses have no covering except angular fragments of rocks which cover the declivities.

To the north and west of the Koh-i-Baba are the mountain-regions of Panjshur and Hazar, and hence the Koh-i-Bala, the whole country between 34° and 36° N. lat. and between 68° and 83° E. long., comprising an area of nearly 50,000 square miles, equal to the extent of England without Wales. The eastern part, or that which is north of the Koh-i-Bala, and is in possession of the Hazar tribes, is the more elevated. Its surface presents a succession of high mountains with rather gentle slopes, which are traversed by numerous open valleys of moderate width. The declivities of the mountains are frequently covered with a soft soil composed of grass, and various shrubs and herbs, but is destitute of trees. Some of the higher valleys can also be used only as pasturage; in the lower valleys barley is cultivated, and in the long narrow valleys, along the coast, wheat, barley, and rice are obtained.

The domestic animals are horses of a small breed, cattle, and sheep, but as the country is so high the climate is very severe, and the Hazar tribes are obliged to cut great quantities of grass for their sheep, which, during three months of the winter, usually sleep under the same roof with their master. The general level of this country appears to be about 10,000 feet above that of the sea.

The mountain-region of the Emainak does not materially differ from that of the Hazar, except that the mountains are less elevated: their general level does not much exceed 9000 feet above the sea. The valleys also sink deeper, and are firmer for cultivation, which is also carried on to a greater extent, but even here the produce of the domestic animals constitutes the wealth of the population. They are not obliged to procure winter fodder for their sheep and cattle in such large quantities as the Hazaras, for in the valleys, to which they return in autumn from the mountains, great quantities of pasturage are found in sufficient abundance. In summer, this region, as well as in the country of the Hazaras, the pastures are so abundant, that several tribes of Doornanees, which inhabit the Zemin Dwar, or the country between these mountain-ranges and the river Helmand, bring their flocks to these pastures; it is for this reason that the rice-grains in that season the grass in their own countries is burnt up.

II. The Valley of the Kabul River.—This valley lies along the southern base of the eastern portion of the mountain-region; just descented, and beginning on the west at the foot of the Pughismian mountains, and stretching eastward to the banks of the Indus river, through a space measuring nearly 200 miles in a straight line. At its western extremity the valley is about 10,000 feet above sea level; but where it terminates on the Indus it does not exceed 750 feet.

The southern boundary of the valley is formed by an uninterrupted chain of heights varying in elevation. This chain is not connected by any ridge with the Mountains of Pughism, but is generally separated from them by a narrow valley called the river Mydan, which is 7747 feet above the sea-level, and is well cultivated, and covered with orchards and fields. Through his plain the road runs from Kabul to Ghuznee and Kandah.

On the east of the road rise some hills of moderate elevation, which at first are rather loose, but unite in a continua-

tion chain. Baber describes them as low, with little grass, bad water, and not a tree on them; and adds that in the whole world he had not seen such a dismal-looking hill-country. This is generally covered with mountainous vegetation, that consists of great metallic riches. During the British occupation of the country it was discovered that extensive beds of very rich copper-ore exist in many places, though the natives only work them occasionally. These hills are separated by about 20 miles from Mydan, at Tazen, where they rise higher and are covered with trees. East of 69° E. long, these mountains attain their greatest elevation in the Sufad-Koh, or White Mountain, which is covered with snow all the year round. This elevated rocky mass appears to extend 30 or 40 miles from west to east, and perhaps half as much from north to south. Its summit rises about 16,000 feet above the sea.

The declivities of this mountain, to an elevation of more than 10,000 feet, are covered with forests, especially the species of deodar; and near the base are plantations of fun-
trees. In some places they are cultivated, and the pasture-
lands are divided by a number of small streams, which descend in numerous streams, which preserve a considerable volume of water all the year round, an inestimable advantage in a country which has a dry air, and where in summer the largest springs are frequently dried up, as they are trickling down to mere brooks. The high mountains appear to termi-
nate near 70° E. long., and the range of lower mountains which runs hence eastward to the Indus is called the Kyber-Tir range. Near the Sufad-Koh these heights certainly rise to 10,000 feet; but they grow lower farther to the east, and where they terminate on the Indies with a precipitous de-
civity they can only be called high hills. This portion of the range descends with rather rapid slopes towards the north, and its sides in many places are marked by a scanty grass, except after the great rains in July and Au-
gust, when the grass is abundant. Cultivation is limited here, but its tops, which present plains of moderate extent, have a deep soil, which yields gold crops where it can be irrigated. The road descends between ridges, in some places mounting to 4000 feet west of the town of Kabool, drains the Mydan valley, and passes through the town of Kabool, where it is an insignificant stream. Below the town it is joined by two more considerable streams, the Helmand, which descends from the mountains west of the town of Logur, and the Yoor, which descends from the most eastern mountain-region, and enters it from a small chain of Kabool from that of Jellalabad, and in this part of its course the river descends about 4000 feet in a space of 30 miles in a straight line, and descends with rapidity; there are oaks in the banks of the river. Two or three miles below Jellalabad the Kabool is joined by the large river which drains the Koonur valley in the Himalaya range, and is generally called Koonur. The Kabool then begins to descend more gradually, and in this part it enters another mountainous tract, and it emerges from it at Muebarr in the Plain of Peshawur, or Peshawar, where its current is very moderate. A short distance below Muebarr it divides into two branches: the lesser, or Shulamur river, passes only four miles north of Peshawur, and unites, 5 miles in a straight line from the point of division, with the Hadezy, or other branch. After a course of thirty-five miles more it enters the Indus. The island formed by the two rivers near Jellalabad and Peshawur may be traversed in 12 hours; and by land is not less than 100 miles. The conveyance of goods on such rafts holds out a prospect of enlarging the navigability of the Indus river itself. No river vessels can ascend this in-
terested river farther than Kalabagh, the current is too weak to transport goods, and the rapids would experience no difficulty in proceeding to Kalabagh, and there discharging their loads into the boats which navigate the Indus. The Kabool river is lowest in the winter, notwithstanding the fact that it enters the Indus in that month, so that place and Attock become too rapid. But the rafts would experience no difficulty in proceeding to Kalabagh, and there discharging their loads into the boats which navigate the Indus. The valley of the river is divided by the high plateaus, which are divided from each other by two extensive moun-
tain-regions. The three basins receive their names from the principal towns, and are called, from east to west, Kabool, Jellalabad, and Peshawur. In their upper parts, called the mountain-regions, they are separated by the river, which is called Lattabund, and the eastern Kyber, from the two most frequented passes which lie across them.
The Basin of Kabul extends about 36 miles from west to east, and from 8 to 16 miles in the opposite direction. It is divided by two ridges of hills into three plains. The town of Kabul is built at the base of a ridge of hills which runs across the plain from east to west, and at the height which the Kabul river passes by a gorge. From its highest summit, called Takt-i-Shat, at the foot of which Kabul stands, the whole ridge has obtained the same name. That portion of the plain which lies west of the Takt-i-Shat ridge is called Charkh-i-Shat, and that portion which lies east of the ridge, and which, for the sake of clearness, we have called the civil or agricultural district of Kabul, is called Kang-i-Shat. This is a very fertile tract, presenting one continuous mass of verdure, and a succession of extensive orchards and meadows, between which a great number of villages are dispersed; they are watered by the Kabul river, raised about two or three months by rows of poplar and willow. Fruit is so abundant that the poorer people live entirely on it for many months of the year, though corn is raised to a considerable amount.

The eastern and wider portion of the basin is divided by another ridge of heights, which is connected with the Takt-i-Shat at its northern extremity, but runs in the opposite direction, from west to east, being at its western end united to the Pushtun mountains. Its eastern extremity does not reach the Hindoo-coocheh, as it is separated from this great mass by a low depression, through which the drainage of the northern districts is carried by the river Ghorhound to the Kabul river. These northern districts go by the name of Koh-i-Daman. On the west they are surrounded by the Pushtun mountains, which rise in fine ridges and ranges and their offsets. The Koh-i-Daman has a length of thirty miles and a medium width of seven. The western side of this plain is much higher than the eastern, along which the drainages and valleys extend. There are in the surrounding it are spread by numerous ravines, through which rills of the purest water fall. The slopes enclosing these ravines are thickly planted with the mulberry, and every moderately level spot is planted with fruit-trees or the vine. The southern part of the plain is a stony and comparatively barren tract, the principal produce of which is fruit, for which both the soil and climate are well suited; the northern and larger portion yields grain, cotton, tobacco, artificial grasses, and various other crops, rarely any fruits are grown by which there are many inhabitants. Here, as in the valley of Peshabhr, which opens into this plain, the mulberries, when dried and ground, produce a flour, which is used in making bread.

Koh-i-Daman is a favourite country residence of the wealthy inhabitants of Kabul, and is almost as thickly studded with castles as with gardens. They are strongly built, and may be compared with the old baronial residences in England.

South of the Koh-i-Daman is the Plain of Logour, so called from the river which traverses its southern portion before it joins the Kabul river. It extends about 20 miles from west to east, and half as much in the opposite direction. In the middle there is a ridge of higher grounds, which divides the Lagour river into two branches. The level that it appears to have been formerly a lake, and at present a large portion of it is a swamp during nearly the whole year, especially along both banks of the Logour river. This is the case along the west, or the Baranak part of Kabul, and the cultivated grounds occupy only a small portion of the surface; but it is very rich in grass, an important object for a nation which keeps so many horses as the Afghans. It contains also extensive orchards and vineyards.

The basin of the river Kabul constitutes the principal article of trade. They go to Hindustan. Grapes of a dozen different kinds are grown, but only two species bear ripening. There are six varieties of apricots; of the mulberry, 20 kinds; of peaches, 7 kinds; of apples, pears, peaches, walnuts, almonds, quinces, cherries, and plums, red and white melons are raised in abundance. The wild fisher root is used to make preserves. The vegetables are excellent, but not plentiful. They have cabbage, lettuce, potatoes, beans, peas, cucumbers, roots, turnips, leeks, celery, and cauliflower: these are generally cultivated in the fields, the gardens being reserved for fruits and flowers. Irrigation is common wherever water is found.

The plain from the foot of the heights to the river, and even the most eastern part of the basin of Kabul is 6000 feet above it; whilst the western rises, in the Mydan valley, to 7747 feet. It has therefore such a colder climate than can be expected from its geographical position. It is warmer in summer than England, but in winter it is much colder. But even in summer the heat is so moderate as never to be disagreeable in the shade, and no night is so warm that a thick covering can be dispensed with. The winters however are very cold. In that of 1839-40 the thermometer was often 4° and 6° below zero of Fahrenheit.

The 3rd of December the first snow fell. The snow generally covers the ground for three months at least; but after the vernal equinox it disappears from the higher places. At this season of the year there are copious falls of rain, sleets, and snow. The changes in the temperature are greater than in England, even in the midst of the winter range of the thermometer in August (1839) was from 46° to 74° at four o'clock in the morning, and at three in the afternoon from 72° to 96°; in September, in the morning from 52° to 64°, and at noon from 64° to 92°. From the first half of October, in the morning from 30° to 68°, and in the afternoon from 64° to 92°. The quantity of snow which falls is very considerable, and is justly considered one of the principal reasons of the vigorous vegetation in the hot and dry season. There is a favourite proverb in Kabul: 'Let Kabul be filled with snow rather than gold.' In spring the rains are rather abundant, especially in April. In May they are rare, and when heavy do great damage to the fruits. In the following months only light showers are experienced.

Between the Basin of Kabul and that of Jellalabab is the mountain-region of the Lattabund Pass. It occupies about 30 miles in extent, and is filled by numerous oases from the southern range of mountains, which approach to the banks of the Kabul river in several detached groups, cut by a series of deep ravines and valleys. The whole is a succession of steep ascents and descents, and the ridges frequently rise 1000 or 1500 feet above their base, and are broken into crags and precipices. Both mountains and plains present no sign of vegetation, except in the immediate vicinity of the Kabul river, where some stunted trees are united with, but not a blade of grass. This tract is almost uninhabited. The few families here are wretchedly poor, and live in caves.

East of the mountain-region of Lattabund is the Basin of Jellalabab, which extends about 40 miles from west to east, and has an average width of about 10 miles. The surface is comparatively much higher than the adjacent elevation. Along the Kabul river is a tract varying between one mile and one half a mile in width, which is level, and low, fertile, and well cultivated. Fine meadows alternate with groves of fruit-trees and fields, on which the sugar-cane, rice, jowary, and maize are grown to a great extent. Villages and mud castles are very numerous. But at the back of this fertile strip the country is a stony desert, overgrown with numerous low and bare hills, which gradually rise higher and higher as they approach to the main range of the mountains, which in the vicinity of these mountains the country improves, and contains numerous villages surrounded by orchards, and between the villages a considerable portion of the surface is under cultivation. The soil of the middle tract is very stony or sandy. Towards the eastern extremity it is a barren, stony desert, surrounded with low hills, where, in the months of April and May, a pestilential wind or simoom prevails, which sometimes proves fatal to the traveller.

The mountain-region of Kyber sends its offsets to the banks of the Kabul river, east of the Basin of Jellalabab. It occupies 20 miles along the river, which is about 20 miles distant from this main tract. This tract also is covered with numerous ridges, which grow lower as they approach the river. Narrow passes, with perpendicular rock walls, line them: one of them is the famous Kyber Pass, whose summit is 3373 feet above the sea, nearly 1400 feet above Jellalabab, and 2300 feet above Peshawur. It is from 18 to 20 miles long in a straight line, and about 30 miles by the road. The hills are mostly covered with shrubbery, which is quite thick, and only covered with bushes; but towards the main ridge there are several smaller table-lands which are tolerably level, and being partly irrigated, yield tolerably good crops of grain. There are also extensive orchards, and groves of peach, mulberry and wild cherry.

The Plain of Peshawur extends from west to east about 60 miles, with a width varying from 30 to 40 miles. The surface is not level, but presents only long and gentle slopes, in some places broken by ravines. The greater part of it has a clayey or loamy soil, which in some places is of great
depth. It requires much watering and much stirring, but when properly treated it bears very heavy crops. The soil of those tracts which lie in the immediate vicinity of the river, and that of the island of the Deodorees, contains a considerable quantity of alluvial earth mixed up with clay, but it is inferior in fertility to most other parts of the plain. Towards the mountains, which surround it on the south like a semicircle, the country is stony, and in some parts also sandy, and of indifferent fertility. The orchards that are scattered over the surface of the plains consist of pomegranate trees, and the greater part of the plain is in the highest state of cultivation, being irrigated by many water-courses and artificial canals. Thirty-two villages have been counted, and one-fourth of four miles square. The inhabitants are wealthy and industrious. The principal cultivated grains are rice, maize, wheat, and barley. During the summer the heat is very great, and at the solstices almost insupportable. It moderates however in the month of July, when showers of rain fall or the air is cooled by winds from the east, in which quarter the rains have commenced. Sometimes a fall of snow occurs, but it melts instantly. Frost however is very frequently experienced in every season. The rains which are carried to Hindustan by the south-west monsoon reach Peshawur, but they do not last more than about four weeks in July, nor are they abundant: in some seasons they fail entirely. But the winter rains are plentiful, and more so in the second than in the first half of winter. The spring is generally abundant, but they are heavier at that time than in any part of Hindustan, Cashmere excepted. This large plain is more than 5000 feet lower than that of Kabul, the town of Peshawur being only 4000 feet above sea.

The plain of Peshawur does not extend to the Indus. From both the southern and northern mountains a ridge runs out which skirts the river at a distance of a few miles; between them the Kabul river flows in a narrow gorge, which is not traversed by a road. But at no great distance from its banks on the south is a depression in the ridge, which forms a defile, called Geder Gulna (or the Jackal's Pass), which is about two miles long, and leads to the bridge over the Indus opposite.

III. The Suliman Range and Eastern Declivity of the Table-land.—What are called the Suliman Mountains is nothing but the elevated crest of the eastern declivity of the table-land itself. The level of the Indus is seldom more than 500 feet above the sea-level, but the level of the crest of the table-land varies from 5000 to 7000 feet. When seen from the banks it appears like a very elevated mountain-range, though it hardly rises a few hundred feet above the general level of that portion of the table-land which is contiguous to it on the west.

The Suliman Mountains are closely connected with the snow-capped mass of the Sufaid-Koh, which must be considered as its most elevated summit. They extend thence southward and westward, with the vicissitude of waters and valleys which they reach 30° N. lat., where they may be said to terminate, nearly due west of the confluence of the Indus with the Gara. A little north of 30° N. lat. the crest of the table-land turns suddenly to the west, and continues in that direction between 70° and 68° E. long., where it meets the Hala mountains of Beloochistan. That portion of the crest which lies from east to west, is called the Muras and Boogtey mountains. There are very few summits which rise above the general level of the Suliman range, but these that do attain the snow-line. The most elevated has given its name to the whole range. It is the Takt-i-Suliman, which lies near 31° 30' N. lat., and rises, according to Liet L. Wood, to nearly 18000 feet above the sea; it appears as the addition of the peak which lies north of the Takt-i-Suliman constitutes a continuous chain, with the exception of one break, not far north of the Takt-i-Suliman, through which the Gomul river, which rises far in the interior of the table-land, descends to the Indus.

The descent between the Suliman mountains and the Indus river is occupied by the declivity of the table-land. The river however does not run parallel with the range; at the northern extremity the distance between them exceeds 100 miles, but it is little farther south. South of 32° N. lat. it falls short of 50 miles.

One of the most remarkable features of the northern portion of the declivity is the Salt Range, which is broken by the Indus river near 39° N. lat., nearly at a right angle, and extends from its western bank west-north-west 'o the Suliman mountains, which it reaches a few miles south of the Sufaid-Koh. It is composed of sandstone, containing very thick and extensive layers of rock-salt, which are largely worked near the town of Kalalagh, just on the banks of the Indus, whence it is exported to different parts of Hindustan and other countries. The Salt Range does not rise more than 2000 feet above the banks of the Indus; but it is probably higher farther to the west. The rivulets and springs are brackish, and the land very poor. A few flocks of sheep and goats are kept. The cultivated land is scattered in small patches. It requires permanent irrigation, and a continuation of favourable weather to raise the coarsest kind of grain.

Between the Salt range and Kyber mountain lies a table-land called the Indian table-land, whose elevation varies from 700 to 900 feet above the level of the Indus; for this is the elevation of the precipitous rocks which here form its western banks. The surface of this table-land is traversed by several ridges, rising from 500 to 1000 feet above their base; they are covered with soil, but of indifferent fertility. The depressions however between them, especially those near the river Toe, have great productive powers, as the soil rests on limestone. They are almost entirely covered with well-cultivated fields, carefully enclosed and abundantly irrigated by the waters of the Toe or other perennial streams, which receive their supply from the Sufaid Koh or its neighbourhood.

The country south of the Salt Range is drained by the river Koornam, which also rises in some of the southern offices of the Indus. The Koornam however falls into a considerable number of small rivers, which descend gradually to the Indus, until it terminates in a plain of considerable extent called Bunnoo. The higher part of the valley bears the name of Bungah-i-Bala, or Upper Bunnoo; the lower is called theratings of the river are low. The plains are much cultivated, and possesses a considerable degree of fertility, especially where the crops do not depend on the rain, but on irrigation from the river or its affluents. The whole, but especially Bunnoo, is well cultivated and populous. The principal crops are barley, rice, and wheat, along the coast, and along the banks which enclose this region, no domestic animals are kept but those which are used in cultivation, cattle and buffaloes.

That part of the declivity of the Suliman mountains which lies south of the Koornam river goes by the name of Damam. Here the nature of the country changed. It is not descended by an inclined plain, but by terraces, each of which is enclosed by two ridges running south and north. In some places there are three, in others four such terraces. Some of the ridges are perpendicular; in general they only have stone shores, with shrubs and bushes, and contain pasture-ground. Some of the valleys between the ridges are sandy, and can only be used as pasture for camels, goats, and sheep; but the larger number of them have a good clayey soil, intermixed with sand, and are planted with the chief crops of the Indus; their fertility is considerable. Wheat, barley, and several of the grains of Hindustan, as jowary, bajra, &c., are cultivated to a great extent. Considerable quantities of cotton, hemp, and silk are exported. It is little excepted dates. Cattle are the chief stock, but sheep are also numerous, both of the heavy-tailed and light-tailed species. Each of the valleys is inhabited by a different tribe; sometimes two tribes live in one valley. Their villages are numerous and often very large. They are enclosed by the walls of the river, which descend to the water from 2000 to 4000 houses, with bazars and numerous shops, in which most of the Indian goods are sold by the Hindu families settled in these places.

Our knowledge of the country that portion of the declivity which lies south of the Gomul river is incomplete. It appears that here also it consists of terraces rising one above the other, and that there are valleys between the ridges; but we know nothing of these valleys and their inhabitants. The cultivation of the plains and the banks of the Indus is separated from them by a rather hard tract from 15 to 20 miles wide. The soil consists of a stiff and hard clay of an ashy colour, which is very difficult to be cultivated. Towards the river however it is much softer, and this part has been washed by the waters and has improved its quality. Near the base of the mountains the soil is partly covered with stones or sand, or both, which have been washed down by the rains. At the southern extremity of this region, north of Mitrun-koh, is a very desert of some extent called Dajul; the hardiness of the clay
develops the greater part of this tract from being cultivated. It is chiefly a jungle, but there are other tracts which are without jungle, and these may be even more valuable. In the depressions, moderate crops of jowary, bajra, &c., are raised, if the rains have been abundant. Along the Indus and smaller watercourses the country is well cultivated, and it is the nature of the soil that between the desert valley and the jowary are the chief crops. The principal domestic animals are camels; but cattle, sheep, and asses are also kept in most places. The villages are small and distant from one another, containing moderate elevations, and the steep, rocky cliffs and places many isolated hills occur, which are only separated from each other by ravines. The valleys however in this tract have a very good soil, and are well cultivated. South of Ghuznee the surface is less broken. The hills are at great distances from one another, and the pasture on the slopes or 20 miles long and wide, and it is only in a few places that their surface is broken by low hills or deep ravines and watercourses. The soil here and farther north is a loam with a great proportion of clay; but stones, gravel, and sand have been lodged by the rain under the hills. As the quantity of rain which falls on this region is small, the lands require irrigation in order to be productive, but the rivers are small and cannot yield a large supply. To obtain this supply the inhabitants have constructed a kind of aqueducts, by which the water of a hill or rising ground is brought out at its foot in a rivulet, to be disposed of at the pleasure of the farmer. Such aqueducts, called kareezes, are made in the following manner. A bed of earth where it is necessary is broken up to a depth of 6 feet, and above it in the acclivity is dug another at the distance of five to twenty yards, according to circumstances. The wells are continued at distances generally equal, until the quantity of water collected in them is deemed sufficient, or until the depression becomes too deep, so that the expense exceeds the advantage. If the acclivity is not very gentle, the highest wells must be very deep, as their bottom must be only slightly elevated above the level of the water in the lower wells. All these wells are means of aqueducts made under the surface of the ground, through which the water from all of them flows to the foot of the hill. Very good kareezes will turn a small mill of the country. This ingenious contrivance of irrigating the fields is the means of the fertility of the country, as in the neighbourhood of Ghuznee a kareez of great extent is found which is ascribed to Sultan Mahmood. Including its branches it is asserted to be nearly 30 miles long, but this is probably an overstatement. More however are two or three miles long. These kareezes are found in other parts of Afghanistan and in some parts of Persia and Turkistan, but nowhere are they so numerous as in this part of the table-land, which thus produces rich crops of wheat and barley. The grain is consumed by the inhabitants, and the fruit is inferior to that of the valley of Kabul. There are numerous villages, and they are tolerably large. They are enclosed by mud walls, as these districts are surrounded on all sides by mountains, which render it necessary for editorial and commercially significant excursions into the lands of their neighbours. South of the fortifications, which are called Kelat-i-Ghilzire, the aspect of the country changes. The surface is much more broken; flats are rare and of small extent; hills and even short ridges are common. Water is scarce, and only to be found at greater depths below the surface. The soil chiefly consists of sand, which in a few places is intermixed with clay, and moreover it is covered with stones, which in some parts are so numerous as to prevent the growth of grass from springing up. This is especially the case with those tracts which lie at the foot of the Kohoj Amran range, where a large space appears like a sea of rocks and stones. In this country cultivation is limited to the banks of the larger rivers, where some level tracts of moderate extent are found, and where a small river of fresh water can be turned to account for irrigation by damming up its bed. Nearly the whole of this country is pasture-ground, in possession of the tribes, and some of these are very considerable. Only a small tract where cultivation is carried on to a great extent. This lies in the vicinity of the town of Kandahar, on both sides of the river Urgundab, from whose banks it extends at some places seven miles inland. Wheat, rice, etc., are grown. The country is rich in orchards, which contain vines of various kinds, apples, pears, quinces, nectarines, peaches, figs, plums, apricots, and cherries. The pomegranates of this place are held in great esteem. Except these plantations, the whole of this region is without

There occur some ridges of considerable extent, which rise from 1000 to 2000 feet in elevation. The most extensive are the Djarah-Koh, north of 33° N. lat., which is parallel to the Sir-i-Koh mountains and is not much lower than that range, and the Gante-hills, cast of Kandahar, which extend east and west. The most northern district, which lies west of the range, is the most uneven. It presents hardly a level tract of any extent, but is in general broken by ravines and watercourses, most of which exhibit numerous ascents and descents of different degrees of steepness. The surface in many places is only separated from each other by ravines. The valleys however in this tract have a very good soil, and are well cultivated. South of Ghuznee the surface is less broken. The hills are at great distances from one another, and the pasture on the slopes or 20 miles long and wide, and it is only in a few places that their surface is broken by low hills or deep ravines and watercourses. The soil here and farther north is a loam with a great proportion of clay; but stones, gravel, and sand have been lodged by the rain under the hills. As the quantity of rain which falls on this region is small, the lands require irrigation in order to be productive, but the rivers are small and cannot yield a large supply. To obtain this supply the inhabitants have constructed a kind of aqueducts, by which the water of a hill or rising ground is brought out at its foot in a rivulet, to be disposed of at the pleasure of the farmer. Such aqueducts, called kareezes, are made in the following manner. A bed of earth where it is necessary is broken up to a depth of 6 feet, and above it in the acclivity is dug another at the distance of five to twenty yards, according to circumstances. The wells are continued at distances generally equal, until the quantity of water collected in them is deemed sufficient, or until the depression becomes too deep, so that the expense exceeds the advantage. If the acclivity is not very gentle, the highest wells must be very deep, as their bottom must be only slightly elevated above the level of the water in the lower wells. All these wells are means of aqueducts made under the surface of the ground, through which the water from all of them flows to the foot of the hill. Very good kareezes will turn a small mill of the country. This ingenious contrivance of irrigating the fields is the means of the fertility of the country, as in the neighbourhood of Ghuznee a kareez of great extent is found which is ascribed to Sultan Mahmood. Including its branches it is asserted to be nearly 30 miles long, but this is probably an overstatement. More however are two or three miles long. These kareezes are found in other parts of Afghanistan and in some parts of Persia and Turkistan, but nowhere are they so numerous as in this part of the table-land, which thus produces rich crops of wheat and barley. The grain is consumed by the inhabitants, and the fruit is inferior to that of the valley of Kabul. There are numerous villages, and they are tolerably large. They are enclosed by mud walls, as these districts are surrounded on all sides by mountains, which render it necessary for editorial and commercially significant excursions into the lands of their neighbours. South of the fortifications, which are called Kelat-i-Ghilzire, the aspect of the country changes. The surface is much more broken; flats are rare and of small extent; hills and even short ridges are common. Water is scarce, and only to be found at greater depths below the surface. The soil chiefly consists of sand, which in a few places is intermixed with clay, and moreover it is covered with stones, which in some parts are so numerous as to prevent the growth of grass from springing up. This is especially the case with those tracts which lie at the foot of the Kohoj Amran range, where a large space appears like a sea of rocks and stones. In this country cultivation is limited to the banks of the larger rivers, where some level tracts of moderate extent are found, and where a small river of fresh water can be turned to account for irrigation by damming up its bed. Nearly the whole of this country is pasture-ground, in possession of the tribes, and some of these are very considerable. Only a small tract where cultivation is carried on to a great extent. This lies in the vicinity of the town of Kandahar, on both sides of the river Urgundab, from whose banks it extends at some places seven miles inland. Wheat, rice, etc., are grown. The country is rich in orchards, which contain vines of various kinds, apples, pears, quinces, nectarines, peaches, figs, plums, apricots, and cherries. The pomegranates of this place are held in great esteem. Except these plantations, the whole of this region is without
trees. Poplars and willows are planted along the watercourses. Gladiolus and reeds, when the water is low, crowd the naked plate of the table-land, is very cold. The winter lasts four or five months. The snows are extensive and sudden, but little snow falls. Whilst the British army was there (1840) the ice in the pools of water and the ditches of the fort was several feet thick, though the winter was considered mild. Temperature increases daily between sunrise and three o'clock in the afternoon varies from 40° and even 50°. From the 26th of April to the 26th of June the thermometer ranged from 50° to 72° at four and five o'clock in the morning, and from 85° to 110° at three o'clock in the afternoon. In April the thermometer was 72°, in May it was 79°. Between the middle of May and the end of August two hot periods each of forty days occur; the second period is hotter than the first. In summer rain is very rare and only falls in short showers. The greatest quantity of rain falls before the vernal equinox, but only in showers.

VI. The Southern Table-land. Lies between the Kohgal Aurnum range and the Murree and Boogtee mountains, and descends to the west, where it terminates in the Desert of Bellochistan before it reaches 6000 feet elevation. It consists of the valley of the river Lorah and the country of Shawl. The Lorah rises on the borders of the Eastern Table-land, and as it runs eastwards drains the valley of Pseeben, and then enters the country of Bellochistan, where it terminates in a lake, which in spring is of considerable extent, but nearly dry at the end of the summer. The elevation of this region above the sea along the road leading from the Dolan Pass to the Kohjak Pass, which traverses it nearly in its middle, is from 9000 to 9200 feet. Near the north end of the country is a rather level, but interspersed with numerous low hills; along the banks of the river only few hills occur, but they are numerous near the Murree and Boogtee mountains. The greater part of the lower country is not cultivated, and overgrown with wild thyme or a jungle of tamarisk. Some tracts are cultivated with wheat, but they are not extensive, as the water for irrigation is derived from karezees, the bed of the river being from 200 to 300 feet depressed below the ground at some spots. Near the north end of the country the river descends, and passes between the lower country to the west and the hills of the table-land of the west, and here is the cultivation of which is applied to the plain through which the Helmand runs, on the banks of which there are many small irrigation canals; the other plate cultivation is limited: cotton is cultivated to some extent. This region appears to be divided between agriculturists and nomadic tribes. The climate is not so cold as that of the northern and eastern part of the central plain, and probably as temperate as that of the hills of the Khyber, which lies at a higher elevation, and where the air is almost as high as that of the Kohak-valley. A large portion of this region is covered with snow in winter, but in spring the snow in the mountain-regions of the north fills the wide bed of the rivers, and in the higher grounds however the snow is burnt up after the summer solstice, and then that part of the rivers is swelled with their herds to the mountains of the Hazarak and Eimack, especially to the elevated plain on which the Helmand rises.

IX. The Table-land of Herat comprehends that part of Afghanistan which lies west of the mountain-region of the Eimack, and extends westward to the boundary-line of Persia. The mountains of the Pajaranibus lower gradually until they constitute low ridges of rocky hills, which run in various directions, but generally north-eastern, and south-southern. They are mostly bare, except for a few months in the year, when they supply pasture-ground for sheep and goats. Between these ridges there are level tracts. Some of them are sandy and sterile, and nearly unirrigated, but others have a soil in which the sand is mixed with a great proportion of clay or loam, and are very fertile—such are the plains of Subzawar and Herat. The first is 30 miles long and 20 wide, and partly cultivated. The plain of Herat is about 30 miles long and 18 wide. It is watered by the Helir-rood, a river which rises far to the east in the mountains of the Hazarak, and all the year round brings a considerable volume of water to the plain, over which it is spread by numerous canals. A bund or dam is thrown across the river, and the water is turned into the canals, and conducted over the whole plain, which is covered with fortified villages, vineyards, orchards, gardens, and corn-fields. The heat is excessive for two months in summer, but the winter and spring are agreeably cool.

Climate.—The degree of heat and cold experienced in Afghanistan differs greatly in different places, in proportion to the elevation of the different parts of the table-land. The heat is insupportable in Seistan, especially in the Gurmahar and the Helamb, which is so hot that the maximum is about 120° and even 130°, but in Guznem and Kabool it is very moderate. The rains which accompany the south-west monsoon extend to the eastern border of the table-land, but at this distance from the sea they are scanty, and last only about
a month, from the middle of July to the middle of August. In the valley of the Kabul river they never extend beyond Jalilabad, where only a few showers fall; but they are much more abundant in Bumnoo and Bungah-i-Bala, and in the north and other countries beyond the Indus. These rains do not appear to be experienced on the table-land itself. The winter rains, accompanied with falls of snow, and the spring rains with sleet, are abundant in the valley of the Kabul river and the central table-land; but not so much in other parts of the country where the climate is not so moist, which is the reason why it is unfit for agricultural purposes. The summer is dry, and generally no rains fall to the higher regions from May to September or October.

**Productions.**—Afghanistan has great mineral wealth. Gold is found in several streams which originate in the Himalaya mountains or in the Hindoo-cooeh and fall into the Indus or Kabul river, and it is collected in some places. Silver is said to exist in the Hazara mountains. Copper ore is abundant in the hills which extend west of the Sasafid-Koh to the neighbourhood of the town of Kabool, and at some places it is so rich as to yield from 60 to 80 per cent. of metal; but it is not much worked. Iron is found in the greatest abundance in the Himalaya mountains north of the Plain of Peshawur, and of the best quality. It is extensively worked in a district called Bajour, where it goes to Cashmere, the Panjash, and to the other parts of Afghanistan; in Kandahar it is used for the firearms of the Kirghises. Silver and copper are equal to the best Swedish iron. Other iron-mines of great extent are on the eastern table-land, at Foornool, in the country of the Wuzoorees, not far from Kangourum; there are two kinds of iron here; one is converted into steel. Iron-mines are also worked in the mountains of the Hazara. Lead of excellent quality is worked in the Hazara mountains, and also in the Pughman range. In the last-mentioned mountains plumago is found, and sulphur in the Hazara districts. Salt is obtained in the greatest abundance from the Salt range. Lignite has been discovered in the country of the Wuzoorees, not far from the iron-mines of Foornool; on the mountains east of the central range there are salt-mines of ancient date; salt is still obtained in some parts at the Hazara mountains. Saltpetre is obtained in considerable quantities from some pits in the vicinity of Peshawur. Near Kalsabagh on the Indus great quantities of coal are got.

The grains cultivated are wheat, barley, peas, beans, maize, rice, and some other grains of Hindustan, as jowary, chana, musoor, bajas, moth, moong, oord, and muthwa; and two crops are annually obtained in the valley of Kabul as far as Mullad; the winter crop consists of paddy, rice, carrots, turnips, radishes, lettuce, cress, cauliflowers, onions, garlic, melons, and cucumbers, with a few others from Hindustan. The fruit-trees have been mentioned in noticing the valley of the Kabul river. No natural grass is cut for hay, except in the provinces of Kandahar and Mullad; but the trees are grown, but they are different from ours. Barley is cut when green near Peshawur twice or thrice, with little injury to the crop; but wheat is more delicate in this respect, and can only be mown once. Mullad is extensively grown on the central table-land, and in Zemini Dawk, and goes from Kandahar to Shikarpour. Turmeric is cultivated in Bumnoo, and also exported to Sind. Assafetida grows in many parts which are very elevated; the greatest part of the produce is taken to the coast, for it is used in the manufacture of soap, or for medicinal purposes. Various kinds of spices are found in this country, and the leather is indifferent. Several wild shrubs furnish food from their roots, bark, flower, or fruit. The fruits of some kinds of berries and of the wild vine are much used.

Forests are only found on the Himalaya mountains and the Sasafid-Koh. There are no woods on the table-land, and all the trees found there are planted, generally in rows along the water-courses and canals, and around the orchards. Only willows, poplars, and other trees are found in the plains of their Irang, but the leather is indifferent. Several wild shrubs furnish food from their roots, bark, flower, or fruit. The fruits of some kinds of berries and of the wild vine are much used. The productions are one-third of this, it is calculated to support a far greater population than tillage. The produce is little affected by the seasons, and is very regular. Silk is not produced to any great amount, except in a few places. Nearly all the fruits cultivated in Afghanistan are also found in a wild state, chiefly in the valleys of the cool mountains, such as apples, pears, cherries, plums, apricots, peaches, quinces, and pomegranates.

The most important of the domestic animals are the sheep. There are two kinds, both with the broad fat tail, which in some parts of the country are kept for the saddle, and in other parts the cart is put under the tail. Herodotus (i. 113) says the same of the sheep of the Arabs. They constitute almost all the wealth of the mountain-region of the Hazara and Eainack, and the inhabitants are dependent on the wool to supply their wants, and for the clothing of their camels and ghees. These sheep yield two fleeces: the spring or coarser fleece is used for carpets, grain-bags, and other coarse stuffs; the autumn or finer fleece is manufactured into cloth, cloak, and mummadis or rugs. The numerous flocks which pasture on the table-land yield only once or twice a year. These fleeces are nearly as numerous as sheep. Those in the Koh-i-Dela mountains and the Paropamisus yield, like those of Cashmere and Tibet, a fine and remarkably soft down, which grows on the root of the hair. The hair is long and usually jet black, but the down is of a shade more or less intensive. The down is in great demand, and exported to Persia, Kabool, Kandahar, Herat, and Shikarpour, where it is employed in different manufactures.

Horses are plentiful, but of an inferior breed, except in Bumnoo and Danan, where there is a good breed. In some places there are good ponies; mules and asses are numerous, and in many places they are the principal animals of burden. A great many camels are found in this country; they are also the principal beasts of burden in the whole of Hindoo-cooeh to the borders of the desert. The quality of these camels is generally much greater than those of Hindoostan. It is also found in the Bactrian camel with two humps. The number of cattle is small, as the pastoral tribes keep only a few bullocks to carry their tents, and a few cows which are fed near their residences. In the vicinity of Lake Hamoon great herds of cattle are pastured on the marshy grounds. In Afghanistan they are of an inferior breed. Buffaloes are kept at some places, but they are not numerous. The cats of Kabool are distinguished by their very silky hair. The number of sheep is great, but though very few of them are found in Persia, and none are exported from that country. These cats are exported in great numbers from Kabool, where the people encourage the growth of the hair by washing it with soap and combing it.

Llamas and tigers are said to exist, but they are comparatively weak and timid. Leopards are found in the Hindoo-cooeh. Wolves, hyenas, jackals, foxes, and hares are common everywhere. The wild hog is not frequently met with, but it is abundant in the province of Peshawur. Many kinds of deer, and also the elk, are found in the mountains, and a few antelopes in the plains. Wild sheep and wild goats are common in some parts of the mountainous countries. There are also porcupines, hedgeshogs, ferrets, and wild dogs. Monkeys occur only in the mountains near the Indus.

The common fowl is kept by the pastoral tribes; in some places it is wild. Water-fowl are abundant on Lake Hamoon. Domestic fowls are rare everywhere. Fish is very scarce. Locusts are most frequent in the eastern countries, but even there they rarely lay waste any part of the country.

**Population and Inhabitants.**—The population is estimated at 14,000,000, inclusive of Beloochistan, but many persons think it is greatly exaggerated. A large proportion of the ruling nation are dispersed over the whole of the table-land; but the mountains are mostly in possession of other tribes, such as the Hazara and Eainack in the Paropamisus. Among the Afghans, the Tajiks, Turcomans, Pathans, Zemindaris, Arabs, with a few of the Armenians, Assyrians, and Calmucks.

An account of the Afghans has been given in F.C., vol. i. p. 169. The Hazara and Eainack, or the inhabitants of the Paropamisus, do not appear to the stranger as being a people of great energy; the chief occupation of the inhabitant of Afghanistan derive their origin, as their physical appearance shows. They are evidently of Mongol race, though at present they speak a dialect of the Persian language, and are the subjects of Sultan Abak the first Mogol. It is said that they are a colony of Mongols left in this country by one of the armies of Manka Khan, one of the successors of Genghis Khan. There is some difference in the manner of life of these two tribes. The Hazara, who occupy the higher part of the Paropamisus, have fixed abodes. They live in small villages consisting of low huts. Vol. I.—H
where they pass the winter season under one roof with their cows and sheep, using as fuel small dry shrubs and the dung of their cattle. In summer they live with their animals on the slopes of the mountains. Near their villages they cultivate small fields, which they live in and which elevation is not too high, wheat. The Emirnck lead a more nomadic life, and reside the whole year round in tents made of dry sticks or felt, and go with their flocks in summer to the higher elevations in winter to the lower elevations of their mountainous districts, where they make a tributary of their tents throughout the year. Each tribe is divided into many divisions, each of which is independent of its nearest neighbour: and they have frequent feuds with one another, in which many young persons are taken prisoners and sold as slaves in Turkistan. They are visited by traders from Herat, Kandahar, and Kabul, who furnish them with some common articles of dress and utensils, and receive in return slaves, cattle, clarified butter, woollen cloth, grain sacks and carpet bags, felts for horse-riding, and carpets, all made from the produce of their flocks. They also furnish lead and sulphur.

That portion of the population on the table-land which is occupied with agricultural pursuits is known by the name of Tadjiks or Tadjikis. They are found in all the countries of Western Afghanistan; from the Mediterranean to Chinese Turkistan; and even in the last-mentioned country many families of Tadjikis are settled. In a few mountainous countries they have maintained their independence, in all others they are subject to the prevailing powers; have conserved their language, and have preserved their pastoral habits. Their condition may be compared to that of the serfs of the middle ages in Europe. They are the glebe adscripti, who work the cultivated grounds, and are obliged to give up to their masters one-fourth or one-half of their produce. They are peaceful, industrious, peasants, more civilized, intelligent, and skilful than their masters. In the towns they constitute the labouring classes; they are tradesmen, mechanics, and labourers. They generalize were made and follow the custom and tradition of their tribe. They have preserved their language, which is however mixed with many terms derived from the language of the predominant nation. Their language is learned by all the Afghans who wish to be considered as men of education.

In the Plain of Peshawar and the neighbouring districts many Hindkies, as they are called, are settled as agriculturists. Their language is a kind of Hindustanee, resembling the dialect of the Panjab. The number of Hindus settled in Afghanistan is very great; there is not a single village in any country except a family or two, and in the larger places there are many. They keep shops; are brokers, merchants, bankers, goldsmiths, sellers of grain, and other occupations. They retain the Hindu features, and some of them have adopted the dress of the Hindus; the great men of the country in every kind of business connected with money or accounts.

The Kuzilbashies are only found in towns, except about Herat, where they are also settled in villages. A great number of them are in Kabul, where they were settled by Shah Nadir and Ahmed Khan. They are Türkmen, and their ancestors were members of some of the tribes which wander about in the plains of Persia. They are mostly soldiers, or employed by men of rank as secretaries, masters of the household, and stewards. Some of them have acquired landed property, which they let out to Afghans or Türk tenants. They are lively, ingenious, elegant, and refined, but fond of luxury and requisites.

Arabs are settled in Kabul and Jellalahad. They are agriculturists, and do not mix much with the other inhabitants; they have lost their original language. According to Elphinston, the number of their families amounts to about 2000. And there are still many in different parts of the country. Arabs are imported into Afghanistan, as well as into Hindustan, as slaves, and generally form a part of the king's guards. There are also Calkisks in the king's guards; but some tribes of that nation are settled near Herat as agriculturists.

The population is very unequally distributed over the country. The most populous parts are the valley of the Kabul river, the country south of the Sooludd-Roh and of the Salt range, the central table-land north of Kolti-Gijes, and the immediate neighbourhood of the towns of Kandahar and of Herat. All the other parts of the population is scanty, as the inhabitants lead chiefly a nomadic life, with the exception of the fertile tract round Lake Hancow, where there is a considerable agricultural population.

The capital of the whole bulk of the Afghanistan is given by Wilken in the 'Transactions of the Scientifie Society of Berlin, 1818-19, in which he compares the constitution of the tribes of the ancient Persians, as exhibited by Herodotus and Xenophon, with those of the modern Afghans, and point out the great difference between them, which he attributes in a curious manner as a result of the events and transactions of the time of the first Cyrus.

Manufactures.—Manufactures which supply articles of export are few and comparatively small quantities, it appears that the manufactures of the country are sufficient for the home consumption, as no manufactured articles are imported from India except cotton stuffs. As a knowledge of the manufacturing arts conveys an idea of a nation's civilization and of the comfort which it enjoys, we transcribe from Elphinston's work the following list of the trades exercised in the town of Kandahar:—Jewellers, gold and silver smiths, book-sellers, book-binders, stationers, makers of kulfumanda (a sort of incense) and copies of the Koran, doorkeepers, gunsmiths, seal engravers, sellers of armour, sellers of shields (the shields are of buffalo or rhinoceros's hide), puszum, sword-cutters, polished and steel, sellers of bows and arrows.

They also make black or white felt, and work in silver, pewter, brass, glass, tin, copper, silver, graving-bags, black, bags, rags, felt, felt cloaks, mittens, soaks, and horse-cloths. The felt cloaks are called koonas, and are extensively used in Kandahar, where they are much prized.

Commerce.—As Afghanistan has no navigable rivers, the transport of merchandise is expensive, and the commerce which is increased by the want of roads, which are not met with in all Western Asia from the Indus to the Straits of Constantinople. The conveyance of merchandise is therefore effected by means of beasts of burden, and the conveyance of goods from one country to another is in great measure done by foot. The most northern of these lines begins on the frontiers of the British Possessions at Ladiana on the Sutlege, passes through Lahore, and reaches the Indus at Attock. Hence it runs through Peshawur to Kabul, where it divides into two roads. One road runs over one of the elevated mountainous districts of the Indus-valley crossing the Russian and the Russian mountain and descending to the plains of Turan, leading to Kandahar and Khulam, and thence to Bokhara. The other road runs from Kabul south-south-west to Kandahar, at which place all these lines converge.

The middle line of commercial communication passes from Lahore direct west, crosses the Indus at Dera Ismail Khan and ascends the Gomil Pass, which is also called the Golgar Pass, and which leads across the eastern table-land. When it reaches the sea coast of the Caspian Sea, it divides into two branches, one of which runs northward to Guizande and Kabul, and the other to the south-west to Kandahar.

The third road connects the Indian Ocean with the Caspian. It begins at the seacoast of the Caspian Sea, and runs chiefly along the banks of the river of Shikarpore, whence it diverges to the north-west, and passing through Darud in Cutch Gavinda, ascends the table-land by the Pass of Bokh. From this place it continues through Quettah over the Kigal Pass to Kandahar.
Russia are also imported by these caravans, especially raw cotton, cottonseed, and other raw materials, needles, looking-glasses, Russia leather, tin beads, and spectacles. A fine cloth made of camel's wool, some raw cotton, and some lamb's wool are also brought from the town.

**Tourm—** A description of the towns of Kabool, Peshawar, Ghuznee, and Kandahar has been given under Afghanistan, F. C., and that of Furfur is noticed under Shiraz, the inhabitants are very poor, and the look of their town is very insignificant. Imports from the Persian market consists of coarse cotton-cloth, muslin and other fine manufacture, some sorts of silk cloth and brocade, indigo, ivory, hemp, wax, tin, sandal-wood, and a large quantity of sugar, musk, coral, and some other trifling articles.

The traffic carried on by the Gonul Pass and Dera Ismael Khan appears to be more important. It is entirely in the hands of the Lehan merchants, a tribe which pretends to be of Afghan origin. They arrive annually with three kafislas at Kandahar and Kabool. The first kafislas leaves Dera Ismael Khan about the middle of April; its merchandise consists of coarse cotton stuffs and salt, which are sold at Kandahar and Kabool. The second kafislas brings indigo from the Ganges, who are about the middle of April, and departs from Dera Ismael Khan about the end of April; some part of these goods go to Bokhara. The third kafislas departs from Dera Ismael Khan about the middle of March, and the bulk of its cargoes consist of kinkal (or cotton), which is divided among the different bazaars and similar articles; a great portion of these goods is taken to the plains of Turan. The last kafislas only brings goods back, and arrives at Dera Ismael Khan in the middle of October with pomegranates, almonds, raisins, and chocolate from Kabool and Kandahar, and with horses, cochineal, nankin, gold thread, raw silk, and other goods from Bokhara.

The commerce between Shamkarpour on one side and Kandahar and Herat on the other, is more important. It is carried on in the same manner as that of Cabool, and consists of a much greater number of camels. The articles which they import into Afghanistan are indigo, hemp, metals of all kinds, country coarse and fine cotton-cloth, Moottanee coarse cloth, silk manufactured at Shirakpoor, and other places in Sind, groceries and spices, raw cotton, coarse sugar, opium, hemp-seeds, shield of buffaloes' and rhinoceros's hide, leather, embroidered horse-cloth, and dry grains. To these are added several articles of British manufacture, such as red and white striped cottons, with a yellow border, the best bleached, the next bleached, a coloured coarse broad-cloth. The returns from Kandahar and Herat consist of raw silk to the amount of 50,000 lacs annually for the manufactures of Sind, turquoise earth, churus (an intoxicating drug prepared from hemp-seed and opium), gum, silk stuffs of various kinds from Herat, dried fruits (such as prunes, black grapes, apricots, almonds, and dates in great quantities), tin thread for embroidery, broken copper and brass vessels (to be re-manufactured at Shishtam), meyer (an important article), especially that grown near Kandahar, saffron from Bukna, west of Kandahar, safflower from Herat, gum salop from Herat, anemone by Bella in Las (an important article), assafetida (an important article) and other drugs, a very fine description of cotton from Herat, cochineal from Herat, and other materials used as dyes.

An active commerce is carried on between Herat and Meshed and other towns in Persia. The exports from Herat consist of wool, cotton, and other goods, saffron from Kandahar, Moottane chintz, Indian brocades, muslin and other cotton-cloth, assafetida, lead (from the mines of the Eimack), cast-iron, saffron, pistachio-nuts, guns, a yellow dye, caraway seeds, and paper. The imports of Herat are chiefly silk, dates, tobacco, and a little opium.

Several caravans go annually from Kabool to Bokhara. They export chiefly articles which have been imported from India, especially shawls and shawl-cloth, white cloth of all kinds, and also cotton-cloth, and they import from Bokhara principally horses, gold and silver in coins and bars. Some articles brought from
number of tumuli is in the plain of Jellalabad, particularly on both sides of the river Surkhrud; but they are also in other places, and on the northern side of the Kabool river. Others are found in the neighbourhood of Kabool. A few small tumuli on the Koh Daman, a low and small group of mounds only, was found at Wardhe, near the river Logur, before it enters the plain of Kabool.

All the tumuli, which are in a tolerable state of preservation, consist of a low mound of earth and small stones, and a cupola, sometimes a few feet in diameter, resting on it. This construction always terminates above in the form of a cupola, which is sometimes so depressed as to exhibit merely a convexity, but it generally approaches to the form of a cone. These edifices are substantially constituted of the same materials as the tumuli which have been described before. They vary greatly in dimensions, some of them having a circumference of 144 feet, and many of only 108 feet. The front, as it appears, is directed to the east, and is surrounded by a recessed way, or a path cut in the earth. They are situated on the skirts of hills or elevations separated from each other by ravines, and in their vicinity there are always many caves, which apparently have been used as dwellings; they are supposed to have been the abodes of priests. Near them there are also always one or more tumuli, but there are tumuli where no tops are found; and in general such tumuli abound all over Afghanistan.

Most of the tops contain passages or tunnels extending from the tumuli or mound, and the centre is occasionally occupied by a small apartment. In these apartments or their recesses are found caskets or vessels of copper or stucco. These vases are sometimes of a globular and sometimes of a cylindrical form, and in many cases contain small rings of gold or silver, often of both. These vessels are often ornamented, but often also are one within the other. One of these smaller vessels generally contains a fragment or two of bone, and these appear to have been the relics over which the monuments have been raised. The whole is carefully wrapped up in an envelope of fine linen. The larger vases usually contain a portion of finely pulverized earth or of ashes; in which are found burnt pearls, beads, rings, seals, and other trinkets, with rare shells, mother-of-pearl fragments, mother-of-pearl shells, &c. In some of the deposits they have been accompanied by twists of tuss-leaves (probably the inner bark of birch), inscribed internally with characters, but they crumble away when they are handled. Some vases contain minute gold and silver cups, beads of pearls, of crystal, agate, coral, and small ornaments of gold and stone, and some coins.

The prevailing opinion respecting these extraordinary buildings is that they were created for the religious ceremony of the relics of Buddha, and that this country was once peopled by nations which had embraced Buddhism. This opinion is supported by the accounts of two Chinese pilgrims, one of whom, Fa Hien, visited the Holy Land of Hihamu, i.e. Hiham, situated about 400 miles north of the frontiers of Afghanistan, about 630 or 650. Both of them state that a hundred years after the death of Buddha, or about a thousand years before the Christian era, his adherents began to settle in this part of the Himalayas, and to build their temples or stupas, and at the time of their travels they found numerous monuments of this description along the road.

Another kind of antiquities are the coins. Single coins have been found at several places. But they occur in great numbers in the Plain of Bighram. They are situated in the Koh Daman, where the rivers which drain that valley unite and take their course to the south-east towards the Kabool river. The plain contains about 24 square miles, and, except some slight ridges, the whole surface is covered with piles of disintegrated bones and ashes; it is a flat plain, on which rain stagnates as it falls. Mr. Masson employed several years to gather the coins found in this plain, and in 1837 he succeeded in collecting 60,000 copper coins, besides a number of silver and gold coins, a large number of engraved sandal-wood, some of them inscriptions, figures of men and animals, particularly of birds, cylinders, parallelogrammatic amulets with sculptured sides, rings, and a multitude of other trinkets, generally of brass or copper. When Lieut. Wood in the following year visited the Koh Daman, he found them in search of coins, and in a few hours they returned with 35 copper pieces. It is further stated that from time out of memory coins have been collected on this plain, which have been buried and dug up, and that in some years as many as 30,000 pieces have been carried off. We are at a loss to explain in what manner or for what purpose such a number of coins have been heaped up at this place. Some think that it is the site of one of Alexander's frontier colonies, of Alexandria near Caucasus, and that it has been for a long time a very large town and the metropolis of a great empire. But in that case extensive ruins would exist, or the ground would have been covered with small and large stones, which only a few of such eminences occur, and it is far from being certain that they are the remains of buildings. But if it be admitted that the Plain of Bighram was the site of a large town, one would be surprised that the small group or mound there only exists for a comparatively short period. But the coins collected by Mr. Masson embrace a period of more than 1250 years, the oldest being coined 256 years before the birth of Christ, and the last about a thousand years after it. If the coins had been left where they were after a town of the sort had been destroyed, it would be most abundant, and those made in remoter times rare in proportion to the time which had elapsed since the destruction took place; but that is not the case: more than 2000 coins were struck during the reigns of the Bactrian kings Menander and Apollodotus, between 126 and 100 B.C.

The coins found on the Plain of Bighram are important historical documents. They throw light on the darkness in which the history of Turan and Afghanistan is involved between the time when these countries were conquered by Alexander and governed by his successors, and the introduction of the Mohommedan religion, or from about 200 before Christ to about 1000 of our era.
According to these lists, several kings reigned at the same
time, or at least several persons acted as independent sove-
igns and coined money. [BACTRIAN COINS, P. C. S.]

Besides the kings placed in Mr. Prinsep's list there is still a
small number of others, namely, Antinacuhas, Archelius, An-
atochus, and the children of Artaxerxes, who appear to have
been governors in Herat and Southern Bactria, and to have
occasionally assumed the titles and prerogatives of kings.

Hence, the last king of the series, is supposed to have
been overpowered by Axes, a Scythian, who, as it ap-
pears, conquered these countries in company with Maues.
Coins of these princes, and of their successor Azilides, are
frequent. They have the Greek and Armenian inscriptions.
It is not easy to dispute about the date of the coin of the
country about thirty years, from 90 to 60 B.C. Before
their arrival Mithridates the Second, of Parthia, had con-
gregated a great part of Eastern Ariana; and though he was
obliged to give way to the Scythian invaders, the Parthians
did not have to entirely abandon the country, as coins with Parthian names of kings are met with, which, to
judge from the style in which they are executed, must have
been made between 100 and 70 B.C. Professor Lassen, who
has also occupied himself much with the coins of India, con-
siders it as established, from the little that we have of Indian
history, that Vike rnakadiya, king of Ojelein, conquered Kabol
about the middle of the century before our era; but no coin
is found of this person, which is not surprising, as coins were
not introduced into India until the reign of Viceramakadiya
from a victory obtained over the Scythians in the Panaj, and
begins 56 B.C. Though the conquest of Vike
rnakadiya rests only on a supposition, an Indian conquest of the
continent is not an unusual event. The coin of Viceramaka-
diya dates from a victory obtained over the Scythians in the
Panaj, and begins 56 B.C. Though the conquest of Vike
rnakadiya rests only on a supposition, an Indian conquest of the
continent is not an unusual event. The coin of Viceramaka
Hindustan.

The dominion of the family of the Kanakes seems to have
been overthrown at the close of the first century by the irrup-
tion of another nation of Scythians, for about this time a new
series of coins begins, of a different dove and style from any before
current. These are frequent, and are called by the name of
Kanakes, and they seem to have possessed the country
nearly to the close of the fourth century. Their coins are not
bilingual: the only characters are Greek, but they be-
come frequent in a very short time in the inscription which
are quite illegible. On the reverse no mythological deity is
represented, but there are two groups of Mithric
representations of the sun or moon, with mystical
names of these luminaries, also in Greek letters. A few of
the Kanake coins have Siva and the bull on the reverse, so
that it appears that the Hindu religion was not wholly re-
jected, but that the Mithric worship predominated.

It is not ascertained when the family of the Kanakas ceased
to reign in Afghanistan, but as the coins of Shah-
porsk, or Sapor II, are discovered in a succession to the
Kanakes, and Nasberwan, are frequently met with, it is supposed that
the country became subject to the Sassanian dynasty in Persia to-
ward the end of the fourth century. That family politically
lost possession of the country to the time when they were
overthrown by the successful invasion of the Arabs under
the caliphs.

It appears further that though the Sassanian dynasty was
conquered by the Arabs of the western part of Iran, or the
province of Iraq, the possession of the eastern provinces of that family still
was kept up, a footing in the eastern part, or in Afghanistan. That
enfeebled power was unable to hold out for a long time
against the repeated invasions of the Turkoman tribes, who
were in possession of Turan. Some of these tribes settled
during the reign of Ahamshah in the eighth centuries in Afghanistan. Among
them were the Afghans or Assakans, mentioned for the
first time by Ferishta under the year A.D. 681, who
further notices that in the ninth century they inhabited the
mountains of Goor or Ghor, where, after the name of
mountain-regions of the Farangian were comprehended. The

Afghans themselves maintain that they are descended from
Afghan, the son of Irmia or Berka, son of Saul, king of
Israel, and all their histories of their nation begin with
narrating the transactions of the Jews, from Abraham
down to the captivity. After the captivity they allege that
their nation had not yet embraced the new doom of the
Mohammedans were found among them. In the ninth century
a Turkoman family, the Samandiades, succeeded in establishing
a regular government in Afghanistan, which lasted to 976.
We refer to the throne deprived the
Samandigh of the possession of the country, which was taken
possession by of Subuktageen.

Subuktageen must be considered as the founder of that
dynasty which is known by the name of Ghuzechnevides, from
the circumstance of their residing in the town of Ghuzne,
Subuktageen had already made some incursions into the Panj
and with success, and his son Mahmoon, more especially
named the Ghuzechnevides, is considered the first Mohammedan
emperor. He undertook to ascend and laid the country west as far as
the plains of Bengal and the peninsula of Guzerat, but he did not
establish a settled government in any part of the con-
quered countries. Like most of the wars of the nomadic
tribes, his expeditions were considered as a mere
insults than as well-conducted conquests. He plundered
the country, and obliged the princes to pay a sum of money
to withdraw with his army. Those princes whose dominions
had been occupied by the Ghuznevides were forced to con-
tribute a regular tribute. His son Massoud and his successors soon lost
their influence over the countries east of the Indus, and the dynasty of the Ghuzechnevides was overthrown in 1186 by the
Afghans.

The Afghans inhabiting the mountains of Ghor had been
much oppressed by the government of the Ghuzechnevides, and
rebelled in 1186, under their chief Mohamed, who not only
overturned the existing government in Afghanistan, but also
established his dominion in a portion of India, which he
called Hindustan, where the Afghan family of Ghor maintained its
power up to 1286. Meanwhile Genghis Khan had begun his
uninterrupted course of victories and conquests, and about
1224 his armies appeared in Afghanistan, and he took Kandahar
as a regular tribute. His son Massoud and his successors soon lost
their influence over the countries east of the Indus, and the dynasty of the Ghuzechnevides was overthrown in 1186 by the
Afghans.

It appears that the descendants of Genghis Khan, or at least a
Mogul family, kept possession of Afghanistan to 1394, when
Timur invaded the country on his famous expedition to
Hindustan. Though he abandoned Hindustan as soon as he had
conquered it, he handed Afghanistan to his empire of Samarkand, and it seems that princes of his house were go-
vernors of this country up to the time of Baber, who took
possession of Kabol in 1504, which remaining his chief resi-
dence up to 1526, when he overthrew the Afghan dominion
in India. Baber, coincided with the appointment of Af-
ghanistan became a province of the Mogul empire of Lin-
hindustan, and remained so until it was conquered by Shah
Abbas the Great, in about 1626, and annexed to the kingdom
of Persia. It was thereafter some years, until it was
conquered by Shah Abbas II. in 1645. As long as the
government of Persia acted with vigour and treated the
Afghans with justice, the peace of the country was not
threatened. But under the weak reign of Shah Sultan Hosein
Mogul, who allowed each of the Afghan princes to
establish his own government, and the governor of Kandahar committed some acts of injustice against
the chief of the Ghilfe tribe, Moar Veis, who killed the
governor and revolted against the government (1709). Kan-
dahar was besieged by a numerous army, which however was
unable to take the town (1713). After the death of Moar Veis

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Ves, his son Meer Mahmood took the power into his hands, assembled a large army, and invaded Persia (1716). Not meeting with any resistance, he advanced to Isphahun, and besieged it in 1722. After a siege of several months, in which the inhabitant of the city, Isphahun, were forced to capitulate. Sultan Shah Husseim resigned his crown to the conqueror, and with Meer Mahmood an Afghan family ascended the throne of Persia. Mahmood soon afterwards became maal, and died in 1725. His cousin Meer Ashursh took his place, the founder of the Ashursh family. Ashursh had not long been occupied by the Afghans. The provinces surrounding the Caspian Sea on the south and west were still in possession of Thamas, a son of Shah Husseim, who was however already reduced to a vassal state, and in 1727 when Nadir Khan found on his way to the south of Persia, he entered his service. He vanquished Meer Aashursh in two battles in 1729, and entered Isphahun. Ashursh lost a third battle near Persepolis in 1730, and was soon afterwards slain. Shah Nadir then conquered Kandahar and the rest of Afghanistan, and, invading Hindustan in 1739, took Delhi, but contented himself with the immense booty he got there, and turned his arms against the Usbecks in Bokhara and Khiva, and the Turks. In 1747 he was murdered in his tent, and one of his generals, Ahmed Khan, became the founder of the Durrance dynasty.

Directly after the assassination of Shah Nadir, Ahmed Khan, accompanied by 2000 or 3000 horse, repaired to Kandahar, where he found a great sum of money sent from Hindustan by Shah Nadir, and himself enabled to gain the goodwill of his countrymen, the Afghans, of whom the Duranses, Beloochees, and the Hazara assisted at his coronation as king of Afghanistan: the Giljes kept aloof. Having secured the ascendency and assembled an army, he crossed the Oxus and captured Khiva, which he took by surprise shortly before his death. In 1748 he reduced the Giljes to obedience, and made himself master of the valley of the Kabul river, whence he invaded the Panjab, defeated the army sent against him, and entered Lahore. He then passed the Sutleje river, and defeated another army at Sirhind, but did not follow up this advantage, but returned to Kandahar. In the following year he established his authority in Herat and Mohob; in 1750 he took Nishapur, and in 1751 he advanced as far as Herat. In 1752 he made an expedition against the Panjab, which he ravaged, and reverted to it Cashmere. By a treaty with the Great Mogul he acquired all the countries of the Panjab and as far east as Sirhind. But in 1756, when the emperor of Delhi had again taken possession of the Panjab, and annexed it to his empire, Ahmed Khan entered Delhi with his army. The emperor was obliged to leave the Panjab and Sinde in his hands. The Mogul government had become so distracted that all its neighbours attacked it, with the concert of the other countries, and the Mahraats took advantage of their expeditions. The Mahraats especially turned these circumstances to account. They for some time had made rapid progress, and in 1757 they took Sirhind and obtained possession of the Panj Jill river Jheelum or Jilun. Ahmed Khan retaken them in 1759, and entered Delhi, which however was besieged by the Mahraats and retaken in the same year. The power of the Mahraats had now attained such a height that all the Mohammedans princes of Hindustan began to fear that their supremacy was drawing to an end, and that they soon would be expelled from the country. This seems also to have been the object of the Mahraats, to judge from the great preparation that they made for that campaign in 1760. The Indian princes therefore called Ahmed Khan to their assistance. He came, and the famous battle of Panipit (7th of January, 1761) put an end to the supremacy of the Mahraats. Ahmed Khan could now have ascended the throne of Delhi, but his object was to possess the possession of the countries which he had formerly been ceded to him, and returned to Kabloo. None of the numerous victories which the British have obtained in Hindustan has more facilitated their conquests in that country than this battle of Panipit, in which they were not prevented by the Five Rivers. Ahmed Khan always succeeded in driving them back into the mountains, but the possession of the Panj Jill remained a precarious tenure. Ahmed Khan died in 1773, and to his praise it must be recorded that the memory of no Eastern prince is stained with fewer acts of cruelty and injustice. The empire which he had erected extended from Herat on the one side to the banks of the Oxus and Cashmere on the north to the Arabian Sea and the mouths of the Indus on the south. It may appear a matter of surprise how such an extensive empire could fall to pieces in such a short time as has elapsed since the death of Ahmed Khan, in 1773. The why of this is that although this empire was as strong as all that the Mogul family had attempted in the course of this as well as so many other extensive empires of Western Asia, which have had the same fate. Some of the conquered countries were left in possession of their native princes, who were generally among those that were obliged to pay a tribute, as Beloochistan and Sinde. To others governors were sent from Kandahar and Cashmere. Whenever the possessors of these countries perceived that their sovereign was unable to compel the tribute, they refused to pay it. The authority of the Afghan sovereigns in their own countries also was not great, as it was dependent on the good will of the chiefs of the different tribes, who frequently paid no attention to the orders of their master, and whom he was not always ready to compel to do their duty. It is evident that such an empire can only be kept together by a sovereignty which is always backed by an army, and always marching from one end of the country to the other, as Ahmed Khan really did. A sovereign gifted with a less active or restless mind soon found that the sovereignty of the country could only be maintained by a standing army, composed of a sufficient army, and always marching from one to the other of the empire, which is the case with all the empires of the east. In 1771 he was obliged to march into the Panjab to recover Mooltan, which had been betrayed to the hands of the Sikhs by the governor. He died in 1773. At his death the second of his sons, Shoojah, was overthrown, and was assassinated. He had to put down several insurrections and rebellions, but the affairs of the Panjab and of Herat chiefly occupied his time and attention. The Sikhs had got possession of the Panjab, and in 1778 he advanced without molesta-

tion to the plains of Kandahar, and got possession in person, and was installed by him as governor of the province. Shah Zeman did not dare to remain long in the Panjab, as his step-brother Mahmood, who was governor of Herat, and acted as an independent sovereign, was always ready to march to Kandahar to get possession of that town, and Zeman was unable to reduce Herat. In 1777 several great men entered into a conspiracy for the purpose of deposing Zeman and raising his brother Shoojah on the throne. The con-

in possession of Kandahar, but he did not succeed. The Shah sent an army to Cashmere, the only province in rebellion, in 1805, and it was subdued in 1806. But at the same time Prince Kysar, a son of Shah Zeman, had been induced to rebel in Kandahar, but was beaten, and submitted in 1808. During this civil war Mahmood had been liberated, and had taken Kandahar. Shoojah marched against and defeated him. Cashmere and the parts of Baluchistan which he had occupied were given by the Shah to Ranjeet Singh, who was defeated and lost nearly the whole army. This event threw the affairs of Shah Shoojah into great disorder. Mahmood captured Kabool whilst the Shah was at Peshawur. In the following year (1809) Shoojah marched against Kabool, but his army was beaten and killed. The Shah, abandoned by all, became a fugitive, and was soon led as a captive to Cashmere.

Shah Mahmood again ascended the throne in 1809. He sent an army in 1811 to attack Cashmere, and to re-establish the supremacy of Sikhs which Runjeet Singh sent to his assistance. Cashmere was obliged to submit, and Shah Shoojah was set at liberty and went to Lahore. Runjeet Singh acquired the fortress of Attock, and since that time the power of the Afghans has ceased on the eastern side of the Indus. In 1815 the Persians were about to attack Herat. Futeh Khan, the vizier of Mahmood, marched against them and defeated their army, but made himself master of the place, dismissing the governor, Khan-i-Khanan. The assistance, Sir William Congreve was defeated of his sight by Kamran, the son of Shah Mahmood, and soon afterwards murdered. The consequence of this event and the state of the Persians in 1815, which they were at that time in process of time was deprived of all its territories except Herat. Several princes of the royal family were raised to the throne, and soon lost it by another revolution, and then several members of the family of Futeh Khan ruled in Herat. In 1820 the kingdom was divided among them in 1824. Dost Mahomed Khan, one of the brothers, succeeded in appropriating to himself the valley of the Kabul river and the adjacent districts in it. He was closely followed by Sir Alexander Burnes, who was compelled to pay tribute to the chief of the Sikhs, and at last he deprived him of his territories, and placed Peshawur under the government of the Punjab. If some valleys in the Himalayas were in possession of the Baluchistan tribes, and the war was reduced, or the settlement was one of the most, the Afghan government was subject to Dost Mahomed Khan.

Dost Mahomed resided at Kabool as his capital city, while Ranjeet Singh governed the Sikhs in the Punjab as envoy from the time in possession of Cashmere and Multan. Dost Mahomed, desirous of securing the friendship of the British government, on the 1st of May, 1836, addressed a complimentary letter to Lord Auckland, who arrived at Calcutta towards the end of June, 1837, and had not heard from the state of India, and he appeared to have soon adopted the notion that the British empire in India was in danger from the intrigues and forces of Russia, Persia, and Afghanistan. On the 20th of September, 1837, Captain Alexander Burnes arrived at Kabul as envoy from the governor-general. On the 24th of December a Russian agent arrived at Kabul, and Burnes was somewhat confounded to learn that he was honourably received by Dost Mahomed. On the 26th of April, 1839, Captain Burnes left Kabul on his return to India, but afterwards, in the presence of Governor General Simla to meet Lord Auckland. Here it was resolved that, as Dost Mahomed was treacherous, and disposed to enter into alliance with Russia and Persia, and could not be trusted, he should be dethroned, and Shah Shoojah sent with an English army to recover the throne of Kabool. Two months before Captain Burnes met the governor-general at Simla, Ranjeet Singh had been joined by Mr. Mountstuart James, with Ranjeet Singh, in which he undertook to prepare the way for the easy advance of the British army through the Sikh country to Kabool. On the 1st of October, 1839, a proclamation of Mr. Simla against Shah Shoojah, and Sir Henry Fane was at that time commander-in-chief of the whole army of India, which was then raised to 208,000 men. Ranjeet Singh, notwithstanding the late treaty, refused to allow the British troops to cross the Punjab, and the principal rendezvous was at Firozepore, on the right bank of the river. The advance of the army on the 20th of February, 1839, began to cross the broad desert towards the Bolan Pass, and reached Dadur, at the foot of the western mountains of Afghanistan, and close to the Bolan Pass, on the 6th of March, when provisions were already so short that the camp-followers were put on the march. The Bolan pass is 60 miles long, winding, rugged, and flanked by high rocks. The surrounding country is inhabited by the wild tribes of Afghans, who live almost entirely by plunder. For several weeks after these events the army were on the march, and reached Quetta, in a fertile valley, after losing a vast number of horses and camels owing to the extreme ruggedness and difficulty of the Pass. At Quetta they expected to find supplies, but there were none; and after some useless negotiations with Meeral Khan of Khelat, to whom the place belonged, the army was compelled to push forward, in a state approaching to famine, to Kandahar, distant 150 miles, which they reached on the 26th of April, having marched 1000 miles since they left Firozepore.

On the 12th of April the Bombay column, after having endurred terrible fatigues and privations, entered the Bolan Pass, and, in spite of considerable opposition, passed through it, and joined the Bengal division on the 4th of May. The army then consisted of about 50,000 men, but the camp-followers had been greatly reduced, but still amounted to 29,000.

Kandahar contained nearly 100,000 inhabitants. The routes led through the mountains and rivers of Afghanistan, which was found to be much more strongly fortified than Sir John Keane had expected. All the gates had been walled up except that opening upon the Kabul road, and it was expected which offered more resistance, to blow down this gateway with powder-bags, and attempt to take the town by assault. On the night of the 22nd of July the gate was blown open with 300 pounds of powder in twelve bags; the storming-party immediately rushed in, and, after a long and desperate attack, the light troops of the British, Afghans, carried the town, and by five o'clock in the morning, or little more than three hours after the gate had been blown open, the strong citadel was also taken, and the British colours waved from the battlements. Hyder Khan, the governor, one of the sons of Dost Mohamed, surrendered in the course of the morning, and was placed under the care of Sir Alexander Burns, who had been knighted previous to the service of the army.

On the 30th of July Sir John Keane marched with the main army from Ghuznee to Kabool; and Mahomed Akber Khan, Dost Mahomed's second son, who held Jel alaba,
having been hastily recalled to assist in the defence of Kabul, Jellalabad was taken possession of by Colonel Wade, who attacked Akbar Khan so vigorously in his retreat that he was compelled to give up all his artillery, baggage, horses, bullocks, and 7,000 rounds of ball-cartridge, which fell into the hands of the British.

As Sir John Keane drew near Kabul, Dehawmed advanced with his third army and camped, and fled with 600 horsemen to seek a refuge beyond the Oxus. At the same time the death of Runjeet Singh was announced. Sir John Keane and Shah Shoojah encamped under the walls of Kabul on the evening of the 6th of August, and on the following day the British officers, by mutual consent, accompanied by the British officers, made his triumphal entry into his former capital; but there was no display of enthusiasm on the part of the natives, whose behaviour was orderly and respectful, but cold and cheerless.

This entry was considered to be complete. The Bombay column quitted Kabul on the 18th of September, the Bengal division on the 20th of October; and, leaving 8,000 men, British and sepoy, besides the Shah’s contingent, to secure him on his throne, the British army returned to India. Sir John Keane returned to England, and was raised to the peerage by the title of Baron Keane of Ghuznee and Cappoquin, with a pension of 20,000 a year.

Mr. MacNaghten, having been created Sir William Mac Naghten, was sent to Kabul as the representative of Sir Alexander Burns as agent to the envoy. In the spring of 1840 insurrections and attacks upon the British outposts began to break out, which, as summer advanced, assumed a bolder character, and were kept down without a great deal of severe fighting. Dost Mahomed was having some assistance returned to Afghanistan, to stir up the insurrection; but as he advanced towards Kabul, he received such severe losses and was reduced to such extremity by the British troops, that he resolved to surrender to Sir William MacNaghten; and, on the 3rd of November, when Sir William was returning from his evening ride, Dost Mahomed rode up to him, alighted from his horse, and presented his sword to the envoy, sought his protection. His sword was returned, and the protection refused. He had ridden many miles from the field of the battle of Purwan Durrah, in which he had been defeated on the preceding evening, straight to Kabul, having been twenty-four hours on horseback. On the 12th of November he was sent to India under a strong escort. Mussoorie, on the British north-west frontier, was assigned to him as a place of residence, and three lacs of rupees, or about 30,000/, were allotted to him as a revenue.

The insurrections continued. At the end of 1840 the British had 16,000 in Afghanistan; in November, 1841, they had 14,000, besides the Shah’s contingent. In May, 1841, Major Pottinger warned Sir William MacNaghten of the dangerous situation of the British, of the insufficiency of their forces, and the weakness of the garrisons in nearly all. He was disregarded both by Mac Naghten and Burns. By the end of September the neighbourhood of Kabul swarmed with predatory bands, and during the month of October the British officers were treated with insolence and insult in their cantonments at Kabul. On the 22nd of November, 1841, Sir William MacNaghten was in the cantonments, and Sir Alexander Burns in his house in the city, when, about nine in the morning, Burns’s house was set on fire, and himself, his brother Lieut. Burnes, Lieut. Broadfoot, and every man, woman, and child on the premises murdered. The British officers in the cantonments seemed to be stupified, and did nothing. Major-General Elphinston at this time held the chief command of the army, but was necessarily confined to all his duties, and could be utterly incapable of acting with the necessary decision and energy in such an emergency. The insurrections continued to increase; the British officers became more confused and indolent than ever. They were murdered in the 23rd of December, in the presence of Akbar Khan, who had invited him to a conference; and by a council of war held on the 29th of December, a treaty was ratified, by which it was agreed to leave behind all the guns except six, to relinquish all the British seats, and give up, in addition, a sum of 6,000 rupees, in bills drawn upon India, but negotiated on the spot by some Indian bankers, for which the whole army was to be escorted to Peshawur; but ultimately Akbar Khan repudiated this treaty and conducted it in safety to Jellalabad, and to Kandahar, and to Peshawur.

On the 6th of January, 1842, the Iills being drawn, and hostages given up, the army left its cantonments at Kabul, and began its retreat, one of the most disgraceful to the British army as well as the most disastrous that has ever been recorded. The whole force was estimated at about 4,500 fighting men, with about 12,000 men of camp-followers, besides women and children.

The work of massacre began immediately; on the 8th of January, Major Pottinger and Captains Lawrence and MacKenzie were given over to Akbar Khan, as hostages for the British officers. The whole British army entered the Khoord Kabool Pass, five miles long, shot in on either hand by a line of lofty hills, with a torrent dashing down the centre, whose course the frost in vain attempted to stop. The country was as bold as it was very great. Lady Sale received a ball in her arm, and Lieut. Sturt, her son-in-law, was mortally wounded. On the 9th the married officers, with their wives and children, and two other wounded officers, were given up to Akbar Khan. On the 10th and 11th the British army made its way through the Kandahar Pass, Durrah Pass, the Dark Pass, and the Tezoon Pass, three miles long, with great loss. On the 11th General Elphinston, with two other officers, fell into the hands of Akbar Khan. On the 12th the army reached Juggululla, 23 miles from Tezeen, and a night entered the Juggululla Pass, two miles long, and exceedingly narrow, precipitous, and difficult. They found the exit from the pass closed up by two strong barries of prickly holly-oak stretching completely across the defile. The army parted, and the right fell into the neighbourhood of Gundumuk, where the final struggle took place, they had only about twenty muskets left. Captain Souter and seven or eight men were taken prisoners. Dr. Brydone and two or three more were taken. The whole time of the retreat the attacks of the Afghans were incessant, the cold was intense, and they were almost entirely without food. Including camp-followers, women, and children, about 25,000 individuals were destroyed.

General Nott held Jellalabad. General Nott maintained himself in Kandahar, and Colonel Palmer, with one native regiment and some artillery, retained Ghuznee, which however was afterwards taken from him, and Palmer and the remnant of his army made prisoners. Akbar Khan on the 18th January, having bested the British forces decisively in the Kyber Pass and when he reached the fortress the beleauring army was dispersed and in rapid flight. General Nott, receiving some supplies in Kandahar, was ready to co-operate with General Pollock and General Nott, and an advance upon Kabul. Shah Shoojah had some friends among the Afghan chiefs, and was able to maintain himself in the Bala Hijar, or citadel of Cabul, after the British had left him to his own resources; but he was assassinated by Shoosh Dowlar and Fatty Malook, and his son, Omar Khan, was proclaimed king by one party and opposed by another.

On the 17th of January, the party of prisoners, consisting of 20 officers, 9 ladies, and 14 children, besides 17 Europeans soldiers, was conveyed to Jellalabad, and the fort of Busssehah, in the Lughman valley, where they were kept till the 10th of April, when they were marched back to a fort at Tezeen, Lady MacNaghten’s baggage having previously been rumaged and plundered of jewels and harts. She had the fort of Jellalabad, on the 29th of April, having bested the Afghans decisively, when she handed it over to the British. At the same time, on the 15th of August, General Nott, at the head of 7,000 men, had left Kandahar for Ghuznee and Kabul. Sultan Jan attempted to stop his march, but sustained a complete
defeat; Ghuznee was retaken, and General Nott continued his advance to Kabul.

On the 25th of August, Akber Khan hurried his prisoners off towards Turkistan, under a threat that he would make presents of them all to the chief of that country. On the 1st of September he reached Barmeen, where they were halted at an old fort till fresh orders were received from Akber. On the 11th of September the khan who had charge of them signed an agreement with five English officers, in which they undertook to receive the proclamation of the British government, to be read to them out of a book in their own language, and to receive afterwards the British flag. The khan then, after due parleying near to Kabul, came in and swore on the Koran allegiance to him and his companions.

On the 15th of September, General Pollock, after some hard fighting at Huttulgulick Pass and elsewhere, having joined his forces with those of General Nott, entered Kabul; and one of his first acts was to send off a party of Kuzzillahs, adherents of the late Shah Shoojah, to the aid of the prisoners, who on the same day had quitted the fort, resolved to fight their way back to Kabul. Pollock, on the 17th of September they were surprised by the arrival of a horseman with a letter from Sir Richmond Skearpe, who was advancing with 600 mounted Kuzzillahs to meet them. They reached the fort at three o'clock in the afternoon, and the next day reached some deserted forts, where they were sheltering themselves from the sun, when, at three o'clock, Sir Rich- mond Skearpe and his troop arrived. 'Our gallant countrymen,' says one of the party, 'was greeted on our side with no less than fifty-two guns, and the overwhelming fire to utter. That we should have escaped unhurt, with so many delicate women, young children, and tender infants, through such numerous perils, fatigues, and privations, and above all from the hands of such merciless enemies as Akber Khan and his Ghilzee confederates, seemed at first too much for the senses to realize.' The march was resumed on the 18th, and on the 20th they were met by General Sale's brigade, the gallant veteran being there in person to receive his long-lost wife and daughter, the widow of the brave Lieut. Sturt. On the 31st of September the happy party marched forward with General Sale's brigade, and entered General Pollock's camp at sunset, amidst the cheers of the soldiers, the congratulations of their friends, and the roar of the artillery, which announced their welcome arrival.

Victory now attended the British standard wherever it was raised, and the Afghan war was at an end. The prisoners had been restored to liberty and their friends, and by a series of well-judged rules and negotiation, all had been retrieved. On the 1st of October, Lord Ellenborough issued a proclamation from Simla, stating that the disasters in Afghanistan having been avenged upon every scene of past misfortune, the war had been declared to be at an end.

On the 12th of October, after having destroyed the fortifications of the Bala Hissar at Kabul, the army began its march back to India, and on the 17th of December, 1842, reached Ferozepore, on the Satluj, where, as Lord Ellenborough expressed it, they were 'within their native boundaries.'

General Sir William Nott died on the 1st of January, 1846, on his estate near Caernarthen, in Wales.

The jurist Africanus, mentioned by Lampridius (Alex. Severus, xii. c. 68), as being connected with the reign of Alexander Severus is a different person from this Africanus: Lampridius has made some blunder, either in the name or in the period to which he assigns this jurist.

E. GEORGIUS (Erythraeus), a Greek painter, who, apparently, from a passage in Vitruvius, may be considered, if not the inventor, at least the first artist who applied the laws of perspective practically in painting. He painted a dramatic scene for Aeschylus in perspective, which was the first work of the kind exhibited to the Greeks; and the contemporary of Aeschylus therefore, he was a man of mature years about 480 B.C.

The words 'scenam fexit,' in the passage in Vitruvius referred to, has been interpreted, he constructed a stage; but this interpretation is shown by the context to be incorrect, the whole passage is as follows: 'When Aeschylus was exhibiting tragedies at Athens, Agatharchus made a scene, and left a treatise upon it. With the assistance of this treatise, Democritus and Anaxagoras wrote on the same subject, showing how the extension of rays from a fixed point of sight should be made to correspond to lines according to natural reason, so that the images of buildlings in painted scenes might be correctly represented upon flat vertical surfaces, some parts should seem to recede and others to come forward.'

This kind of scene-painting was termed Scenography (ενεργονοοηδος) by the Greeks, and was sometimes practised by their architects; Diocles of Halicarnassus, Archelaus of the Typoses, by Masson; Princeps's Note on the Historical Results deducible from the recent Discoveries in Afghanistan; Ireland's Memoir of the Climate, Soil, Produce, and Husbandry of Afghanistan, in Calcutta Asiatic Journal, Ns. 59, 94, 95, 97; On the Wool and Woolen Manufactures of Khorasan, in Calcutta Asiatic Journal, No. 99; Edward Conolly's Notes on the Eusoofy Tribes in Afghanistan, in Calcutta Asiatic Journal, No. 105; Postman's Memorandum on the Silk Trade between Shikarpore and Khorasan, in Calcutta Asiatic Journal, No. 110; Report on the Physical Geography of Seistan, in Calcutta Asiatic Journal, No. 103; Arthur Conolly On a Mission into Khorasan, in Calcutta Asiatic Journal, No. 110; Edward Conolly's Journal kept while travelling in Seistan, in Calcutta Asiatic Journal, No. 102; Dr. Grifffith's Extracts from a Report on subjects connected with Afghanistan, in Calcutta Asiatic Journal, No. 118; Postman's Memorandum on the Trade between the Towns of Shikarpore and Candahar, in Calcutta Asiatic Journal, No. 111; P. C. Josttman's Account of a Tour through Parts of Panjibab and Afghanistan, in Calcutta Asiatic Journal, No. 139; Captain Drummond On the Mines and Ressources of Northern Afghanistan, in Calcutta Asiatic Journal, No. 103; The Balon Pass, in London Geographical Journal, vol. xii.; Forster's Journey from Bengal to England, through the Northern Parts of India; MacFarlane's Indian Empire, 2 vols. 12mo.)

AFRICA NUS, SEXTUS CAECILLIUS, a Roman jurist. Many excerpts from his Nine Books of Questions contained in the Digest [JUSTINIAN'S LEGISLATION, P. C.] Africanus often cites the Responses or opinions of Salvius Julianus, who lived under Hadrian; and he was a pupil or friend of Julianus, and consulted him. (Dig. 25. 5. 15.) The period of his life, according to Graecopius, was 164, under Hadrian, who died A.D. 138, and to that of his successor Antoninus Pius. The fact of Africanus being quoted by Paulus and Ulpianus shows that he was prior to these two jurists. In a passage in Gulus (ii. 219) which has been referred to in order to show that his contemporary reading is probably 'et Sexto,' instead of 'ex Sexto,' and this Sextus may be Sextus Pomponius. As Julianus belonged to the legal sect of the Sabiniians, it is probable that Africanus also did. Anius Gellius (xx. 118) has a brief discussion between Sextus Caecilius, a distinguished jurist, and Favorinus, a philosopher, on the Twelve Tables; and the date of the Twelve Tables is fixed in this discussion as near seven hundred years prior to the time of Gellius. This makes the table probably not the later, but the earlier, the number of seven hundred is too much by a century for the age of Gellius. This error is no objection to our concluding that the Sextus Caecilius mentioned by Gellius is the same as Africanus. The excerpts of Africanus treat of many legal points, and have been well illustrated by Cujicius (Opera, tom. i. tract. 9.)

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There was another Greek painter of the name of Agatharchus, who lived about half a century later than the above. He was contemporary with Zeuxis, and Plutarch relates an anecdote of the two, how Zeuxis reproved Agatharchus for boasting in company of the art with which he possessed himself — by quietly observing that he (Zeuxis) painted very slowly. This Agatharchus is the painter whom Alcibiades shut up in his house until he had painted certain pictures in it. The circumstance is noticed by Plutarch and by Andoanthes, but there are different accounts of the conclusion of the affair.

(Vitrivius, viii. Proef.; Diogenes, II. 125; Aristotle, Poetic, iv.; Plutarch, Pericles, 13, Alc. 16; Andoanthes, Orat. in Alcid. 7.)

Agatharchus (Ἀγαθαρχος), a Greek historian and poet, who lived under the emperors Justinian and Justinus the Younger. He was a son of Memnonius, and born at Myrina in Asia Minor, about A.D. 550, but he received his education at Alexandria, whence he went in A.D. 556 to Constantinople, and his father seems to have settled during his son's stay at Alexandria. Agathas had commenced studying the law, and afterwards distinguished himself as a speaker in the courts of justice. The title of Scholasticus (Σχολαστής), which some writers give him, and which appears in the MSS. of his work, refers to his profession of advocate, for scholasticus at that time signified an advocate. But notwithstanding the great reputation he thus acquired, he never liked his profession, which he practised, according to him, only for the sake of earning a livelihood: his favourite pursuits were poetry and history. He was esteemed by most of the most distinguished men of the time, and seems to have been rather given to courting the great. Some of his epigrams, which are also extant, contain this description of Agathas: he was a Christian. He died about A.D. 585, in the reign of Mauritius Thrax.

Agathas was the author of the following works: —
1. 'Daphnica' (Δαφνικα), a collection of erotic poems in hexameter verse. It consisted of nine books, but is completely lost. Agathas himself calls it a juvenile production.
2. 'Cycius' (Κύκλος), that is, a poetical anthology, in which he collected the poems of his contemporaries, especially of his illustrious friend Alcibiades, and also a few of his own. The collection itself is lost, with the exception of the introduction, which Agathas wrote. His epigrams, which are still extant in the 'Greek Anthology,' may originally have formed a part of the Cycius: they show that Agathas had considerable poetical talent and wit. 3. 'History of his own time,' is the most important among his works, and is complete, at least as far as he wrote it; for it breaks off abruptly in the twentieth chapter of the fifth book, probably in consequence of the author's own death. This historical work commenced at a late period of his life. It contains the history of the short period from A.D. 553 to 559. He appears throughout this work as a good and honest man, and as a faithful historian. His great faults are ignorance of historical and geographical details, which were at that time little connected with the west of Europe. His language is a tasteless compound of nearly all the dialects of ancient Greece, in which however the Ionic predominates. Among the editions of this work the most important are that of Bonaventura Vulcainus (Lugdun. 1594), those in the Paris and Venice collections of the Byzantine writers, and above all that of B. G. Niebuhr, which forms the third volume of the 'Corpus Scriptorum Historiae Byzantinae' (Bonn, 1828, 8vo.), and contains the good account of the life of Agathas, and also his epigrams.

A'GATION, a native of Sicily, succeeded Demus in the see of Rome, A.D. 678. The Emperor Constantine Pogonatus, brother-in-law of the empress Constantina, about A.D. 680, Agathon sent legates to it, who concurred in condemning the heresy of the Monothelites, who contended that, in consequence of the union of the two natures in the person of Christ, there was in him only one will and one operation, an opinion which Agathon seems himself to have entertained, many prelates, and even by Pope Honorius I. These subtle metaphysical distinctions, to which the minds of the Orientaries were prone, seem to have puzzled at times the more sober and masterly minds of the West. A.D. 682, in the favour of Agathon the usual fine which the see of Rome paid to the emperor at every new election previous to obtaining the imperial confirmation of the bishop elect. The confirmation itself however continued to be required for a considerable time after, if not from the emperor, at least from the Exarch of Ravenna, who was the emperor's representative in Italy.

Agathon died A.D. 682. He is numbered by the Church of Rome among its saints.

(Sandlin, Vita Pontificum Romanorum ex Antiqvis Memoriae Actis, A.D. 530, t. 7.)

AGATHOTES CHIRAYTA (Don, in London and Edinb. Philos. Mag. 1836), the latter being the specific name, an imitation of the Sanscrit and Bengalee names of a plant of the tribe of the Gentianaceae, and so greatly resembling P. Gentianum, that the latter name has been given to it by Buchanan, who has figured it in his 'Plantae Asiatice Rariores,' vol. iii. p. 33, t. 252. It has been known for a great length of time as a remedy in India, but has only recently been introduced into European practice. Indeed it has not yet been received to the same extent as the well known pharmaceutical plants of that of Edinburgh: that it merits however a more extended use is certain. It is probable that even in India two distinct plants, both gentianaceous, are designated by the name Chirayta: one being the A. Chirayta, and another the A. Hancora, the last two so termed. The smaller of the two is that which is here treated of. Continental pharmacologists have had sometimes the one, sometimes the other, supplied to them. Hence very erroneous accounts are met with of the habitations and physical characters of the Chirayta. Geiger describes it as a perennial plant, native of Egypt as well as India, and of larger dimensions than the plant now introduced. The genuine Chirayta is an annual plant, about three feet high, flowering in the rainy season. It is not difficult for collecting it is just when the flowers begin to wither. When dried it has an intensely but agreeable bitter taste, and is destitute of aroma. The root is possessed of the greatest bitterness. The bitter principle is readily impregnated with water: it is a diuretic, and is used as a remedy in dropsy. The plant the continental chemists analysed, it seems best to follow the analysis of Mr. Bartley, whose specimens must have been genuine, having been furnished by Dr. Wallich. According to this chemist, it contains a free acid, a bitter resinous extractive, with much gum, and chlorates, with sulphates, of potash and lime. No alkaloid has been detected in it; what is therefore sold as a sulphate of chirayitane is well known to be only the disulphate of quina. In regard to the pharmaceutical virtues of the plant, in every case of diarrhoea, failure of appetite, or the duration of its function, are anything but beneficial. It is one of the most depressing medicines, and is best employed in the cold infusion a pint of warm water is to be condensed, as this causes most distressing headaches. Even to form the cold infusion a pint of water should not stand more than twenty minutes on half an ounce of the bruised plant. The tincture is a grateful addition to it.

Chirayta possesses the general properties of bitter herbs, but has at the same time some peculiar to itself, which fit it for a variety of medicinal purposes. Unlike most other tonics, it does not constipate the bowels, but tends to produce a regular action of the alimentary canal, even in those subject to habitual constipation. During its use, the bile becomes more abundant and healthy in character. The patient is more cordial and cheerful, and everyday increase of strength, the function of filth, is much restrained by its use. These qualities fit it in a most peculiar degree for the kind of indigestion which occurs in gouty persons. It may, when necessary, be associated with alkaline preparations or with acids; the latter are generally preferable. The same remark applies to its employment in the treatment of scrofula, in which alkalies are so freely and often injudiciously employed. As a remedy against the languor and debility which afflicts many persons, it is deeply recommended; nothing usual in the treatment of this plant. It may be taken twice or even more frequently daily, for a considerable time; then discontinued, and afterwards resumed. Children take it more readily than most other herbs. It is found to be a very efficacious remedy in India against intermitents, particularly when associated with the Guilandina邦东, or Caranga nuts. The debility which is apt to end in dropsy is often speedily removed by infusion of Chirayta; to which is added the tincture formed of it with equal parts of an infusion of Cascara. A remedy of great value has procured for it the name of worm-seed plant. The extract is given with great benefit in some forms of diarrhoea and dysentery, particularly if combined with ipecacuan, the emetic tendency of which is well known, and probably makes it more effective. It is more probable that in the present day is said to yield the
AGLAOPHON of Namur. Whencesoever obtained, this oil possesses great virtues. It is much used in India against rheumatism. It has the power in a most remarkable degree of preventing the hair of the head from falling off after acute diseases, such as pleurisy, or after confinement or protracted nursing. With it even restores it after it has fallen off. But it must be strong and pure; not the diluted feebly oil sold by perfumers under the name of oil of grass.

AGNOSTOS. [Agnostos.] There were two distinguished Greek painters of this name, who were probably related. Bogtius supposes that the younger was the grandson of the elder Aglaophon, and the son of Aristophon, the brother of Polycleitos. The latter was born in a little island off the coast of Thassos, where his son Polycrates was also born. Aglaophon's greatest distinction is that of having been the father and the instructor of Polycrates, who is the first painter recorded in history who attained great fame. Quintilian is the only writer who speaks of the style of Aglaophon, but he indiscriminately couples him with Polycrates. He says, 'Notwithstanding the simple colouring of Polycrates and Aglaophon, which was little more than the crude beginning of what was afterwards accomplished, many ravers, certainly with some affection, preferred their works to those of the greatest masters who succeeded them.' There can be as little doubt that this passage refers to the elder, as that which following from Cicero refers to the younger: Cicero says, talking of Apelles: 'Aglaophon and Apelles, both great masters, were all different in their styles, yet each was perfect in his own style.

None of the works of the elder Aglaophon are particularly mentioned, unless the Winged Victory spoken of by the scholiast on the Birds of Aristophanes (v. 675) may be attributed to him.

The two pictures of Alcibiades mentioned by Athenaeus must have been by the younger. After Alcibiades, says Athenaeus, returned to Athens a victor at the Olympic games, he exhibited two pictures of himself, one representing Olympias and Pythias crowning him, and the other he was painted extremely beautiful, lying on the knees of Nemea. Plutarch attributes the latter of these pictures to Aristophon, the brother of Polycleitos, a painter, of whom nothing is known besides, but as the account of Athenaeus accords better with the time, it is more probably correct, at least under the supposition that there were two artists of this name. The beautiful horse spoken of by Adian was probably the work of the younger Aglaophon.

(Suidas, Ἀγλαόφων; Quintilian, Inst. Orat. xii. 10. 3; Athenaeus, xii. 534; Plutarch, Alcibiades, 16; Cicero, De Anima, 31. 6; Adian, De Anim. in Epilo.)

AGNOSTUS. [Agnostos.] A genus of Crustacea usually found with Anaspis Buchi and other trilobites in the lower Paleozoic strata. (Brongniart.) Called Battus by Dalman. It abounds near Llanddilo and Christiania.

AGNOETHERIUM, a fossil genus of Mammalia. (Kaup.)

Agricultural Institutions. In this article it is proposed to give some account of various institutions for the improvement of agriculture, beginning with the Board of Agriculture.

This semi-official institution was established chiefly through the exertions of the late Sir J. Sinclair, and was incorporated in 1793. It was annually assisted by a Parliamentary grant. One of the first acts of the Board was to commence a survey of the English counties on a uniform plan, which brought out, for the information of the class most interested in adopting them, improved practices, originating in individual enterprise or intelligence, and which were confined to a particular district. The 'Surveys' are many of them imperfectly executed, but they were useful at the time in developing more rapidly the agricultural resources of the country. During the years of scarcity at the end of the last and beginning of the present century the Society took upon itself to suggest and, as far as possible, provide remedies for the dearth, by collecting information and making reports to the government on the state of the crops. The statistics which the Board collected were also at times made use of by the ministers of the day, and are still used by the Board in connection with his schemes of taxation. The Board encouraged experiments and improvements in agriculture by prizes; and it naturally exercised considerable influence over the provincial agricultural societies.

The Board of Agriculture was reorganized in 1816. The Smithfield Cattle Club, which has been in existence half a century, and some of the provincial agricultural societies, especially the Bath and West of England society, which commenced the publication of its 'Transactions' nearly seventy years ago, have been very useful in promoting agricultural improvement. Until the last few years, the exertions of Agricultural Societies have been too exclusively devoted to the improvement of stock.

With the establishment of the 'Royal Agricultural Society of England' a new era commenced in the history of institutions for the improvement of agriculture. When the society was founded, in May, 1838, consisted of 468 members. At the first anniversary, in May, 1839, the number of members had increased to 1104; in May, 1840, to 1770; in May, 1841, to 3564; in May, 1842, to 5246; in December, 1841, 5592; in May, 1842, 5844; and by the following May, 1843, the number had been increased by the election of 1436 new members. At the sixth anniversary of the Society, in May 1844, the number of members was 6927, of whom 274 had been elected in the preceding three and a half months; and there had previously been struck off the list 249 names of members who were either dead or had not paid their subscriptions. The number of life governors (who pay an admission fee of 50l.) was 97 in December, 1844; and there were 208 annual governors, who pay 5l. for admission, there were 470; and of annual members, who pay 1l. yearly, there were 6827. At the above date the funds property of the Society amounted to 7700l., and the number of members was 6000. The 26th of March, 1840, the Society received a charter of incorporation, on which it assumed the designation of the 'Royal Agricultural Society of England.' By the 22nd rule of the Society, 'No question shall be discussed at any of its meetings on a political topic; nor shall any new business be brought forward, or pending, in either of the Houses of Parliament,' and this rule is made permanent by the charter of incorporation.

The objects of the Royal Agricultural Society, as set forth in the charter of incorporation, are: 1. To embody such information contained in agricultural publications and in other scientific works as has been proved by practical experience to be useful to the cultivators of the soil. 2. To correspond with agricultural societies and other bodies, at home and abroad, and to select from such correspondence all information which, according to the opinion of the Society, may be likely to lead to practical benefit in the cultivation of the soil. 3. To pay to any occupier of land, or other person, who shall undertake, at the request of the Society, to ascertain by any experiment how far such information leads to useful results in practice, a remuneration for any loss which he may incur by so doing. 4. To encourage men of science in their application to the improvement of agriculture, by giving them either a grant of land, or a share of the proceeds of the construction of farm-buildings and cottages, the application of chemistry to the general purposes of agriculture, the destruction of insects injurious to vegetable life, and the eradication of weeds. 5. To promote the discovery of new and other useful animals, bird and other vegetables, useful to man, or for the food of domestic animals. 6. To collect information with regard to the management of wood, plantations, and fences, and on every other subject connected with rural improvement. 7. To take measures for the improvement of the education of those who depend upon the cultivation of the soil for their support. 8. To take measures for improving the veterinary art, as applied to cattle, sheep, and pigs. 9. At the meetings of the Society by the distribution of prizes, and by other means, to encourage the best mode of farm cultivation and the breed of live stock. 10. To promote the comfort and welfare of labourers, and to encourage the improved management of their cottages and gardens.

The Society has already directed its attention to nearly all the objects above mentioned. The country meetings which take place annually in July, have perhaps been more serviceable in stimulating agricultural improvement than any other meetings by the society; and the Board of Agriculture, by the arrangement adopted by the society upon each part of the country in succession, and by exciting the attention of each district to the objects which the Society is intended to promote. England and Wales are divided into nine great districts, and a place of meeting in each district is appointed for the Board, of which the first meeting was held at Oxford; and others have been successively held at Cambridge, Liverpool, Bristol, Derby, and Southampton. The meeting for 1845 will be held at Shrewsbury; in 1846, in some town in the Northern district; and in 1847, the circuit will be completed by the meeting being held in the
South Wales district. The value of the prizes distributed in 1838 amounted to 1790/. It was increased to 2800/ in 1844, and continued to the Southampton meeting, to 1400/.

The show of agricultural implements at Derby comprised 700 different articles, and the aggregate value of implements, according to the selling price of each, declared by the makers, was about 7400/.

There can be no doubt that the agricultural societies are making material progress since the establishment of the Society. The opportunity of contrasting and estimating the utility of various implements used for similar purposes in different districts or in different soils, cannot fail to extend improvement from one district to another and all the more to prove that the establishment of such institutions is extremely beneficial. The Society has already published 'Proposals for a Royal Institute or College of Agriculture and other branches of Rural Economy.' There is the Slithropian Professorship of Rural Economy in the University of Oxford; and at the University of Edinburgh there are professorships of agriculture and agricultural chemistry; and at the University of Aberdeen there are lectures on agriculture.

The botanical, geological, and chemical professorships and lectures in the different universities are however, to a certain extent, subject to the same sort of drawbacks as the similar establishments of such institutions as the one at Grignon in France, young men are sent out as a great expense to pupils to farmers in the counties where the best system of agriculture is practised. In the case of all the most prosperous farmers in the United States, the income from the sale of their produce is sufficient to enable them to purchase farm books and periodicals at any cost. It is therefore questionable whether the benefits of the agricultural museums established under such institutions as the one at Grignon in France, are limited to the purchase of agricultural books and periodicals; but although this may be a good plan for obtaining practical knowledge, it is imperfect as regards acquiring a knowledge of the scientific principles of agriculture. The Earl of Ducie has established a model or example farm on his estate at Trenchard, Devon, which is to be of considerable local advantage. Such a farm, says Mr. Daubeney, if well conducted, cannot fail to benefit the farmers round about; by exhibiting to them improved implements; by introducing a greater economy of labour, demonstrating for the practical farmer the advantage of employing labourers indefatigably in the promotion of this object, and probably would have succeeded, but for his premature death. In the projected Agricultural College and model Farm at Cirencester, there will be a scientific course of lectures and scientific, under a person thoroughly acquainted with the management of a farm, associated with a professor of chemistry, mechanics, 

Schools of industry, similar to the one established by the late Rev. W. L. Rams at Winkfield, may be made the medium of imparting an acquaintance with the principles of agriculture, which at present the labouring classes do not usually obtain; and they obviate the objection that a child who remains long at school is unfit for hard labour on the Winkfield schools there are attached about four acres of good land; and under the guidance of so accomplished an agriculturist as the late Mr. Rham the scholars enjoyed the advantage of pursuing all the details of the most skillful husbandry, and undergoing a course of training in garden and farm management of no ordinary excellence. Schools of a similar kind to the one at Winkfield have been established at Ockham, near Ripley, in Surrey; at Lindfield in Sussex [Alwyn and William, C. S.]; at Horsham, near Eynsford; and at Tunbridge Wells. On Mrs. Davies Gilbert's estate there is a school of manual labour, and the principle on which it is established might perhaps be made conducive on a large scale of the two objects, namely, the dissemination of the elements of learning and of fitting them by proper industrial training to become expert and industrious in field and garden work. At the school here spoken of, the master is paid one penny per week for each boy; but the chief employment of Mrs. Davies Gilbert's estate there is a school of manual labour, and the principle on which it is established might perhaps be made conducive on a large scale of the two objects, namely, the dissemination of the elements of learning and of fitting them by proper industrial training to become expert and industrious in field and garden work. At the school here spoken of, the master is paid one penny per week for each boy; but the chief employment of
the master arises from the labour of the boys on the school land. Their time is divided into two portions, one part of which the master devotes to their instruction in reading, writing, and arithmetic, and the other in keeping the farm and in cultivating his land. (Committee of Council on Education, 1844.)

In Ireland the government affords direct encouragement to agriculture by granting financial assistance to the Board of National Education. The persons who are trained for the office of teachers in the national schools are required to attend the lectures of a professor of agricultural chemistry; and during a portion of the time occupied in preparing for their future duties they are provided with model farms at Clonmel, seven, where they are lodged and where, during, five mornings, they attend lectures on the principles of agriculture; and an examination subsequently takes place. Once a year the veterinary surgeons of various local boards are instructed in the operations required by the various causes which are continually occurring on the farm. Others are appointed to attend to the gardens, and to the following departments: woods and plantations; inspection of repairs taking place on the premises; making of starch, cheese, and other articles; the phonography, book-keeping and the accounts. A daily register is kept of the amount of the manure obtained from the cattle of any kind. A pupil newly entered is appointed to act with one of the pupils of three years' standing, and all are expected to make a report, in the presence of the committee, of whatever has been done during the week in their respective departments. The professor, who presides over the practical part of their education, explains on the spot the proper manner and system of operations. The students attend two or three lectures on these different processes at the time when they are in actual progress. The professors in each department render their courses as practical as possible; the professor of botany by herbaceous and the professor of chemistry by geological excursions; the professor of mathematics, by exercising in the plan he has pointed out, the survey and measurement of certain portions of land. After two years' training in the theory and practice of rural economy, the pupils undergo an examination, and if approved as a candidate for the degree of bachelor, a diploma is granted, which certifies to the capacity of the pupil for fulfilling the duties of what may be styled an 'Agricultural Engineer.' Institutions designed for the improvement of agriculture, and supported by the state, have been established in most parts of Germany. In Prussia there is a public model farm and agricultural academy in nearly every province. The most important of these institutions is the one at Möglin, in Brandenburg, about thirty miles from Berlin, which was founded by the late king. Von Thaer was at one period the director. The establishment consists of a college and a model farm of 1200 acres. When visited by Mr. Jacob, in 1820 ('Agricultural and Literary Journal'), the farm was divided into three parts, and the profits arising therefrom, after being applied to their maintenance, were distributed amongst the pupils; one for mathematics, chemistry, and geology; one for the veterinary art; and the third for botany and the use of the various vegetable productions in the Materia Medica, as well as for entomology. Attached to the institution there was a botanical garden, arranged on the Linneas system; an herbarium; a museum containing skeletons of domestic animals, models of agricultural implements, specimens of soils; &c. The various implements were made in workshops upon the farm, and the pupils were expected to acquire a general notion of the modes of constructing them. The sum paid by each pupil was very high, not less than 80l. a year.

At Hohenheim, in the kingdom of Württemberg, two leagues from Stuttgart, a model farm has been appropriated as an agricultural college. The quantity of land attached to the institution is about 1000 acres. The pupils are of two grades, and those belonging to the superior class pay for their board 150 florins, and for their books and services 32l.; the pupils of the inferior class pay for their board 60 florins, and for their books and services 37l., and extra expenses make the annual cost about 50l. Natives of Württemberg are admitted at a lower rate than the subjects of other states. The higher class of students do not, as at Grignon, take part in the actual labours of husbandry; but they are brought into contact with the practical side of instruction, and are very carefully instructed. Lectures are delivered by twelve professors on the following subjects:—Mathematics and physics, chemistry and botany, technology, tillage, and other departments of rural economy, and the veterinary art. The objects are to familiarise the students with the various functions that they can be either attended in two halves or three or four. In the former case much preliminary information must have been acquired. There is attached to the institution
a small botanical garden; a museum of zoological, botanical, and mineralogical objects; skeletons of domestic animals; collections of seeds and woods; and a library of works on rural economy. The establishment also comprises a manufactury of beet-root sugar, a distillery, and a potato-mill, and there is an apartment devoted to the rearing of silkworms. A part of the farm is reserved for experiments. The second class of students do the manual labour, but they are nearly maintained at the expense of the institution, and, when they can supply the farm labour, they have the opportunity of attending the lectures at the college.

In Bavaria the king has given up the domain attached to the royal palace of Schleisheim for the purposes of a model farm; and the king has been in selecting it much below the average standard of fertility, which, as well as land of extraordinary productiveness, should be avoided. It is on a much inferior scale to the establishment at Hohenheim. In 1840 there were twenty-one scholars who paid about 15s. a year, and eleven who paid about 6l. The latter are merely field-labourers; and those who belong to the upper class are about the same grade as the second class at Hohenheim.

There are agricultural institutions supported by the state in several other countries of Europe.

(On public Institutions for the Advancement of Agricultural Science, by Dr. Daubeny; Dr. Daubeny's Lecture on Institutions for the Better Education of the Farming Classes, address delivered at the Agricultural College at Cirencester, delivered at Oxford, May 14, 1844; Journals of Royal Agric. Soc. of England; Dr. Ludlow's Gardener's Chron. and Agric. Gazette, &c., &c.)

AGRICULTURE (from the Latin Agricultura). The economy of every country is based on the number of branches of industry is the subject of the following remarks.

The question has sometimes been propounded whether agriculture or manufactures are more useful to a state, or, in other words, whether agriculture or other branches of industry contribute most to the wealth of a state; and whether a state should give more encouragement to agriculture or manufactures. Such questions imply that there is something which essentially distinguishes manufactures from agriculture; and also that there is something which essentially favours the success of agriculture. Agriculture is the raising of vegetable products from the soil, which are either consumed in their raw state or used as materials on which labour is employed in order to fashion them to some useful purpose. Manufactures, in the ordinary sense of the term comprise the various modes of working up the raw products of agriculture and mining. So far there is a distinction between agriculture and manufactures; agriculture is auxiliary and necessary to the other. In the popular notion, agriculture is the raising of these two principal products from the ground and the working up of the product into another form, constitutes an essential difference between these two branches of industry; and accordingly agriculture and manufactures are often spoken of in opposition or contrast, and they are often viewed as standing in a hostile opposition to one another. But such a distinction between agriculture and manufactures has no real foundation.

The agricultural products which are articles of food—as bread, the chief of all—are essentials, and the industry of every country is directed to obtaining an adequate supply of such articles, either from the produce of the country or by foreign trade. Some of the various kinds of grain which are used as food are the principal and daily articles of diet in many countries. Agricultural articles which are employed as materials out of which other articles are made, such as cotton, are only in demand in those countries where they can be worked up into a new and profitable form. The varieties of soil and climate render some parts of the world more fit to produce grain, and others more suitable for cotton. Even since the earliest records of history the people of one country have exchanged their products for the products of other countries; and if the matter were simply left to the wants and wishes of the great majority of mankind, no one would trouble himself with the question of the relative superiority of the process by which he produces grain or cotton, and the art by which his cotton is turned into an article of daily utility, and the age of his cotton back to him in its initial form to be exchanged for grain or more raw cotton. He might not perceive any essential difference in the process of turning the earth, committing the seed to it, and reaping the crop at maturity; and the process by which the raw material which he has produced, such as flax or cotton, is submitted to a variety of operations, the whole of which consist only a giving new forms to the material or combining it with other materials. In both cases man moves or causes motion; in the one case the relative place of the particles of matter, and in the other case it is the relative place of the particles of matter combined with other particles of matter. So that if the amount of the direct labour of hand is to be the measure of the importance of agriculture, manufacturing processes and manufactures than manufactured articles are. Some branches of agriculture, such as wine-making, indeed belong as much to manufactures, in the ordinary sense of that term, as they belong to agriculture; and wine is in part of the process of wine-making; but the making of wine is equally essential. There are some few agricultural products which receive their complete value from what is termed agriculture; but the making of flour or wine or cloth is a manufacturing operation, as the word manufacturer is understood in the dictionary.

But it is a question in which all those branches of agriculture which are directed solely to the production of food.

Now if the question be, which of these branches of industry adds most to wealth, or, in other words, is most useful to mankind, the answer must be, they are all equally useful. If it be urged that some are of more intimate necessity than the others, inasmuch as food is essential, and therefore its production is the chief branch of industry, it may be replied, that this is not the case, because the raising of these two principal products from the ground and the working up of the product into another form, constitutes an essential difference between these two branches of industry; and accordingly agriculture and manufactures are often spoken of in opposition or contrast, and they are often viewed as standing in a hostile opposition to one another. But such a distinction between agriculture and manufactures has no real foundation.

Though it is an idle question to discuss the relative value of any branches of industry, when we found the comparison upon a classification of which it rests on no real difference, and leave out of the question their aptitude to minister to our wants. One might discuss the relative value of the manufacture of scents and perfumes, and the manufacture of wine and beer; and then the question of the comparison of value might be the number of persons who use or wish to use the two things, and the effect which the consumption of scents and perfumes on the one hand, and of wine and beer on the other, will have on the consumers and the condition of those who produce them.
of hunting, mining, are not due to agriculture, even in the sense in which the advocates of this theory understood the term agriculture: and further, a large part of agricultural products receive most of their value from other labour besides agricultural labour; whilst the materials of which the products of agriculture are composed, must undergo a manufacturing process before it becomes bread. But the greatest part of the corn that is produced has little value in the place where it is produced: it obtains its value by being transported to another place where it is consumed, and which is capable of limiting it, for the purpose of its selling price.

Lastly, the corn is of no value even when it has been removed from one place to another, unless it has been removed to a place where it is wanted by those who are not raising it. Hence the producing community is bound to give it to the consuming community.

The value of the corn is circumscribed ultimately on the labour and the wants of those who do not concern themselves about its production.

If those who possess political power were free from all prejudices and all motives of self-interest, or what they suppose to be their interest, there would neither be encouragement nor discouragement given to any branch of industry, and least of all to agriculture. If taxes must be raised, they would be raised in such a way as would least interfere with the free exercise of all branches of industry; and they would not be raised upon raw products of any kind. It is the business of a State to find sufficient means, at the least possible cost to the whole community, for defence against foreign aggression, for the administration of its government, and for the ultimate interest as its direction and superintendence.

To ascertain what these matters are to be and how they are to be effected, belongs to the subject of government; and the sphere in which the State should limit its activity cannot be exactly defined. But there is one thing certain, that there is a difference from many matters: this is:—If men are not interfered with, they will employ their labour and capital in the ways which are most profitable to themselves; and each man knows better how he can employ himself profitably than anybody else can, or any government can, whether such government is of one or many. Agriculture is no exception to this general principle; and there is no reason of public interest that the government should either encourage or discourage it. In order that the State may be able to benefit by the development of agriculture, it is necessary that it be free from all restraint, and that it be also free from the equally injurious influence of special favour or protection.

But no governments have ever let the things alone which they ought not to have meddled with; and agriculture has been subject perhaps to more restrictions than any other branch of industry. The interference with agricultural industry lies at first sight appears. Land is an essential element of a state: it is the ground for all the products of agriculture. Now the political constitution of every country is intimately connected with the nature of the landed property; and if we would truly trace the history of any nation from the earliest period, we shall find that the development of the political and social notions of the law of property in land. In this country for instance it is easily shown that the present mode in which land is held and occupied is the result of those feudal principles which were established, or confirmed and extended, by the Norman conquest of England. The various modes in which land is held by the owner and occupied by the cultivator, the modes in which it may be alienated or transmitted by or by descent, the burdens to which it is liable either on any change of ownership, are all important elements in estimating the degree of freedom which agricultural enjoys.

The political constitution of a country also materially determines whether the land shall be cultivated in large patches of portions, whether owned by a numerous body or owned by a few; there may also be positive laws which affect the power of acquiring land or disposing of it; and these circumstances materially affect the freedom of agriculture and its condition. The political constitutions of countries, so far as they are productive of a medium generation of the present generation find something transmitted to us which our predecessors have been labouring to amend or improve; they in like manner received it from their predecessors at the beginning of the series we cannot ascend to.

Such as have sometimes an object purely political, that is to say, a law may be passed which shall have a direct object, not agricultural, and yet it shall indirectly affect agriculture. Any statute or law which in any way either prevents large masses of land from being owned or cultivated by individuals, or which results in a great subdivision of land among owners and occupiers, has an indirect effect on agriculture. Those who cultivate on a small scale cannot enter into the market in competition with those who cultivate on a larger scale. State which consists solely of small landowners must be a feeble political body, and the amount of surplus produce which can be raised will be small. Such a community, if it has not the resources of foreign commerce, will in seasons of scarcity pay higher prices. The more political bodies depend on a variety of considerations, but whatever it may be, the profitable measure will be practically determined in a country where land can be freely bought or hired, and where capital and labour are abundant. In such a country, and where there is a certain amount of land, it is probable that circumstances will produce farms of every size from the smallest unprofitable holdings to the largest farms which can be managed with profit. Where land is hired by the cultivator, it is an essential condition to good agriculture that there should be farms to hire and dispos of it as be pleases either during his lifetime or at his death. Though this general principle must be admitted, it may still be laid down as a safe rule that there are admitted to be within which the power of any man's power over his property in land ought to be circumscribed. He should not be allowed, for example, to determine the line of life of the person or class of persons shall enjoy his land, and to limit the power of alienating it; unless it may be when his property is given for public purposes of unquestionable utility. For with regard to the public utility of purposes, the State ought to apply the property to new and useful purposes. There are therefore limits which ought to be placed to a man's power over his land. But such limits should not in any way limit the productive use that can be made of the land; and therefore, whatever may be the limit, is to prevent any large amount of land from being withdrawn permanently out of the market. In a rich country, where great fortunes are acquired by commerce and manufacturing industry, there are always men who wish to invest money in land, and it is for the public interest that there should be opportunities of making such investments.

The tenure of land in any country may be unfavorable to the improvement of its agriculture. If the object is to encourage agriculture in the only way in which a State can profitably encourage it, all restrictions that arise from the peculiar tenure of land should be removed. But the mode in which land is held may have a political character, and this may be an obstacle to the agricultural improvement. It is, however, necessary for its improvement. It might be considered that in this country it would be politically useful to forbid those large accumulations of land in the hands of individuals, a condition which is accompanied with a diminution in the number of small landowners. If it were with a view to enact a law that should limit the quantity of land that a man could cultivate, it would be very unwise in another points of view; and such a law would also easily evaded. The Agrarian laws of Rome only apply to individual free cultivators; for the larger farms were cultivated by slaves. Though these laws were not an interference with private property, as the term is properly understood, they interfered with the profitable employment of capital; and they failed in accomplishing their principal object. Under the article ALLOTMENTS, P. C. S., of the gradual decrease of small farms in England and their consolidation into large farms, a process which will certainly take place in all countries where there is no positive obstacle, whenever capital is become abundant.

The political constitution of a State may therefore encourage or discourage agriculture; and laws may be from time to time enacted which shall have the same effect. Such laws have sometimes an object purely political, that is to say, a law may be passed which shall have a direct object, not agricultural, and yet it shall indirectly affect agriculture. Any statute or law which in any way either prevents large masses of land from being owned or cultivated by individuals, or which results in a great subdivision of land among owners and occupiers, has an indirect effect on agriculture. Those who cultivate on a small scale cannot enter into the market in competition with those who cultivate on a larger scale. State which consists solely of small landowners must be a feeble political body, and the amount of surplus produce which can be raised will be small. Such a community, if it has not the resources of foreign commerce, will in seasons of scarcity pay higher prices. The more political bodies depend on a variety of considerations, but whatever it may be, the profitable measure will be practically determined in a country where land can be freely bought or hired, and where capital and labour are abundant. In such a country, and where there is a certain amount of land, it is probable that circumstances will produce farms of every size from the smallest unprofitable holdings to the largest farms which can be managed with profit. Where land is hired by the cultivator, it is an essential condition to good agriculture that there should be farms to hire
which permit and require the employment of large capitals. It is also necessary that he who hires the land shall be able to secure the use of it for a period long enough to induce him to cultivate it in the best way, and to make those improvements the possession of which is made a generally essential and equally important condition that he should not be restrained in his mode of cultivation. Small farms, short leases, or uncertain terms of years, and conditions which prescribe or limit the mode of cultivation, will infallibly produce bad agriculture.

The productive power of agriculture is not free in any country when the agriculturist is fettered by restrictions upon the use of his produce; when the restrictions imposed by his own State and by another State prevent him from selling his produce where he can, or whether they are imposed by another State which refuses to receive his surplus produce. In neither case will agriculture attain the development of which it is capable. France furnishes the free intercourse between the different provinces of the kingdom was once imposed by many restrictions, and corn could not be taken even from one province to another. [France, P. C., p. 431.] The consequence was that agriculture was in a wretched condition, but it improved when the restrictions were removed. The history of all countries shows that the interference with the power of disposing of agricultural produce has been unfavourable to agriculture, and consequently injurious to the whole community. Nor is the agriculture of a country which prevents the land occupiers from taking their produce to heavy taxes, direct or indirect. Such taxes raise the price of agricultural produce, and so far diminish the power of persons to buy it; they also increase the amount of capital requisite for cultivating a piece of land, for the payment of the taxes is not always in the form of money, contingent on the amount of the produce when the produce is sold converted into money. Payments the amount of which is fixed with reference to the productive powers of the land or which depends on the actual amount of produce, may either be in the nature of rent, that is, the amount which a cultivator agrees to give to the owner of the land for the use of it; or they may be payments which the land owes to some person or persons not the owner or occupier, and quite independent of the payment due to the landlord: to this second class of payments belong. The cultivator of the Roman Public Land paid the State a tenth of the produce of arable land, and a fifth of the produce of land planted with productive trees. But this second class of payments is on obstacle to improvement, for the occupier must lay out capital in order to increase the produce of the land; and it will often happen that he pays the tenth of the produce before he has got back his capital, and long before the reclaim of any profit. The money payment which a man makes to the owner of the land is not to use it; is not to be the value of the produce which remains after all expenses of cultivation and all costs and charges incidental to the cultivation are paid, and the average rate of profit also returned on the investment of capital; at least this is the general notion which the amount of rent under ordinary circumstances will be determined. It may therefore be as low as nothing. How high it may be depends on various circumstances.

In a country where the property to the land is free from all restrictions, it may in a given time reach the limit of its productive powers. In a country which has a considerable extent of surface and variety of soil, this limit may not be reached for many centuries, because improvement in agriculture is slower than in almost every other branch of human activity. The best lands which are both occupied and carefully cultivated, as in America; the inferior lands will in course of time be resorted to, and the result of modern science will be applied to improve the worst parts. An agricultural country, or a country which produces only raw products, and has no manufactures, will have reached the limit of its productive powers when it has raised from the soil all that can be profitably raised. Whether it will have a large surplus agricultural produce or not, depends entirely on the degree of freedom of the farms; but in either case the country will have attained the limit of its productive powers under the actual circumstances in which the agriculture is carried on.

But a country which also abounds in manufacturing industry may continue to extend its productive powers far beyond the limits of its agricultural produce. Part of the agricultural produce will be food, but when the producible amount of food has reached its limit, the productive power of manufactures has just begun to be felt, and it is the balance between agriculture and manufactures. Great Britain, for instance, might not be able to raise more food than is sufficient for its actual population, but Great Britain could supply the world with cotton-cloth and hardware. A country of any considerable extent with a fair proportion of good soil will always be to a considerable extent an agricultural country, for, however much its other resources may be developed, it will always be as profitable to cultivate the good lands of such country as to import foreign grain, the price of which is increased by the cost of carriage and contingent expenses. The balance which all countries, with very rare exceptions, have in the food population not employed in agriculture, when foreign grain can be imported and sold at a lower price than grain can be produced on poor soils; and if there is no restriction placed on the importation of grain, experience will soon show whether it is more or less profitable to cultivate the deficiency of the home produce than to attempt to raise the whole that is wanted by cultivating poor soils. No country of large extent with a great population could obtain the whole supply of corn by foreign commerce; such an importation is not on record. But a manufacturing country which has up to a certain point produced all the food that is required for its population, will be stopped short in the development of its manufacturing power, if from any cause whatever it cannot obtain an increased supply of food. An increased supply of food and an increased supply of raw produce are the two essential conditions, without which the manufacturing industry of a country must ultimately be limited by its own power to produce. It may be that the population of such a country, if it is not suffered to import grain from foreign countries, it is a matter of indifference to all who consume the food where it comes from; and the agriculturist himself, as far as he is a consumer of food, is benefited with the rest of the community by the greater abundance of grain supplied by the grain-growing countries. The increased productive powers of the manufacturer. It is not necessary to determine how the increased supply of food will operate on wages or on profits, or on both: it is enough to show, that a time may come when there can be no increase of manufactures power, if the supply of food is limited to what the country produces; and that by an addition to the supply of food an additional power is given towards the production of those articles which monopolised their limit because the supply of food cannot be increased.

A country which has already produced from its best and its second-rate soils as much as these soils can produce in the actual state of agriculture, will begin to import grain from other countries, if there are no restrictions on importation. For capital will be more profitably employed in buying and importing foreign corn from countries where it is abundant than in raising it at great cost from inferior soils at home. It may be supposed that the quantity of grain imported will take manufactured articles in exchange, and if there are no restrictions on either side this must be the case; for the manufacturing country does not want the grain more than the agricultural country wants the manufactures. But it might be supposed that a certain limit of grain would be the general notion that the foreign trade would find it much cheaper to buy annually from grain-growing countries all the corn that is wanted to supply its deficient produce at home, than to attempt to supply the deficiency, or to add to the present stock of food, by cultivating very poor soils; and this, even if the grain-growing countries should refuse to take a single article of manufactures. The only way, indeed, of actually testing the truth of such a case as this is by experiment; but if commerce were free from all restraint, the importation of corn would become a steady trade, the amount of which would be regulated by the condition of agriculture in the importing country. If the importing country had brought all the better soils into cultivation, and the amount of forested land would not be indefinitely increased, the cost of production in the exporting country would be raised, and the limit of profitable corn-cultivation in the importing country would tend to increase importation. The limit of profitable corn-cultivation in the importing country, under its actual circumstances, would be determined by the cost of production; increase of population would tend to increase importation. The limit of profitable corn-cultivation in the importing country, under its actual circumstances, would be determined by the cost of production; increase of population would tend to increase importation. The limit of profitable corn-cultivation in the importing country, under its actual circumstances, would be determined by the cost of production; increase of population would tend to increase importation.
encourages the industry of the foreign country, supplies the wants of the importing country, and stimulates its industry by competition and the contrast of the home and the foreign article at the market. The variable profits and of bearing a rent, which, with the tax, could not be profitably cultivated or give a rent to the owner. The price at which the cultivator must sell his grain in order to continue to cultivate includes his profit and the owner's rent, and the price is paid by him who consumes the grain.

It remains to consider the effect of taxation on the exporting and importing countries. If both are free from taxation, or if the taxation is equal in both, or nearly equal, no nation will administer a tax which would be employed in some other way, as in pastureage or planting. Corn thus becomes dear; and agriculture is encouraged or protected, as it is termed, to the injury of the mass of the people, and to its own injury also, for experience shows that those branches of industry receive most improvements which are neither restrained nor encouraged, but are subjected to fair competition; in other words, industry to be most productive to a nation must have no other direction than what the hope of profit will make individuals give it. If foreign grain is not excluded, but admitted on paying certain duties, the evil is much less than in the case of absolute exclusion, provided the duties are not high, and provided they are uniform; for nothing except a uniform duty can regulate the foreign agriculture is not produced, or is produced peculiarly to the interest of the agriculturist. A uniform duty, as compared with absolute exclusion, is equivalent, so far as concerns the foreign trade, to an addition to the productive powers of the soil of the importing country. If trade is free, the farmer sends his grain to the market without raising the cost of production and the cost of transport do not raise the cost-price of such grain above that of the grain raised in the importing country. A miraculous addition to the productive powers of the soil of the importing country, or a sudden improvement in its agriculture, without any corresponding change in the exporting country, would at once lower the selling price of grain in the importing country, and diminish the supply from the exporting country. The effect is the same as if a tax of an amount equal to the cost of production were laid on foreign grain, for that duty will, in certain stages of the agriculture of both countries, just make the difference that prevents the foreign grain from being sold in the importing country at the same price as the native grain. In such case the foreign grain cannot enter the country till the price of the native grain has risen by an amount equal to such fixed duty; the mode in which this rise operates is considered in a subsequent part of this article. But there is this important difference, that a duty of two or three cents on ten or twelve bushels of corn cannot produce as decided a change as the fertility of the soil or a sudden improvement in agriculture and the case of a fixed duty, that in either of the two cases the country has an increased supply of grain, in the other it has not. In this case the limit of production is not perfectly ascertained, and the precise terms on which foreign and native corn shall enter into competition; and if the duty is moderate, and is considered necessary for the purposes of revenue, some people argue that a country is not ill administered in which such a duty is raised, though, if it is a manufacturing country rich in capital, such a necessary tax is an obstacle to the full development of its manufacturing powers.

If the duty is variable the trade cannot be steady, and consequently the price of corn may vary to every degree with very wide limits, an assertion which is not a conjecture, but a fact ascertained by experience. [Corn Trade, P.C.] If there is a duty, either variable or fixed, it gives to poor soils a value which they would not have if the trade in corn were free; for the price of corn on such soils is cultivated, and the price of food is regulated by the cost of producing food on the poor lands, and food is consequently dear. The cost of producing food on the rich lands is less; either owing to their abundance in fertility, or that less power and care are required, or owing to both causes. This superiority of rich lands over poor lands gives to them an increased value either as objects of sale or objects of hire; the selling price of such lands is raised, and the letting price is raised by a duty on corn; and their landlords also acquire a value that they have not otherwise have.

In a rich country it matters little if a capitalist who wishes to have land gives for it more than its value; such must be the case if the corn is dear; and if it is raised, the rent is likely to become a constant rent, and the desire and the power to purchase are constantly increasing. But the effect of a tax on foreign grain in a manufacturing country, when all the best soils are under cultivation, is directly to increase the value of land, and to add to the income of the landlord by making land capable of yielding a more valuable rent. Such a tax would be an obstacle to the culture of crops which would be less, the tax, could not be profitably cultivated or give a rent to the owner. The price at which the cultivator must sell his grain in order to continue to cultivate includes his profit and the owner's rent, and the price is paid by him who consumes the grain.

The whole mass of articles in the merchant's hands, foreign or native, must be at the same time raised, as in a country exporting, as well as a country importing. Any tax which the State may have raised, directly or indirectly, on the native produce, raises its price;
and the tax which it imposes on the imported article raises the price of that article and also the price of the native product. The average price, therefore, at which the merchant can furnish the articles of foreign land to domestic produce is raised, and the consumer must pay this price. The State derives no benefit from the tax or duty on the imported article beyond the bare amount of the tax; it may even be injured in other ways by the tax which the consumer is thus made to pay, for he may be made to pay more than the cost of the article, if cheaper than it is in any other country. The means of purchasing other things and paying other taxes are so far diminished. The effect on the producer of the domestic article, which comes into the market in competition with the foreign article, may be to lower the price, but it is not the same thing as having the foreign article being introduced and sold to any considerable amount while there is a domestic article, shows either that the foreign article is wanted to supply the deficiency of the home production, or that it is preferred to it. In either case the producer of the domestic article is injured. All consumption may be, but it is at least we pay if there were no duty on the imported article. The duty, therefore, gives something to the native producer, which he would not be able to get if there were no duty. This explanation applies to all articles of native produce which are not subject to an excise duty, if there are any such, and at least it applies to grain. Now the additional price which the producer of grain is enabled to get because there is an import duty on foreign grain does not ultimately go into his pocket; it goes into the land, which pays the occupier or another; for there is a competition among farmers for land to occupy, and they will offer rent up to that amount which will leave them the usual rate of profit, or even less, if they cannot cultivate their own land as equally as they do under the advantage of the tax; for he can either profitably farm his land when there is no duty on imported grain, or the duty on imported grain enables him to cultivate land which otherwise he could not cultivate, because the duty raises the price. The State raises a tax on the imported corn, which the consumer pays; and this tax enables the native producer of grain to demand of the consumer another sum of money, which is in the same or the same as the tax. All duties, therefore, paid are added into a country's products of that country, and are not subject to an internal duty, are of the class called protective duties, whatever their amount may be. It is not the object of this article to discuss how far such protection may be equitably given to any class of producers or proprietors in a highly-taxed country. It is sufficient to show that all persons as consumers are injured by the tax, and that the only persons who receive any benefit from it are the owners of land. If the land is not so highly taxed, and in which there is no duty, imported grain as in other countries, the injustice of such a duty is the more flagrant. [Land-Tax, P. C. and P. C. S.]

There is another mode of viewing the operation of a fixed duty upon corn (Economist Newspaper, Dec. 5, 1848). It is urged by the advocates of a protective duty, that such a duty would maintain that the rich man who has no need of the corn that is raised in the importing country, until the price of corn in that country has risen high enough to cover the price of his corn. This argument is fallacious. The raising of the price of corn in the consuming country would have the effect of raising the cost of transportation, and the fixed duty also. It is further maintained, that the price of all the corn in the importing country must be so raised before foreign corn will come in; and consequently, that in any season when there is a deficiency of corn in the importing country, it is not the duty on the foreign grain imported that must be paid by the consumer, but he will have to pay an amount equal to the fixed duty on all the corn that is raised in the importing country for the consumption of that year. But if the consumption is 20,000,000 quarters, and the deficiency is 2,000,000 quarters, a fixed duty of 5s. per quarter on the 2,000,000 quarters will cause a rise of 5s. in the quarter on the 18,000,000 quarters also. Accordingly the State will get the duty on the 2,000,000 quarters, which the consumer will pay, and some body else will get the 5s. per quarter on the 18,000,000, which the consumer also will have to pay. The truth of this proposition in its full extent may be questioned. The amount of the duty per quarter will be more than the duty on the 2,000,000 quarters, but perhaps somewhat less than the 5s. per quarter on the remaining 18,000,000 quarters. For something must be allowed for the fact that all the 18,000,000 are not in the market for sale at the same time. For instance, some 2,000,000 quarters of imported corn would be sold when the market price had risen to (say) 47s. the quarter; and an advance of shilling or two in the price would induce other holders to sell their corn; but all holders might not do so. The market price might then turn, and others would dispose of their ware-housed grain while the price was falling. The home market might then become depressed for a considerable period and during this period it might be so low as to render it unprofitable to import foreign corn, even if the duty were only two or three shillings. In this case the consumers would not be able to get any corn at all, and would have paid no tax, as the price of the foreign corn would have been free. Something also must be allowed for the disposition of merchants to speculate; and both they and the producers are liable to be acted upon by the apprehension of a future scarcity. The fact is that 6s. is merely the price of the foreign article, and prices are depressed beyond all reasonable calculation. We should be disposed, therefore, to qualify the assertion of the Economists by the conclusion that, in the importing country, with a fixed duty of 5s., the average price of corn in the importing country may be raised to a quarter higher than it would have been if the trade had been free; and perhaps this is all which the writer intended strictly to contend for. It may perchance turn out that the consumer will have to pay more than 5s. per quarter on the 18,000,000 quarters, or on some part of it; but it seems hardly safe to assert that he will have to pay exactly 5s., neither less nor more.

A chimerical difficulty is sometimes raised of this kind:—If a country does not produce all the grain that it requires, or if it is dependent for any considerable amount on foreign trade, it may suffer from scarcity in some seasons, and in time of war might be in danger of famine. As to the scarcity, every country is determined to be independent of foreign supplies, unless there is a regular trade in corn, that is, a trade into which a man can enter as he would into any other well regulated trade. If a scarcity should ever happen in the importing country, it will be remedied by the stoves of grain on hand that are supplied by a regular trade. The trade, unsteady and uncertain, the scarcity may be supplied or it may not: but it must be supplied at a higher cost, and sometimes it may be difficult to get a supply at all. Rome, both in peace and war, has been determined to be independent of foreign grain, but the supply was uncertain, for it was not all furnished in the way of regular trade, but sometimes called for as a forced contribution, sometimes accepted as a gift, and it was often purchased by the State, for the purpose of distribution among the poor, either grain or at a low price. All Italy imported grain largely under the early emperors. The scarcity with which Rome was sometimes threatened was not owing to the grain coming from foreign parts, but to the fact that there was no regular trade into which persons could venture by command of a body of persons able to pay for it. If a government shall regulate or attempt to regulate the foreign trade by scales of duties varying according to any law that the wisdom of a legislature may select, the result will be the same, great evil will be caused in consequence of the doctrine that every duty cannot be indubitably determined, and the difference whether the State imports directly or regulates the importation of its supplies by a capricious rule. The direct importation of the State, if we were well managed, would obviously be the most advantageous. What is here referred to the system applies only to the importation of foreign grain into the city of Rome. The necessity which existed for the importation is a question that can only be discussed with the question of cultivation in ancient Italy, and the gratuitous distribution of grain at Rome. De la Malle has some valuable remarks on this subject (Economiste Politique des Romains); but we do not assent to all his conclusions.

The fear that war might shut out the supplies of grain which a country might be import from abroad, that it cannot enter into the minds of those who view the question without prejudice. War does not and cannot destroy all trade; it may impede it and render it difficult, but trade has existed in all wars. The supposition that a rich manufacturing country cannot under any circumstances buy corn out of its superfluity, is a proposition which should be proved, not conjectured. It belongs to those who maintain this proposition to give reasons why it is not to be expected.

For some remarks in this article the writer is indebted to Gailh, Dictionnaire d‘Economie Politique, art. Agriculture.

AGRICULTURE, STATISTICS OF. In several countries of Europe there is a department of government organized either for collecting the statistics of agriculture or superintending institutions which have immediate relation to that branch.
of industry. In France these duties devolve upon a department of the Ministry of Commerce and Agriculture. The management of the royal flocks, veterinary schools, and the royal stews; the distribution of premiums in agriculture; the organized research, and the development of the technical side of agriculture, are comprised in the duties of this ministerial department. The councils-general of agriculture, &c., in each department of France collect the agricultural statistics from each commune; and the quantity of land sown with each description of produce, the kind and the margin of stock for the whole of the kingdom, are accurately known and published by the Minister of Commerce and Agriculture.

In Belgium these facts are ascertained periodically, but not every year. One hundred and one agricultural departments, forming a part of the decennial census, an attempt is made to ascertain the number of each description of live stock, including poultry; the produce of cereal grains, and of various crops; the quantity of dairy, orchard, and garden produce, &c., in each State. There are twenty-nine heads of this branch of inquiry. The only countries in Europe which do not possess statistical accounts of their agriculture founded on official documents are England and the Netherlands. In England the quantities of corn and grain sold in nearly three hundred market-towns, the quantities imported and exported, and the quantities shipped coastways, are accurately known, but no steps are taken by any department of the government to ascertain the quantities produced. On the same principle that a census of the population of each State can be made, the distribution of the produce can be ascertained from the total output of the different kinds of agricultural produce, and the productive resources. The absence of official information is supplied by estimates of a conjectural character, founded at best only on local and partial observations. In France it is possible to ascertain that the average produce of wheat for the whole kingdom is deficient. In the circumstances of our agriculture it is known that the maximum produce of wheat per acre is about forty bushels, and that the minimum is about twenty bushels. The usual conjecture is that the average produce of the kingdom in years of fair crops is about thirty-eight bushels, but the total superfluities sown with wheat or any other grain, and the total quantity of the produce, are matters simply of conjecture. The only statement the public or even the government are in possession of in respect to the quantities of cultivated and uncultivated, and of land incapable of producing grain or hay, in Great Britain, rests upon the authority of private inquiry made by one person, Mr. Coulson, a civil engineer and surveyor, who gave the details to the parliamentary committee on emigration in 1837, now seventeen years ago. As there is an account published weekly in the 'London Gazette' of the quantity of each description of grain sold in nearly three hundred market-towns in England, with the average prices, and the quantity of foreign corn and grain imported, the means are introduced within the hands of the community the important elements of calculation in reference to the supply of food, if they could also learn after each harvest what had been the breadth of land made up of all wholesome or grain-bearing land, the amount of produce harvested. The result could not fail to be felt in greater steadiness of price, which is particularly desirable for the interests of the tenant farmer, and also highly advantageous to the public. For example, the harvest of 1837 was so great a degree, that before the produce of 1838 was secured the great superabundance of the two preceding harvests was all consumed, and the stock of grain was more nearly exhausted than it was ever known to have been before. In the beginning of the year, 1838, there had been a check in consumption, which, as regards wheat, had been going on with unwonted profusion, but in August, September, and October, 1837, the markets fell from 60d. 1d. to 51s. per quarter, and it was not until the middle of the following May that the average was again as high as it had been just before the harvest of 1837. By the third week in August, 1838, the average had risen to upwards of 73s., and wheat was admissible at the lowest rate of duty. The buyers consequently resorted to all that was conveniently sold with solid bodies, or there was an increased importation of foreign grain, resisted by a wild spirit of speculation, which subsequently was productive of great loss to importers, rose enormously. It is contended that these losses and the fluctuation of prices would not have occurred if the produce of the harvest of 1837 had been accurately known and published before the harvest of 1838. The preparatory statistics of Agriculture, by G. R. Porter, Esq., of the Board of Trade, the probable operation which statistical facts officially collected would have upon agricultural improvement are thus reported to by Mr. Porter. It has been stated that if all England were as cultivated as the counties of Northumberland and Lincoln, it would produce more than double the quantity that is now obtained. If the cultivator of land where agricultural knowledge is the least advanced, could be brought to know, upon evidence that could not admit of contradiction, that the produce of the single grain, procured, from land of fertility not superior to his own, larger and more profitable crops than he is in the habit of raising, is it likely that he would be contented with his inferiority? In 1856 the late Lord Sydenham, while president of the Board of Trade, published the results of an inquiry that might result from a more extended attempt, caused circular letters containing fifty-two simple but comprehensive queries relating to agriculture to be sent to each clergyman in the parishes of the United Kingdom. Out of this number only 27, or about one in five, replied, and further inquiry was abandoned. The tithe commissioners make returns of the crops in all parishes, but they do not do so simultaneously. There is however no insuperable difficulty in collecting the national statistics of agriculture, when ever government thinks fit to undertake such a duty. On the 18th of April, 1844, on a motion in the House of Commons for an address to the queen praying for the establishment of some method of collecting agricultural statistics, the vice-president of the Board of Trade, on the part of the government, concurred in the object of the motion, but from various causes he declined at that time giving the motion his support. The yearly expense of the inquiry would be from 20,000l. to 40,000l., which would not be an excessive sum, if the appropriate machinery will be in operation. In this way the government advance the interests of agriculture and of the public at the same time. In a country like England, which abounds with men of rank, wealth, and intelligence, who engage in science at their leisure, the government is quite unnecessary for the government to assume the superintendence of matters which relate to practical agriculture; but this may be done with propriety in other countries, which are placed in different circumstances.

AIR BEDS AND CUSHIONS. The mechanical application of common air, in respect to its pressure or elasticity, has been greatly extended within the last few years. The pressure of fourteen or fifteen pounds on the square inch, which is the weight of the air at the surface of the earth, is known to be the maximum, and the air at the surface of the earth, is a mechanical agent which, under certain arrangements, becomes a substitute for powers of a very different kind.

Provided a mass of air can be confined within a given receptacle, and that receptacle be of an elastic or yielding character, the air assumes many of the qualities of a soft stuffing or padding, when its quantity is small compared with the size of its envelope; but when the quantity is so great as can be enclosed in a space as large as the human body, the shape of the air is in fact nearly equivalent to a solid body. So long as the means were wanting for conveniently making air-tight cloth vessels, this principle was slumberly applied; but the use of the envelope, as a new substance and new animal, has, from the first, developed many ingenious contrivances for this object.

Almost any textile fabric may be rendered impervious both to air and water by the use of some one or more of the coagulating compositions [Water-proof Cloth and Leather, F. C.]; and when a bag has been made of such material, rendered also air-tight by somewhat similar means at the seams, air may be passed into it as a substitute for more solid materials. In practice there are some very neat arrangements adopted in making air-engines or air-cushions. The air is made to form a bag of air-tight cloth, perfectly enclosed at every part except one corner, where is inserted a small tube and stop-cock, capable of admitting or preventing communication from the interior to the exterior. The cock being opened, and the tube applied to the mouth, air is blown into the cushion, until it expands to the desired degree of fullness; the cock is then closed, and the air remains imprisoned. In this state the cushion is of a more equable kind than any one can find by the hand, and if the air be not allowed to escape, it will retain its efficacy for a long time. When not in use, such a cushion can have the air expressed from it, and may then be folded up into a small space.

It is obvious that seats, cushions, pillows, and bags of various kinds, having a similar object in view in respect to softness, fullness, and elasticity, may be made by similar means. When the quantity of air included in an envelope is greatly increased, it may be made the means of producing actual pressure in a more equable way than by any solid bodies. Thus, an air-tight bag was invented a few years ago.
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which many persons had an opportunity at the time of seeing a specimen at the Polytechnic Institution. The object of this arrangement is to form a wrapper to an arm or limb under surgical treatment. There is a bandage with straps, capable of being conveniently tied round the arm; and when so tied, air is breathed into an air-tight envelope to the bandage, through a small tube provided with a pipe: by increasing or lessening the quantity of air impelled, the pressure of the bandage is readily regulated. This arrangement is said to have a similarity to the apparatus of the people of the ancient Tartars, and may be even painfully close, and it will be capable of being regulated in different parts.

About four years ago Mr. Walton took out a patent for certain modifications of the mode of using air-bags for beds and similar purposes. The plan seems as if it must necessarily be a costly one, and is thus described,—There are first made a number of globular air-vessels of India-rubber, in one of two modes. In the first mode, a metallic receiver is one is capable of being moved up and down by its connection with a stop-cock, at the upper part of this receiver there is a pipe furnished with a stop-cock; a jointed lever, countersunk on the under side, is brought down upon the pipe, a small aperture being made through the lever opposite the centre of the pipe. India-rubber bottles are cut in half and soaked in water at 100° Fahr., and afterwards in cold to facilitate their separation into laminae; the thin sheets thus obtained are placed over the pipe and held down upon it by the lever. Upon their way down, the air passes through the cock, the air-tube up through the aperture in the lever, expanding it into a ball; in other words, the force of the compressed air both makes the ball and fills it by the same action. When brought up, the receiver sinks down, or rests against the required resistance, the ball is tied round with thread close to the lever, the superficial edges are cut off, and the joint secured with India-rubber cement. The second mode of making and filling the air-balls consists in the use of a pair of hemispherical cups hinged together, and both connected by a tube with a metal receiver furnished with a stop-cock. A piece of thin sheet India-rubber is stretched over each hemispherical cup; and the air being then extracted from within, the external air forcing the membrane to conform to the interior of the cup. The two cups of India-rubber are then joined together, forming a ball. The balls, made and filled by either of these methods, are connected together, either externally, or by being enclosed within an external covering, forming a sheet of balls. Many such sheets may be laid upon each other, enclosed in an outer case, to form a bed or mattress of any thickness. The object of this complicated plan is stated to be, the limitation of an accidental injury or rupture to one small portion.

AIR-VESSELS are the parts constituting a piece of machinery invented by Mr. Cubit to serve the purpose of a fly in regulating the motion of a wheel which, as a prison discipline, is turned by men.

A two-cylinder was employed, each of which is cylindrical, and consists, like a pair of bellows, of an upper and lower board, with sides of leather: the vessel has only one aperture, and the lower board is made fast to the floor, while the upper one is capable of being moved up and down by its connection with a crank which turns on the axle of the wheel. A sliding plate having holes pierced in it is capable, by wheel-work, of moving before the aperture, so as to diminish the latter to any required extent, and is connected with the governing balls of the machinery.

Thus, when the velocity becomes too great, the divergence of the balls causes the sliding-plate to pass more or less over the aperture and contract its dimensions; by which means lessened air is expelled, and the resistance is created which diminishes the speed. Or, in the event of the velocity becoming too small, the balls descend, and the sliding-plate is drawn off from the aperture, by which means the air enters and issues more freely, and thus the resistance to the motion of the machine is diminished. (Transactions of the Society of Arts for 1827.)

AN apparatus of the same or a like kind might be employed for other purposes: for example, in lowering heavy goods from a height from the upper part of a warehouse; and an ingenious machine, in which the resistance was produced by the passage of water or oil through an orifice, is or was in use at some of the warehouses belonging to the East India Company.

It consisted of a cast-iron box immovably attached to the ground, or floor, and a bellows for furnishing two hollow cylinders, in vertical positions and of equal heights, separated from each other by a portion of the material. The two cylinders were capable of holding about a gallon of fluid, and they communicated with each other by openings left near the top and bottom of the material between them. In the larger cylinder was a solid piston which ascended and descended in consequence of its connection with a crank on the axle of the wheel by which, in general, goods were raised up to the place. In the middle of the smaller one was a circular plate capable of being turned about an axis in the direction of the wood, and thus to have a specific or variable resistance to the motion of the cylinder.

In use, the two cylinders were nearly filled with water or oil and the piston being and filling alternately as the goods in descending turned, by the cranio-cope, the axle of the wheel, the resistance created by the passage of the fluid through the communications between the two cylinders and through the opening at the circular plate, prevented them from descending and the amount of the accidents to which a simple brace is liable was avoided.

AIX EN PROVENCE. In the fresh-water deposits of this locality many fossil insects have been detected. (Murc.)

AIZANI or AZANI, Antiquities of, (Aizavoi, 'Arzavel) according to its modern name, Tchaffer-Hissar, a city of Asia Minor, in the antient province of Phrygia, about nine hours journey from kutahia. It is mentioned by Strabo (v. 1827), and there is a view of the place given by a name of Azani; other authorities write the name Aizani (Stephan. Byzant. v. 'Arzavel). Nothing is known of its history, and its existence has been almost forgotten until recently. When Lord Elgin, in 1815, opened the ruins of 'Samothrace, and by his means could have an opportunity to examine the numerous remains of extensive edifices have given it archeological interest in the history of architecture. Lord St. Aasoph was the first who communicated any intelligence respecting these ruins (1825), which were visited about the same time by Count de Jussieu, and by Major Keppel; but it is to Charles Tectier, the architect, who, after completing his studies in Italy, was sent out by the French government to Asia Minor, about 1834, that we owe extensive views of the ruins. He finds the name of the site to be Aizani, which is believed to have formed an elevated platform or terrace cut out of the hill and perfectly regular in its plan, which is a parallelogram and nearly a square, its measurements being 592 feet (Eng.) on its north and south sides, and 460 on its east and west. The roads or remains of edifices which it is conjectured that the platform of the temple formed a peribolus or court to the temple, enclosed on three of its sides, while the east one (corresponding with the entrance end of the temple) was left open, and on that side the terrace was decorated architecturally throughout its entire extent by a series of twenty-two arches with pilasters between them, i.e., eleven on each side of the central flight of steps (100 feet wide), forming the ascent to the upper level. Thus the terrace here formed a magnificent substructure that, together with the temple, must have produced an unusually striking and imposing effect. The temple itself stands exactly in the centre of the peribolus or platform, consequently exactly in the axis of the temple. On the east side are inscriptions found among the ruins to have been dedicated to Jupiter of Aizani, is now more than half destroyed, little more remaining than the columns of the north and west sides and the corresponding portions of the cela; yet what is left affords sufficient data for determining the accuracy of the particulars in regard to its plan and the peculiar character of its order. Referring to the article Temple in the 'Penny Cyclopaedia' for an explanation of the respective terms, we may give a brief description of it thus: an octagonal cela, with twelve dorodipteral with fifteen columns on its flanks, therefore exactly corresponding with the cut which is there given (p. 182) as an example of a pseudodipteral plan. Its general dimensions do not appear to be exact, but it was near 53 feet by 63 feet, the broad side on the north, which it is raised, 121 by 72, and therefore of more probable dimensions of the cela, it is much smaller than some of the structures noticed in the 'Table' of them in the 'Penny Cyclopaedia,' nevertheless
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considerably larger than some of the most celebrated of them,—for instance, the Marathon Carreé at Niammes, which is only 38 by 77 feet. The whole is constructed of white marble, and the columns, 31 feet high, are each of them wrought out of a single block; but what gives such interest to this monument is that it affords a very remarkable example of the Attic Ionic order. The rows of the flutes of these are so very diminutive that they could hardly have been distinguishable at that height, and therefore were probably intended only to produce the effect of an enriched cillion or necking to the capital with the fluting separated from it. Furthermore, the columns, both for its proportions and decorations: the architrave, which is divided into three façades with carved bead mouldings, is considerably deeper than the frieze, which excess is caused by the unusual breadth of its coping, consisting of a large ovo and cavetto above it, both enriched. The frieze is still more remarkable—e'en unique in its design, which is such as to render it most difficult to describe: large upright acanthus-leaves placed singly at intervals after the manner of triglyphs, are interspersed with two panels within the limits of each of two scroll-like volutes meeting each other in front like those at the angle of a Corinthian capital, to which they bear a very strong resemblance; therefore taken with the acanthus-leaves they were evidently intended to produce a Corinthian-like effect. The corona again differs both from Greek and Asiatic-Greek examples of the order, inasmuch as, in addition to the dentils of the latter, it has small modillons: this corona is narrow; the gymnasion above it, on the contrary, is very deep, and, or apertures in the pavement of the colonades next the walls of the cells, and the steps leading to it were within the peristyle. Several columns now lying on the ground within the peristyle indicate that that enclosure must have been adorned with them, since they evidently do not belong to the temple itself, being not much above half the size of the others, and besides the lower part of their flutings are cabled.

The most notable among the other monuments discovered at Alaini are a theatre, stadium, and gymnasion: the first of these, which is in better preservation than almost any other ancient structure of its kind, is 185 feet in its greatest diameter, and the spectatory had sixteen rows of marble seats, but the theatre itself is divided into the usual three parts: the podium however of that tier, or the wall of the precincts separating it from the lower one [Theatre, P. C., p. 294], is for the greater part remaining, and shows one peculiarity, namely, mutual division at intervals in pairs, of which there were altogether 24. The orchestra forms more than a semicircle with a radius of 66 feet. The scene was decorated with six pairs of coupled Ionic columns, but these have fallen down, and are lying with a mass of other ruins and fragments in the midst of the foundations.

The stadium, which is a little to the south-east of the theatre, measures 725 feet in its extreme length and 152 in its extreme breadth. There were two pavilions or logia, one belonging to the dependence of the king of the Alains, the other to the company of runners; and ten rows of seats along each side, capable of accommodating between 12,000 and 13,000 persons.

Of the gymnasion, or what is supposed to have been such, which is situated to the south of the peribolos of the great temple, there are few traces remaining; and it had a colonnade extending upwards of 200 feet, whose pillars are all of white marble and of a single piece. To the north-west of the temple are also some ruins of what is supposed to have been a basilica. The river Rhynemus, which passed through the city, was crossed by two bridges of white marble, each consisting of five semi-circular arches. Both are remaining, as are also the parapets of the quays along the river, which, like the bridges, are constructed of white marble and ornamented with sculptures. There are besides many tombs, whose doors and portals (represented in Texier's work) afford valuable architectural hints and studies.

Alani ('Aladros') is the collective name of different nomadic nations that lived in the countries north of the Euxine and the Caspian, and may be divided into European and Asiatic Alani. They became early known to the Romans, if the Alani mentioned by Strabo (c. 75, xxvi. 2) are the same as those of whom we speak, and not the Alaini, who lived in the southern quarter of the present country of Daghistan and in Shirwan, and are mentioned by Strabo (p. 495, Cai.), Prokopius, and many other ancient writers. The Alani of the time of Ammianus Marcellinus (xxxi. 2) says that the Alani were the same as the antient Massagetae, which is probable if we take the name in its collective meaning, for the same author says (xxii. 19) that the Alani lived north of the Massootia, a country of which the Massagetae, in early times, have even remained names. The name appears to have originally belonged to a Caubian tribe which lived between the chief range of the Caucasus and the Forte Caspiae, now the Iron Gate, near Derbend, and as far north as the great steppe between the Araxes and the Volga; and it is probably this tribe which subdued the neighbouring nations, and to which we must refer the words of Ammianus Marcellinus (xxxi. 2), who gives the best description of the Alani; he says that the nobles among them were about five hundred, and that they were a handsome people. The Alani are of small stature, of a delicate and fair complexion, and of a singularly light, but they liked warfare above all other occupations, and made frequent incursions into the Roman provinces. Their arms were excellent, and the arms of the men were light, and well suited for a predatory mode of warfare. The Romans fought many battles with them, but not always to their advantage. The Emperor Gratian was defeated by the near Philipopolis a.D. 245; and they took a decisive part in the victory which they the Alani obtained in a.D. 376, near Adrianople, over the Emperor Valens, who was killed in or after the battle. (Ann. Marcell. xxiii. 15.) In a.D. 406 and 407 the Alani became still more conspicuous by invading Gaul with the Vandals, Suevi, Burgundians, and other barbarians. After having lived some years in that country they joined the West Goths and Vandals for the purpose of invading Spain, which soon yielded to their advance (near 411). The Alani were then settled in Lusitania and the province of Cartagena, and lived for some time under their kings till they quarrelled with the West Goths, whose king, Wallia, defeated them in a.d. 440 in a pitched battle, where the Alanian king Atax lost his life. Upon this the Alani joined the Vandals, and shared their fate in Spain as well as in Africa. After a.D. 440 they ceased to be an independent nation. The later part of their history can only be traced in the dry and short chronicles of Prosper, Gregory the Great, and Isidore of Seville. At the time of the Spanish expedition in a.D. 411, but remained in Gaul under their king Goar. In a.D. 440 Atius, the Roman governor of Gaul, allotted them settlements in the environs of Valence, with a view of making them serve as a barrier against the Franks. Their king then became a suzerain of the Emperor Theodosius, and was invested with the title of Atius with the command of Orleans, which Attila was besieging in a.D. 451; and it appears that he was bribed by the Hunnic king, to whom he would have surrendered the town if he had not been closely watched by the Romans and the West Goths, who trusted him so little, that in the great battle on the Campi Catalanei they put the Alani between their most faithful troops, and thus compelled them to fight. The second expedition of Attila into Gaul, which seems to be an other fact, although it has not been generally admitted by the author who mentions it, was undertaken under the pretext of subduing those Alani of Valence. Gregorius Turonensis states (Hist. Franc. ii. 7) that they were deprived of their country, the king of the Alani, with the title of Atius, and that the name of the Alani occurs in all the later historians, among whom besides those quoted above, Zosimus, Procopius (in his 'Bellum Gothicum,' as well as in the 'Bellum Vandalicum'), and Fracus, are the best sources. All the passages of these anonymous writers are, according to the nation are included in Stritter, 'Memoriae Populi.'

For many centuries after the destruction of the Alani in Spain and Gaul their name occurs in the later Byzantine writers, and we have many modern maps in which a whole line, more or less, is drawn down as inhabiting the tract between Derbend and the Kuma. Ethelwold, a most competent writer on these matters, shows that this arises from a mistake, the Byzantines having confounded the Alani with the Albani, a Turkish tribe, with which the Greek emperors were engaged in perpetual war.
The Alani were undoubtedly a Cassianian nation, and as the social state of the Caucasian tribes seems to be nearly the same as it was fourteen hundred years ago, a nearer acquaintance with these people will enable the student to form a pretty correct idea of the state of civilization of many of the barbarous nations of the Roman empire. The feudal system is a very old institution in Caucasus.

(Aichwald, Alte Geographie des Kaspischen Meeres; Mascou, Hist. der Antient Germans, translated by Lediard; Rakkah.)

ALARIC II. (ALARIC/CUS), king of the West Goths, succeeded his father Eudes in A.D. 484. Gothia, the then name of the West Gothic kingdom, had been considerably enlarged by Eudes, and extended over Hispania Terraco- nomica, Pannonia, the Rhine and Gaul itself. From the Rhine, by which rivers it was separated from the kingdoms of the Franks, the Burgundians, and the East Goths, who were masters of the province. If we can trust Isidorus, Alaric had spent his youth in idleness and luxury, though the truth seems to be that, preferring a peaceful reign to war, which in the eyes of the Goths was the only occupation worthy of kings, he incurred that reproach because he was not fond of bloodshed. He was an Arian, as most of his countrymen were; he was a very able man, from the acts of the Council of Agde, which was held in A.D. 506, and by which many privileges were granted to the orthodox Catholics. His toleration was the cause of his ruin. After his death his successor, the last of the Franks in Gaul, coveted the fine countries west of the Loire; and there being still many Catholics in Gothia who were dissatisfied with his king because he was merely tolerant towards the Catholics, and did not adopt the Catholic religion, the kingdom was divided. By the Treaty of 607, the East Gothic king, Theodoric the Great, whose daughter Theudighota was the wife of Alaric, foresaw the war, and tried to prevent it by conciliatory means: the letters which he wrote to that effect to the kings of the Franks, the West Goths, and the Burgundians, are preserved by Cassiodorus; but his endeavours were in vain, and the war broke out in A.D. 507.

For twenty-three years the Goths had had no war of consequence (for that they should have had no feuds with their neighbours the Franks and Sueves, and yet live together in peace, their habits of life were rather relaxed; while the Franks sincerely knew what peace was, and improved their discipline in continual contests with their neighbours. When the West Goths and Franks came to settle their difference in a pitched battle near Vougle, in the environs of Poitiers, the result proved fatal to king Alaric, whose army was entirely defeated. Alaric fled, but was overtaken and killed. Gregorius Turonensis mentions his death in a few words, too vague to be exactly translated; and finds that he was a rival with his own hand, as several modern writers say. The Goths made a halt at Narbonne, and, unfortunately for them, quarrelled among themselves about the choice of a new king. One of the elders, Gesallos, who was the eldest of the bastard son of Alaric; and another Amalasun, the lawful son of Alaric and Theudighota. This prince being too young to rule, the regency over the West Gothic kingdom was intrusted to his grandfather, the East Gothic king Theodoric, who drove Gesallos out, and compelled the Franks to restore their conquests. A proof that Alaric was peaceable because he appreciated the blessings of peace, and that he was able to consolidate that peace by a regular system of legislation, is the code called The Germanic Alaric (C. 0. 3).

(Cassiodorus, Variorum, 1. 3. 1., rec.; Gregorius Turonensis, ll. 36; Procopius, De Bell. Goth. ll. 12; Jornandes, De Reb. Goth. p. 129, ed. Lendenborg; Isidorus, Chron. Goth. ad an. cre 522; Mascou, Hist. of the Antient Germans, translated by Lediard; Aeschbach, Geschichte der West- gothen.)

ALBA, the province of, an administrative division of the Sardinian States, is bounded on the east by Acqui and Alessandria, on the south and west by Cuneo and Mondovi. The country is hilly, and it is intersected from south to north by the Tanaro, an affluent of the Po. The products are wine, corn, pulse, fruit, and silk. Truffles are dug up in many places, and are an article of export. A considerable number of vineyards are cultivated in this province.

The area of the province of Alba is about 800 square miles, and the population is 103,700 inhabitants. It is divided into eleven mandamenti or districts, and seventy-seven communes.

The head town, Alba, a bishop's see, is situated in a fertile plain near the banks of the Tanaro, and contains 8000 inha-

Alba, the cathedral, built in the fifteenth century, and several other churches; an hospital, a royal college, a clerical seminary, a literary and philosophic academy, and several private collections of antient medals and other antiquities which have been found in the neighbourhood. Alba was a town of the Statielli, and it is said to have been restored by Pompeius Strabo, the father of Pompeius Magnus; in consequence of which it was called Alba Pompeia. The Emperor Pertinax was born at Villa Marsia near Alba, where there is still an ancient temple of Jupiter. It is said that the celebrated rescript of Pertinax, which has been found in a farm called Le Martineng, the owner of which has published an interesting account of the same: 'Della Villa di Marta, Casa, e Leri dell' Imperatore P. Elvio Pertinaco ne' Celto-Liguri-Tanaro; Illustrazione del Conte Ant. A. L. Pertinax, Firenze, 1818.' A sepulchral altar of marble, with a frieze of elegant workmanship, was found in the bed of the Tanaro in 1779, bearing the names of Calvis Cornelius Germans, sedilis, mastor, duuriv, and aceddios, and of his wife Marcella. This monument has been illustrated by the antiquarian Baron Vermazzia: 'Germani et Marcellae Ars Sepulcralis Commentario Illustrata.' The monument is deposited in the court of the town-house. In the middle ages Alba was one of the principal towns of the marquisate, and was annexed to the dominions of the house of Savoy by the treaty of Cherasco in 1631. The learned Vida was many years bishop of Alba.

The other towns of the province are: 1. Brk or Braida, a considerable place, of 10,000 inhabitants, in a district abounding with corn, wheat, fruit, cattle, and silk. Brk is not far from Pollena, built on the site of the antient Polletia, where Stilicho defeated the Goths, A.D. 403, and for a time saved Italy from the barbarians. B. Brk and Trakes, 8 mile distant; 2. Canale, with about 4000, and other smaller places. (Casalis, Dizionario Geografico, Statistico, Commerciale, degli Stati di S. M. il Re di Sardegna; Denina, Quadro della Anti- Italia; Calendario Sordi; Serristori, Statistica dell'Italia.)

ALBATEGNIUS (Astronomer). D'Herbelot calls him Mohammed Ben Giber, but Mr. Gayngoes, who has given more particulars of him than any one else (in the Biog. Dict. de la Science de l'Annee 12), gives Jafir Ibn Senan Abd Abdullah. The term Albategnius is the Latinized form of El Batani, or Al Bateni, from Batin in Mesopotamia, where he was born. He lived in parts of the ninth and tenth centuries, beginning his astronomical observations in A.D. 977, and continuing them till his death in 999. He generally resided at Rakkah (Arcata) or at Bagdad. His writings comprise abridgments of Ptolemy and Archimedes, with comments; a work on astronomy, chronology, and geography; and another on astrologers. He is distinguished for his points of astronomy; an elementary treatise on astronomy; and one on astrology; with minor works. The treatise on the rising of the constellations (Lalande inverb., Delambre) was translated from Arabic by one Plato Tiburtinus, but badly (as he was the astronomer of Alhazen). This treatise, as first as 'Alfragan Rudimenta Astronomiae, et Albategnii Liber de Mota Stellarum ... cum Joh. de Regiomontiano Orto- introduc- toria ... Norimbergae, 1537, 4to.: next a 'Albategni de Scientia Stellarum Liber, cum aliquot Additionibus J. Re- giomontani ... editi Bernardinus Ugulotus, Bononie, 1645, 4to. Both editions leave out the tables which the book was written to explain, from which it is difficult to form a very accurate idea of the labours of Albategnius; but there is a very good treatise on the subject of the earth which he was the author of, and a very independent turn of thought: it is likely that he was among the first, if not the very first, to find out that the data used by Ptolemy required correction. He seems to have had no other guide; the Indian summaries are not found in his work, so that it is difficult to suppose that he derived any astronomy from that quarter.

He was the first who rejected the chords, and substituted sines in the place of them, or the sine, after the trigonometric improvement we are reserved to the fruits of this day, he was long since (and though without seeing the full extent of their utility) tangentia. He determined the obliquity of the ecliptic with the parallactic instrument as described by Ptolemy, in such manner as to take in the corrections of later times and his work gives 0°50' for the annual diminution of that element: our modern tables give it, at this time, 0°47'. His sines gave trigonometry, even in his own hands, quite a new appearance and a new power; and he had a much greater number of methods in spherical trigonometry than the Greeks. It is
most likely that he invented those himself, for he distinctly
intimates himself to be the first who abandoned the chorda;
the rules for finding the third side from two sides and the
included angle, and the angles from the sides, must be attrib-
uted himself and Ptolemy for the right-angled triangles. He
determined the length of the tropi-
cal year, making it only 2m. 26s. too short; a result much
more exact than that of Ptolemy. The same may be said of
his determinations of the precession and calculations of the
day of the solar apogee and of the excentricity of the earth's
orbit. Looking at his determinations of the two latter, and
seeing that he does not infer that they are changeable ele-
ments, we are left to conclude that he attributed the difference
between himself and Ptolemy, at least in part, to error of
calculation. Rather, as in the research of Albategnus that succeeding
astronomers were able to infer the variability in question, and as
the only reason for his not inferring it was his well-grounded
ward of confidence. Ptolemy's results, he has the merit of
the discovery.

Several writers have affirmed that he did
announce it; but incorrectly. The changes which he made in
the lunar theory of Ptolemy are slight; and in his planetary
theory he has very little success. For a fuller account of his
work, see Delambre, 'Hist. de l'Astron. Moyenne,' 10-32.

This learned and excellent historian, who rarely lets an author
go without stripping a few leaves from his crown, shows Albe-
tegnus to great advantage in comparison with Ptolemy as
an astronomer, though of course of less importance as a theorist;
and the subject of our article may fairly take
rank as the greatest of the Arabian school, which forms
the link between that of the Greeks and our own.

ALBENGA, the Province of, an administrative division of
division of the Kingdom of Sardinia; contains about 10,000
souls situated on the southern slope of the Maritime Alps, which
here become blended with the Apennines, and it stretches along the
coast of the Mediterranean for about 30 miles. Its
greatest breadth is about 15 miles. It is bounded on the north-east
by the province of Savona, on the south-west
by that of Onglia, and on the north by the province of Monferrato
in Piedmont. The country is intersected by objects
of the Maritime Alps which run to the coast, and form narrow
inlets with their terraced and orange-covered sides, giving
time to sea and rain. The only river that does not dry up in summer
is the Aroa, which rising in the province of Onglia on the
western slope of the high ridge on the opposite side of which the
Tanzaro has its sources, flows in a south-east direction through the
long valley of La Plave, receives a number of
mountain torrents, and afterwards entering the plain of
Albenga about four miles above its mouth assumes the name of
the Cenis, and then joins the sea to the west of
the town of Albenga. The whole town was
indeed built on an island about 800 square
miles. Formerly the river flowed to the eastward of
Albenga, where a Roman bridge is still seen of ten arches, the
pier of which are now buried in sand. In seasons of heavy
rain the water rises so high as to completely
 inundate the plain and the town of Albenga, until
the Castellane Somia, not long since Intendente or governor of the
province for the king of Sardinia, caused the river to be
embanked above the town, which was thus secured from the
flood. He also filled up with sea and the marche near the
coast, which in summer infected the atmosphere. The malaria
fevers have now almost entirely disappeared from the territory
of Albenga. The plain of Albenga, one of the few plains in the
Propesean territory, is dedicated for the harvest of
the wheat, being the region of the largest
fertility. The town of Albenga, the head town of the province, situated in
a plain about a mile from the sea-coast, is a bishop's see; it
has several churches, some lofty towers, a grammar-school, and
in him; with great admiration. The
province of Albingaunum was formed by the union of
Scipio and
the province of Albingaunum and was finally
subdivided by the Province L. Emilius Paulus,
ae. 161 (Livy, xi, 25-29). Albingaunum was the birthplace of
T. Julius Fuscus, who assumed for a time the imperial title
in the name of Pompey; not without good
Scipio, called Mucius, and were in the
Historia Augusto.) Several Roman inscriptions and other
remains are scattered about the town. In the middle ages,
Albenga governed itself as a municipal town under the
supre-
macy of Genoa. The other towns of the province are:
1. Aliso, a town on the coast, south-west of Albenga; it
has a collegiate church, a communal college, and 6300 inha-
bilants, mostly adm0ined, with great admiration. The
province of Albingaunum was formed by the union of
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Elizabeth to the Virgin, in the imperial gallery of Florence; it contains however only the two saints, but beneath it is a predella in three compartments, illustrating in small figures the labours of Hercules; among which was the Last Judgment, for the cemetery of Santa Maria Nuova, which, says Vasari, many suppose to have been the entire work of Bartolomeo. Alber- tinitelli was so much distressed at losing the society of Bart- olomeo, and finding himself in a foreign land, that he had much difficulty in preventing him from following his example. Vasari says that he died about 1620, aged 46, the victim of his own debaucheries. He had some distinguished scholars; the best was Visto, who, according to Vasari, died in Hung- ary; others were: Giuliano Bugiardini; Franchisciano; and Innocenzo da Imola.

Alberinitelli painted in fresco in Florence, in Viterbo, and in Rome. Vasari mentions a very excellent portrait by him of the Florentine author, Manuzio, daughter of Roberto Orsini, the constable of Naples. A picture in the Louvre by him is inscribed:—"Maricocci De- bertinella Opus. Ano. Dom. M.D.VI."

In the chapter- house of the Carthusians at Florence, a crucifixion in fresco, with the story of the entrance of Charles V into Florence. (Vasari, "Vite de' Pittori," &c.)

ALCAMENES, (Alca'me'nês) a celebrated ancient sculptor, and a native of Athens. He was the pupil of Phidias, and lived therefore in the middle of the fifth century B.C., and later. Phidias, Alcamenes, and Polycletus were the three greatest sculptors of ancient Greece; Alcamenes survived Phidias some time, as he was still living in the 95th Olympiad, according to Pausanias, about 400 B.C., for, as many of his colonists statues of Mares, and Hercules, to commemo- rate the victory of Thrasylus over the thirty tyrants, which he dedicated in the temple of Hercules at Thebes: this victory took place in the second year of the 95th Olympiad, or 405 B.C.

Alcamenes was sculptor in marble and statuary in bronze; his most celebrated work was a Venus, known as the Venus in Kôron or in the gardens; it was in the temple of Venus Urania at Athens. In the dialogue of the Portraits, Lucian makes this statue the basis of some of his stories of Alcamenes, and he takes from it the face and hands to contribute towards his ideal portrait of the beautiful Panthèsis, the daughter (according to Wieland's conjecture) of the imperial family-prætor in Asia, and the concubine of the emperor Hadrian, who was the former mistress of the empress Faustina, but was herself only a concubine in (the Roman sense.

Many other ancient writers speak of this statue. Pliny says that Phidias finished it; by which must be understood that he made a few alterations on the finished statue of Alcamenes, which, according to his riper judgment, it required: mere technical finishing is not the work of a great master.

In another statue of Venus, Alcamenes contended with his fellow-pupil Agoracritus of Paros, and the Athenian judges awarded the prize to Alcamenes, not because it was the better work, says Pliny, but because it was the work of their own citizen. Agoracritus was so much hurt at the decision, that he charged Alcamenes with Nemesis, and sent to the people of Rhamnus, on condition that it should not be set up in Athens: and as the Rhamnussian Nemesis was long cele- brated as one of the most famous works of antiquity, and was preferred to all other statues whatever by Varro. The statements about this work are various: according to some, it was made by Phidias for Agoracritus; a report which may have been spread by the Rhamnussians to give the statue more value in the opinion of the world. Pausanias, who saw it at Rhamnus, says that the authors of this work of Phidias, and does not mention the name of Agoracritus.

Agoracritus continued also, according to Tzetzes, with Phidias: the subject was a statue of Minerva; and the work of Alcamenes was at first, on account of its higher finish and previous to the work of Phidias, but was fixed in their destined places, the superiority of the statue of Phidias was evident; the latter gained effect, the former lost it. In this instance, Phidias gave Alcamenes a lesson, from which modern artists might derive a benefit. The great majority of the statues and works of sculpture in the modern world is said to have been made without any allowances for either the elevation or the distance from the eye, of the destined locality of the work: that a work in which this principle is carried fully out is un- known, as the artist has made bad apology for its neglect, though it may satisfy the artist's vanity.

Another celebrated statue by Alcamenes was one of Dionys- us, of ivory and gold, placed in a temple to that god in the part of Athens called Aigion, the part in which the sculptor was said to have been born. It stood in the interior pediment of the temple of Jupiter at Olympia, represent- ing the fight of the Lapithæ and the Centaurs, were by Alcamenes. Pausanias mentions besides at Athens, a statue of the Parthenon, which he represented as painted by the hand of Hecate on the Acropolis, the first in that form; and statues of Proene and Ityæ, in the same place. There was also a Roman and Hespeletes at Athens, in which the lameness was expressed without destroying the beauty of the statue: it is noticed by Cicero and by Valerius Maximus. Pausanias men- tions also an Aesculapius at Mantineæ, and Pliny speaks of a bronze figure of a pentathlete, or in the pentathlon, or five athletic exercises, which was called engrinomemos; these statues were very high, running; the discus, or throw, for- getting the javelin, and wrestling.

(Pliny, Hist. Nat. xxvi. 6, xxvii. 4: Lucian, Imagines, 4, 6, and the note in Wieland's translation; Pausanias, i. 8, 19, 20, 34, 39; v. 10; viii. 9; ix. 11; Cicero, Nat. Fam. ii. 16; and Soestus: Nauk. Maxim. Athens, in the Illustrated Travels of Tzetzes, vol. iii. viii. 193; Winckelmann, Werke, vol. vi.; Thierseh, "Epochen der bildenden Kunst," &c.)

ALCOHOL, Medical Properties of. These are of a twofold kind: first, those in which it is employed on account of its solvent powers, it being, next to water, the most ex- tensively employed solvent, to obtain, preserve, or facilitate the administration of a variety of active principles, vegetable, mineral, or animal; and secondly, those in which it is used as a stimulant, a purgative, or as an agent to counteract poisoning. Besides, it is a solvent, and in the production of various medicinal agents it is employed to dissolve, precipitate, or facilitate the discharge of a foreign substance in the system. It is a stimulant in the same way that wine is, and is capable of being used with much advantage in the treatment of certain forms of disease.

ACER, Medical Properties of. It is a purgative, an astringent, and a styptic. It is also a stimulant, an agent which will remove diseases of the brain, to which it is applied in combination with other medicinal agents. It is also employed as a luminary in the treatment of various diseases.

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A single moderate dose, suitable for the individual, produces effects which are entirely limited to the viscera of the abdomen. They extend themselves from the solar plexus of nerves to the organs upon which the splanchonic nerve is distributed, and are in these a livell action. A feeling of comfort in the abdomen, quicker and more powerful digestion, stronger peristalsis, moderate sweating, but, more abundant secretion, especially augmented secretion from the kidneys, are the common phenomena which result from the lowest degree of its action. A larger quantity, or several small doses a day, can be employed; this has produced increase of the size, increased the roundness of the sphere of the splanchic nerve, even to the spinal chord, the brain, and entire nervous system. The feeling of comfort and warm experienced in the preasocial region is diffused over the whole frame. The pulse is raised, becomes more active, sweats more profusely from the stomach, or on occasion of more case, strength, and capacity of endurance, the tone of the nervous system is raised, the influence of the nervous energy upon the other organs is quicker and more powerful; but, above all, that part of the nervous system whose functions are executed by the brain is most perceptibly increased, as is seen in the greater cheerfulness, humour, and courage, as well as the more active and acute power of thinking. During this degree of action the sensibility to external impressions is unaltered, but those of the aeria are more affected. The nauseous nature of the drug is occasioned by a more eager participation in the incidents occurring or sentiments expressed, and in the expansion of the affections or passions.

Concomitantly with these, all the functions of organic life are carried on more actively; of which we have proof in the increased secretions, especially of the cutaneous transpiration and secretion of urine.

From this view it is obvious that alcohol is an agent which, when used properly, may be most beneficially employed when some portion of the system, particularly the stomach, brain, or kidneys, requires assistance. Hence under the influence of many sedative poisons, alcohol furnishes the readiest and most potent means of surmounting their effects, the prolonged action of which would prove fatal. Some poisons however, particularly those of rancunueous plants, such as muskaboad, probably from their active principle being dissolved by the spirit, have their deleterious influence increased by alcohol, and deprave the blood, and exerted themselves in the frame by its emaseuant, or bitter-smase, the latter with whikeye. Such persons are rarely intoxicated. Many persons with a feele and slow digestion have the process expedit ed by a small portion of alcohol taken after their meals. The employment of which is not probable to those who are prone to calculous disorders, find great benefit from pure alcohol, in preference to either malt liquors or wines. (Frout, On Diseases of the Stomach, 3rd edition, p. 8.) The difference between pure alcohol and alcohol combined with other principles in wines has already been pointed out. (Virrs, P. C. p. 465.) With persons very prone to acidity pure alcohol agrees better than any wines, especially than the sweet wines; and those disposed to the lithic acid diathesis find the same advantageous. (Oedele, in his Hist. Halls, B. C., the 4th ed., p. 132; Heindorf, in his History of the Rhine, B. C., 4th ed., p. 132.) The employment of which however must be habitual, not occasional. Immense benefits would be conferred on the community in this country, if they could be introduced at a moderate price, as the quantity of alcohol in them is very small compared with other wines.

A reference to the chemical composition of alcohol will show that it is a highly carbonized compound. When taken to excess it produces exhaustion of the nervous power and an oppression over the mind. From this point alcohol is a powerful stimulant to the stomach-pump, vegetable acids given freely, occasionally dashing cold water on the face or head, artificial respiration, and very cautious venesection, in some instances restore the sufferer. Liebig says alcohol has not been detected in the urine. With quinsy there is a dangerous source of the disease, which can be all exhaled by the lungs, this may be true; but the presence of alcohol in the blood, brain, and urine has been proved by Dr. Percy. (Dr. Golding Bird, in Medical Gazette, vol. iv. pp. 301, 302.)

ALDEGREVER, HEINRICH, a celebrated German painter and engraver of the sixteenth century, was born at Soest in Westphalia in 1502. He became the pupil of Albert Dürer, being attracted to Nürnberg by the great fame of that artist, and he imitated his style so closely that he acquired the name of Albert or Albrecht of Westphalia, a circumstance which has led some writers to mistake the name of Albrecht Dürer for Albrecht Aldegrever. There can be no doubt of his name having been Heinrich or Henry, as it is so engraved in two different portraits both executed by himself. As a painter Aldegrever executed little. In his early life, he was chiefly employed in engraving. His plates are generally small, and are executed in a very minute and laboured manner, whence he is reckoned among the so-called little masters, of whom he is one of the most distinguished. His prints are very numerous, exceeding three hundred, and they bear dates between 1502 and 1569, which is supposed to have been the year of his death; it is however a mere conjecture. His designs are conspicuous for the sharp and angular lines of the Gothic style; but though hard and wiry, many of his figures display good anatomical drawings. His subjects are sacred and profane. Thirteen plates of the labours of Hercules are among his very best works: they are very scarce. A print of the Count D'Archeambaud, just before his death, killing his son lest he should leave the paths of virtue for the road of vice, is among his most admired plates. Among the portraits engraved by Aldegrever are those of — Luther, dated 1564; Melanchthon; John of Leyden, king of the Anabaptists; and the fanatic Bernard Knipperlolling. He engraved also many designs for silversmiths and for book-sellers.

His paintings are in the same style of design as his engravings, but they impress, still more than his prints, with the feeling of the pains they cost him: his colouring is very high. In the gallery of Berlin there is a small picture of the Last Judgment by him; in the gallery of Munich there is an excellent portrait of a man with a red beard; there are a few of his works at Schlesheim, at Vienna, and at Nürnberg, and at Soest, in some churches.

In a print of Titus Manlius ordering the execution of his son, Aldegrever has introduced an instrument, very similar to the guillotine used by the terrorists of the French revolution; it is dated 1563. (Heineken, Dictionnaire des Artistes dont nous avons des Estampes; Hartz, Printers Graev.)

ALETHOPERIESI (Sternberg), a genus of fossil Ferns, mostly from the coal formation. (Pecopertis of Bronn and Elt.)

ALFINUS VARUS, one of the Roman jurists whose excerpts are contained in the Digest. [JUSTINIAN'S LEGISLATION, P. C.] He was one of the most distinguished pupils of the great jurist Servius Sulpicius, the friend of Cicero. Fonponusus (Dig. i. tit. 2) states that he became consul, and that he is generally said to have been consul a.d. 152, and the same person as the F. Alfinus or Alfinus Varus of Dion Cassius (lib. iv. Index). But as Sulpicius, the master of Varus, was born about b.c. 110 and died b.c. 63, it is not probable that Alfinus the jurist could be consul so late as a.d. 126.

Acron the schollast (Horstius, Sat. i. 3. v. 150) has a story that Alfinus was a shoemaker at Cremona, who came to Rome, where he became the pupil of Servius Sulpicius, and attained such distinction for his legal knowledge that he was made consul and had a public funeral. The passage of Horace and the remark of the schollast have occasioned much discussion (Wieland, Horazas Satiren übersetzt, note on Sat. i. 3. v. 43). It is very difficult to form any conclusion from the passage of Horace, though it may perhaps be assumed that he does refer to the jurist Alfinus; but this will not determine whether the story of his early life as given by Acron and alhed to by Horace is true.

Alfinus wrote a work entitled 'Digesta;' in forty books. He is often cited by other jurists; the excerpts in the Digest show that his style was clear. Gellius (vi. 5) quotes a passage from the third book of the Digesta Varus in the second book of the Collectanea, or Conjectaneas, as it stands in some editions of Gellius; from which expression one might infer either that the Collectanea was a part of the Digesta of Alfinus, or a different work by Alfinus. But it is often an improbable that Alfinus was the author of the compilation of Audifius Nannus (Dig. i. tit. 2) in one hundred and forty books, which he made out of the writings of eight of the pupils of Servius. If so, Gellius referred to the
passage both in the original Digesta of Alfenus, and to the same passage in the Collectanea of Namus.

ALGÆ, FOSSIL. The remains of sea-woods in a fossil state are less common than their probable abundance in the ancient ocean and the generally marine origin of the strata in which they have been found. This arises perhaps from the cellular texture and destructive nature of the marine plants. Traces however of several genera occur in Silurian, carboniferous, liasse, colliert, and later deposits.

ALGADRI, ALGADRO. Italian sculptor and architect, chiefy distinguished however as a sculptor. He was the son of a silk-mercer of Bologna, where he was born about 1600, or even earlier, but the dates given by the various writers who have written notices of him are so contradictory, that it is extremely difficult to give a precise idea of his age or any definite certainty. He entered the celebrated school of the Carracci, but finding that sculpture was more suitable to his taste than painting, he became the pupil of Giulio Cesare Conventi, a sculptor of celebrity in his day. At the age of twenty, says Bellori, he accompanied Gabriele Bertazzuoli, the architect, to Mantua, and was introduced to the duke Ferdinand, with whom he apparently became a favourite, as he received many small commissions from him for models, and was afterwards sent on several important objects. In Rome he was two statues in stucco, for the Capella Bondoni in the church of San Silvestro on Monte Cavallo. He obtained these commissions through the intercession of his friend Domenichino: they were a John Baptist, and a Magdalen, and obtained for him the preference, as he had had the previous year still to depend upon the jewellers for support. His patron Ferdinand, duke of Mantua, died shortly after his arrival in Rome, he quarrelled with Domenichino, and for many years he laid no other occupations as a sculptor than that of restoring ancient fragments. But about 1640 his prospects changed; he was chosen by Pietro Buoncompagni to execute the statue of San Filippo Neri for the sacristy of the Padre dell' Oratorio of Rome; he made a group in marble of two colossal figures, the saint, and an angel kneeling by his side presenting him a book; and he displayed so much judgment and taste in working the marble, that he raised himself to an equality with the most favoured of his contemporaries; and the Cardinal Bernardino Spada, in consequence of the success of this group, gave him a commission to execute a colossal group in marble of two figures representing the decapitation of St. Paul, for the church of the Padre Ber- nabei at Bologna. St. Paul was represented kneeling, with his hands bound behind him, the criminal, enquiring, as he was asked, was behind the saint, with his sword mixed ready to strike. The success of this group was complete; it is technologically a work of very great excellence, but in the attitudes it is forced or affected; it however established for Algardi the reputation of a master, and he was employed in executing many works in rapid succession, chiefly in metal, both for Bologna and Rome. The principal of these were the monument of Leo XI. in Saint Peter's, and Attila checked by Saint Leo, an altoriel of enormous size, for one of the altars of the same church.

Algardi's better fortune commenced after the accession of Innocent X. In 1644, whose niece Costanza Panfilii was married to Algardi's friend and patron, prince Nicolò Ludovisi, the cardinal, henceforward, his works are on a scale. On Camillo Panfilii, another of the pope's nephews, entrusted to Algardi the erection of a villa without the gate of San Pancrazio, now well known as the Villa Panfilii. As an architectural designer he worked of little merit, though it is Algardi's most successful effort in architecture: it is richly ornamented with sculpture.

Algardi executed also the bronze statue of Innocent X. which was decreed by the Roman people or senate in con- sideration of the great services rendered in the Republic. Don Camillo Panfilii, another of the pope's nephews, entrusted to Algardi the erection of a villa without the gate of San Pancrazio, now well known as the Villa Panfilii. As an architect he worked on a scale, it is of little merit, though it is Algardi's most successful effort in architecture: it is richly ornamented with sculpture.

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common arithmetic to the complete double algebra, as it may be called, the subject matter of which is capable of representation in space of two dimensions. It is not within human limits to demonstrate every one of those heads; but much has been done in the articles already cited, and by dwelling a little upon the parts which are completely new (as far as this work is concerned), it is probable that the reader who has mastered those articles will be able to supply what is wanting for himself.

1. In pure arithmetic the subject matter is simple number. Its number of symbols is much less than that of a mere geometrical, or the [3—4;] 1, 2, the abbreviation of 1—1; that of 1—1—1, etc. Also the symbols + — and ± of powers and roots. All these symbols have specific meanings, and the symbols of operation are connected with known operations. There are also symbols (not in full, but in part) of operations which will not enter into the discussion of pure arithmetic, that is, each one stands for a definite number, known or unknown, throughout any one train of thought, though it need not represent the same number in all investigations.

2. The fundamental direct symbols of operation, seen in $ax, ab, a^x$, are connected with inverse operations, seen in 

$$a - b, \frac{a}{b}, a^b, b^a.$$

Each inverse operation offers certain difficulties: those of $a ^b$ and $a - b$ are overcome by the introduction of the notion of factors; those of $\frac{a}{b}$ by the considerations in Linnell, P. C., applied to what is called the approximate extraction of roots. But $a - b$ presents cases of special interest, and the impossibility of being removed as long as the symbols are the symbols of pure arithmetic.

3. The rules by which operations of pure arithmetic are performed are found to be capable of classification under five heads: (1) a step by step in any train of thought leads to anything by the use of one of these five simple rules, or of complex rules obtained by their combination. Of course these rules are understood as applied only when they give intelligible results.

4. Rules for signs. Whenever two of the signs $+$ and $-$ both act upon any symbol, the result is that like signs give $+$, unlike signs give $-.$

5. The double rule of signs. In such cases the signs + and — are connected by a symbol, the result is that like signs give $+$, unlike signs give $-.$

6. The conversion of addition and subtraction, as in $a + b - c = b + c - a + b,$ etc.

7. The conversion of multiplications and divisions, as in $a \times \frac{b}{c} = b \times \frac{a}{c},$ etc.

8. The distribution of multiplications and divisions, as in $(a + b + c) = ab + ac + ad,$ etc.

9. Rules of exponents. These are $a^{b+c} = a^b \times a^c$ and $(a^b)^c = a^{bc},$ etc.

Every master of the use of these rules can perform all the steps of any arithmetic, and in that respect Algebra is nothing but a branch of arithmetic, but provided that no steps are entered except those which are arithmetically intelligible. Even the common rules of computation, so far as they are not acts of memory or trial, consist in the use of the first four rules.

On examining problems into which the impossible subtraction enters, whether in process or result, whether from inconsistency in the problem or in the mode of solving it, the impossibility is always to be traced to a diagonally wrong case put upon the meaning of some one quantity, as reading gain for loss, or ascent for descent, etc. And since the impossible subtraction can always be reduced to the form $0 - a$ or $- a$ (thus $3 - 7 = 3 - 3 - 4,$ or $- 4,$ and since this is found of every case where, as a correction, that a unit should be taken of the sort diagonally opposite to what was supposed when $0 - a$ was found, it suggests itself to let $1$ and $- 1$ mean, not merely the addition and subtraction of $1,$ but any two opposite kinds of units whatever [Negative, $- c,$ etc., F. C.]."
also with intelligible meanings. Every such system of meanings, superadded to the symbolical algebra, is a logical algebra, and every process of reasoning or a collection of reasonings. In all probability there is an infinite number of logical algebras to every self-consistent system of symbolical algebra: we merely note down the list of those which have hitherto been traced from the general and purely symbolical algebra.

I. Pure arithmetic, in which the subject matter is number.

II. Single algebra, in which the symbols represent numbers derived from concrete magnitude, considered as being, in every case, in the number of two or of two kinds.

III. Double algebra, the main subject of this article, in which each symbol represents a line of definite length, and in some definite direction out of the infinite number which may be taken in one plane.

IV. Triple and quadruple algebra, in which the quantities are represented in one plane (this subject is in its earliest infancy). V. The geometry of the second book of Euclid, and the corresponding solid geometry. Here AB actually means the area of the rectangle under the lines A, B, and C: the fundamental rules can be demonstrated, and propositions can rigorously be proved. The ordinary and incomplete mode of demonstrating the second book of Euclid must appear, in this particular practice, objectionable.

The complete process of operations, in which the symbols, or as many of them as we choose, are not magnitudes at all, but directions to perform certain operations on a variable quantity. [OPERATION, P. C.]

Let us assume that every symbol admits of explanation for every symbol or combination of symbols. Thus I. just mentioned requires 0 — 1; II. requires \( \sqrt{-1} \); III. is perfect; and IV. may perhaps be made so:

in V., AB means no more than AB, if it have meaning, and A is wholly inexplicable; and VI. is encumbered with difficulties of new and serious kinds as soon as its elements are passed. It may happen that the proper meaning of a symbol or formula cannot be assigned at the commencement of a logical algebra, but can afterwards be deduced from its symbolic consequences. When this is the case, the deduction may be termed an interpretation of the five symbols. This process is the interpretation to which we have alluded, and symbols of which the meaning is laid down from the common interpretations may be said to be explained.

It is impossible that a perfect algebra can be founded on ideas of time, loss and gain, or any in which only two directions can be imagined. Space, from the infinity of directions which it admits, is, as yet, the only perfect medium of explanation. Time before and after a certain epoch may be considered as two directions, positive and negative; and what is there in the ideas of time to which \( \sqrt{-1} \) possibly apply? Again, show us a commercial operation which, performed upon a gain, produces a sort of result which can neither be regarded as a loss or a gain, or which repeated two or more times upon a gain, turns it into a loss—and we should immediately construct a system of commercial algebra, in which \( \sqrt{-1} \) shall be intelligible. But, as yet, the necessary ideas are found in geometry only, which causes some persons to object to the extension of algebra. But these surely forget that even common single algebra must derive its theory of opposition from concrete quantity; — 1, standing alone, is unintelligible in the science of pure number.

12. Remark the manner in which [RELATION, P. C.] the definitions of \( a+b \) and \( ab \) can be given, even in arithmetic, in terms of process, without mention of subject-matter: \( a-b \) requires one to proceed as in \( a \) we proceed from 0 to form \( b \); \( ab \) requires us to proceed with \( a \) as we should with 1 to form \( b \).

13. Let the common symbol of algebra signify a length in a direction in a certain plane, change either of length or direction demanding change of symbol. Take a point \( O \) for the zero point or origin, and let 0 signify that we do not leave that point. From \( O \) draw any line at pleasure for the axis of length, and take a length \( OU \) upon it for 1: continue the unit axis both ways. Draw a perpendicular through \( O \) to the axis of length, and call it the axis of direction: the reasons for these terms will appear in the sequel.

14. Let \( a \) and \( b \) be the direction and length from the origin which is gained by going over first \( a \) and then \( b \); and let \( a-B \) denote that gained by going over first \( a \) and then a line equal and contrary to direction in \( b \). Let \( AB \) denote a line whose length has units equal to the product of the units of \( a \) and \( b \), and the sum of the angles which they make with the unit line for the angle it makes with the unit line. Similarly, let \( AB \) have the quotient of the lengths of \( a \) and \( b \) for its length and \( \pm \) of the difference of the angles for its angle. These definitions are for example open to most objections; if, however, they be all on the unit-side of the axis of length, there is nothing but pure arithmetic; except when an impossible subtraction obliges us either to reject the process, or to enlarge the definition and pass to the opposite side of the axis of length.

16. Make a positive and negative direction on the axis of direction, thus: Choose a direction of revolution in which a line revolving round the origin, and setting out from the one side of the axis of length will be called positive, and which we shall denote by \( + \). Let the unit revolve positively, and let the first side of the axis of direction which it meets be called the positive side of that axis. Let the opposite direction of revolution be called negative, and which we shall denote by \( - \). Let \( AB \) and \( AB \) be the operations of single algebra whenever the two lines are in the same direction. And if all lines be on the axis of length all the four operations are those of single algebra.

17. By \( A = (a, \alpha) \) let us agree to mean that \( A \) signifies a line of \( a \) units of length, inclined at an angle \( \alpha \) to the positive side of the axis of length. Use the notation \( A, B, \ldots \) of measuring angles. Then \( (a, \alpha), (a, \alpha + 2\pi), (a, \alpha + 4\pi), \ldots \), are all representations of the same line \( A \). The peculiar symbols of the new algebra, as long as they are wanted, shall be capital letters; small letters denoting the symbols of the single algebra.

18. The first four of the fundamental rules in § 5 may be easily shown to be true. The geometrical propositions principally required are two. Firstly, that any number of lengths being given and their directions, if we set off from a point through those lengths and in those directions, one after the other, we reach one and the same point in whatever order the lines of progress are taken. Secondly, that if any polygon revolve about one of its angular points, while at the same time it is turned into similar positions which have been changed in the same ratio, the figure always remains similar to what it was at the outset. With these propositions and the following:

\[
(a, \alpha) \times (b, \beta) = (ab, a + b\alpha) \quad \frac{(a, \alpha)}{(b, \beta)} = \left( \frac{a}{b}, \frac{\alpha}{\beta} \right) = (a, -\beta),
\]

which are merely expressions of the definitions, there will not be much difficulty in establishing the first four of the rules.

19. Let the cube, square, round power, \&c., of \( A \), as yet, be denoted in full by \( AA, AAAAA, \ldots \), \&c., and their corresponding roots by \( \sqrt[3]{A}, \sqrt[2]{A}, \sqrt{A} \&c. \). There is then no difficulty in establishing, as in the previous cases, \( P, A, P \&c. \) : That the nth power of the nth root of \( (a, \alpha) \) is derived from

\[
(\sqrt[n]{a, \alpha + (n-1)\pi}),
\]

\( a \) being any integer; that \( \sqrt{A} \) has 4 values and no more; that \( \sqrt[3]{A} \) stands for a unit on one side (say on the positive side) of the axis of direction, and \( -\sqrt[3]{A} \) for a unit on the negative side. Also, as in the article cited, that \( p + q \) and \( p - q \) in the complex number \( A, \alpha \), on the assumption that \( A \) is identical in meaning with \( p + q + (1/p-q) \) and with \( (\cos a + \sin a + 1) \). Indeed, at this point it will be advisable to receive the imperfect system of \( A, \alpha \), called quadratics, \&c., only reading elements of length and unit above, powers at full length, roots with the old radical sign.

20. Why do we not hitherto admit the exponent, and define \( A^\alpha \) to mean \( AA, \ldots \) ? Because we are not prepared with a definition which will include all exponents. In the article just cited, we get the meaning of \( A^{n-1} \) by inter-
27. The meaning of \( \cos^e \) is the line whose logometer is 
\[ \theta \sim \sin \theta \] and its sine \( \cos \) or \( \sin \) the equation 
\[ \cos = \cos \theta + \sin \theta \] is a necessary consequence of the various trains of definition. 
Now as far as we know, the various trains of definition are that the 
meanings of the symbols satisfy the five rules in § 3, it may 
seem to be too much that so remarkable an equation as the last 
should be actually involved in the definitions, instead of being 
the result of a long sequence of reasonings. And in truth it 
is too much in one point: for most of our preceding reasoning 
on the subject of \( A \) would only really to any base 
we might choose for logarithms, and any unit for measuring 
angles, what have we done but prove the preceding equation 
true for any base and any angular unit? And we reply that 
so far as the definition of \( A \) is concerned, our proof is 
perfectly general: but that, on looking back, we find a restrictive 
connexion between the logarithmic base and the angular unit, 
as follows:——It is very easy to see that in our prior definitions, the 

\[ \cos (1, \theta) \cdots (1, \theta) \cdots (m \text{ times}) = (1, \theta) \] 
leads to the following 

\[ \cos a \cdot \sin \theta \cdots \sin a = \cos m + a \cdot \sin m \cdot \sin \theta \] 
in which we may use \( m \) as an exponent, since for the same 
integer, representing a line in the axis of length, the definition 
in § 23 gives \( A = A \cdots \cdot A \) . 
Let \( \theta \) be the angular 
unit; then we have 
\[ \cos (1 + i \cdot \sin \theta) = \cos a \cdot m \cdot \sin m \cdot \sin \theta \] 

But the last is 
\[ \cos (1 + i \cdot \sin \theta) = \cos a \cdot m \cdot \sin m \cdot \sin \theta \] 
and for all integer values of \( m \) and this not merely from 
equation (8), but from comparison of what \( \cos 1 + i \cdot \sin \theta \) must 
mean in the definitions prior to that of the exponent, 

with the complete exponential meaning of \( e \). 
Hence we must have \( l \), the base of the logarithms, connected with 
The angular unit by the equation 
\[ \cos (1 + i \cdot \sin \theta) = \cos a \cdot m \cdot \sin m \cdot \sin \theta \] 
and any base and angular unit which satisfy this condition 
will do. The most simple way of doing this is to take \( \pi = 2 \cdot 71828 \ldots \) 
as usual, and the angular unit such that there shall be \( \pi \) or 
\( 3 \cdot 14159 \ldots \) units in two right angles: but if any one should 
prefer \( \pi = 2 \cdot 71828 \ldots \) for a base, and \( n \cdot \pi = 14159 \ldots \) for 
the number of units in two right angles, he might get into trouble, 
but not into error.

28. Another difficulty, of the sort which arises when the 
result seems above the means employed in the demonstration, 
is that we have a complete system of trignonometry ready for 
demonstration by mere algebraical mechanism, without casting 
a further thought on the meaning of the symbols \( \cos \theta \) 
and \( \sin \theta \), or more on those of \( \tan \theta \), \( \cot \theta \), \( \sec \theta \), \( \cosec \theta \), 
then to make them, by definition, severally mean, \( \sin \theta \cdots \cos \theta \), 
\( \frac{1}{\cos \theta} = 1 \div \cos \theta \), \( \frac{1}{\sin \theta} = \cos \theta \). All we have done 
with the \( \cos \theta \) and \( \sin \theta \) is to take them into our system as 
expressing the numerical values of the projections of a unit 
included at the angle \( \theta \) upon the axes of length and direction. 
We have not even directly used \( \sin \theta \) \( \cos \theta \) \( \theta \) but 
\( \pi \) in our system, and who attentively read Eucied see that he does, 
in the sixth book, prove \( 1 \cdot 47 \) over again, without any use of \( i \), 
showing that all similar figures described on the three sides of a right-angled triangle 
have the two smaller together equal to the greater.

\[ \sin (e \theta) = \cos \theta + \sin \theta \] 
\[ \cos (e \theta) = \cos \theta - \sin \theta \] 
In the above definition of \( \sin \theta \) and \( \cos \theta \) it is clear that 
\( \cos (- \theta) = \cos \theta \) and \( \sin (- \theta) = - \sin \theta \), whence 
the first of the following, being universally true, gives the second:

\[ i \theta + 1 \cdot \sin \theta \cdots \sin \theta \]
Whence we have

\[(\cos \theta + \sin \theta \cdot \sqrt{-1}) (\cos \theta - \sin \theta \cdot \sqrt{-1}) = e^\theta\]

Now, by definition, has 0 \& \infty, or 0 \& 1, or 0, for its logarithm, and is therefore (1, 0) or 1. And the first side is, by consequence, the rule, \(e^\theta = e^{\theta_0} \cdot e^\theta\). If any one, instead of merely applying rules to the equation

\[(\cos \theta + \sin \theta \cdot \sqrt{-1}) (\cos \theta - \sin \theta \cdot \sqrt{-1}) = 1,\]

should proceed to demonstrate the rules upon this instance, he would, in a circuitous way, be led to a perfect geometrical demonstration of \(e^\theta = e^{\theta_0} \cdot e^\theta\).

29. No equation of this system, which hitherto admits of expression, presents any difficulty as to the meaning of its sides, or any combination of symbols for which the meaning is to be found by interpretation. Perhaps one of the most remarkable results of the ancient system of algebra is the equation

\[\pi = \frac{\log (-1)}{\sqrt{-1}}\]

Some algebraical writers have stated that \(-1\) has neither square root nor logarithm, and without further warning have afterwards made the non-existent logarithm, divided by the non-existent square root, give the ratio of the circumference of a circle to its diameter. Others have given fair warning that, in using what they called imaginary quantities, they were appealing, more or less, to experience; seeing that operations so conducted always led to truth, when, by the limit of \(\sqrt{-1}\), the results could be interpreted, they were content to use such an equation as \(\pi = \frac{\log (-1)}{\sqrt{-1}}\) as an instrument of which the power was known, though its mechanism was concealed. In the complete system it is visibly obvious that \(\pi = \frac{\log (-1)}{\sqrt{-1}}\) is one of the logarithms of \(-1\), or of \((\sqrt{-1})^N\).

30. In ordinary working, there is no objection to dropping the distinction between the logometer and the logarithm, there being no difference between the two in operations.

That this system will finally be introduced into elementary instruction we entertain no doubt whatever. But how soon will this take place? The school-books hardly yet teach the interpretation of the negative quantity: so that there would be little hope of the speedy success of the complete system, even if elementary works existed by which to make it known. But truth must conquer at last: and the respect with which the memory will be preserved of the mathematicians who were neither discouraged by the difficulties nor rendered incredulous by the mysteries of the ancient system, will not protect from ridicule those who shall obstinately refuse to see light because there was once darkness, or shall willfully continue in the imperfect system from those who wish the exact sciences to be in all their parts the perfection of reason are at least duties to be delivered. With respect to those parts of the doctrine of series, and of the integral calculus, which still present difficulties, though of a different character from those here treated, the lesson taught by the victory over what was rashly called impossible, which must have required many years to gain, is—Never refuse to examine, and to continue in the examination of, all consequences of the symbolic laws of algebra: there is every reason to hope that the symbols are always right, even though the views of their explanation may require correction.

ALGEBRAIC GEOMETRY. The regular treatment in this as in every other case, cannot be dispensed with by any of our readers who are desirous of acquiring it. But in this article, as in the last, we are led to write by the total want of elementary works to explain a new and useful modification of the mode of viewing a part of the subject. In the body of the Cyclopedia we avoided, as much as we could, articles which presumed, from their outset, a very ready acquaintance with the details of the branch on which they entered. Thus, though we might take for granted much algebra in treating the elements of the differential calculus, and much differential calculus in such an article as Operation, P. C., or Taylor's Theorem, P. C., we endeavored to make every article to which a beginner was likely to refer an elementary exposition as we could. But it may be allowed, in a Supplement, to make some attempt at supplying the omission. And, during the progress of the Cyclopedia itself, we have observed that, though defects are not to be avoided, they are capable of being remedied within our limits of space: and the mere mention of those defects is a sufficient excuse for our assuming in the reader a reasonable knowledge of existing works.

In geometry of two dimensions, the number of co-ordinates is not so great as to make symmetrical disposition extremely necessary at the outset. We should not, for instance, gain much by forming the equation of the straight line thus:—ay + bx + c = 0 instead of \(x = m(a) + b\); in fact, the writers who have preferred the symmetrical course have rather overlaid themselves with symbols, to an extent which makes the burden thus imposed on the memory greater than that from which symmetry relieves it. But it is not so in geometry of three dimensions. There are three co-ordinates to every point; and, as it happens, symmetry, even when obtained by augmentation of the number of symbols, is found to be, on the whole, an assistance in the remembrance of formulæ. According, the equations of the plane and straight line, and formulae connected with them, are expressed with great convenience in the manner of which the following is a summary: the first use of which, as far as we know, is found in the celebrated work of Malus, 'Théorie de la double Refraction,' Paris, 1810, 4to.

1. In arranging expressions containing three quantities or different sets of three, symmetry requires that no one letter shall ever appear at the beginning of one expression without appearing at the end of another; and that in every set of expressions which are formed by combination of pairs, an interchange of any two letters, or of the corresponding pairs taken out of different sets, shall reproduce the same set of expressions in another order, or at most with different signs. Thus, \(a - b, b - a, c - a, a - c, b - a, a - b\) are the same.

2. When there are two equations of the form \(ax + by + cz = 0\), \(ax' + by' + cz' = 0\), the quantities are not given, but their proportions are: and \(x, y, z\) are in the proportion \(bc' - ac', ac' - bc', bc' - ac', ac' - bc'\).

3. An expression of the form

\[(c^2 - ax^2) + (2ax - ay)(c - ay - ax)\]

is identical with

\[(a^2 + b^2 + c^2)(x^2 + y^2 + z^2) - (ax + by + cz)^2\]

4. The form of the equation of a plane \(ax + by + cz + d = 0\); the common form \(a = \hat{A}x + by + c\) is unsymmetrical. The plane which passes through the point whose co-ordinates are \(p, q, r\), which call the point \((p, q, r)\), is

\[\{x - p\} \cdot \{y - q\} \cdot \{z - r\} = 0\]

The plane which passes through the three points \((p, q, r), (p', q', r'), (p'', q'', r'')\), is

\[\{x - p\} \cdot \{y - q\} \cdot \{z - r\} \cdot \{x - p'\} \cdot \{y - q'\} \cdot \{z - r'\} = 0\]

one term of which is enough; symmetry will point out the rest. Remember the order \(pq, qr, rp\).

5. When such symmetrical expressions as \(ab' - ba', bc' - ca', ac' - bc', \text{etc.} \), are to be constructed, the best way is to write down the letters \(a, b, c, \text{etc.} \), under one another, and to calculate from the left to the end, without returning to the beginning. Thus from

\[
\begin{array}{c|c|c|c|c|c|c|c|c|c|c}
8 & 1 & 3 & 8 & 1 & 2 & 4 & 6 & 2 & 0 & 6
\end{array}
\]

we have

30. — 6, — 42

The most convenient form of the equations of a straight line is as follows. Let \((abc)\) be a point on the straight line, and let \(aBc\) be any three quantities proportional to the co-ordinates of the points which the straight line makes with the directions of \(x, y, z\). Then the equations of the straight line are

\[x = a + y(\frac{a}{b} - \frac{b}{a}) + z(\frac{a}{c} - \frac{c}{a})\]

\[\text{where } \sqrt{(a^2 + b^2 + c^2)} \text{ is the distance between } (abc) \text{ and } (xyz).\]

7. The plane whose equation is \(A(x - a) + B(y - b) + Cz = 0\) may be called the plane \((ABC)\), and the straight line which is mentioned may be called the straight line \((ABC)\). Throughout this article capitals are generally proportional to co-ordinates of angles, and small letters are co-ordinates of points. The order of co-ordinates is \(xyz\), and all letters connected with co-ordinates run in consecutive triples, ABC, ABC, ABC, ... But when triplets of pairs are made, as AB, BC, CA, then AB particularly belongs to the co-ordinate which is attached, BC to that of A, and CA to that of B.

6. The angles made by the straight line \((ABC)\) with the axes have for their co-ordinates \(A + \sqrt{(a^2 + b^2 + c^2)}, \text{etc.} \)
and the angle made by the two straight lines (ABC &c.), 
\((AC'BC')\) has for
\[ \frac{\sqrt{A'C' + B'C'} + \sqrt{A'B' + C'B'}}{\sqrt{A'B' + C'B'}} \]
When the lines are perpendicular, \(A' + B' + C' = 0\); and when they are parallel, \(A', B', C'\) are in the same proportion as \(A', B', C'\).

9. The angles made by the plane (ABC  &c.) with the planes of \(px, sz,\) and \(zy\) are \(\angle \frac{A' + B' + C'}{A' + B' + C'}\); the co-

2. The plane (ABC) is at right angles to the line (ABC), whatever \(a, b, c, p, q, r\), etc. be. And the plane (ABC) line (ABC), where \(a, b, c, p, q, r\), are, parallel to \(A', B', C'\). But the plane 

The intersection of the two planes (PQR') and (PQR') is the straight line (ABC), in which \(A, B, C\), are proportional to \(Q'R' - B', R' - P', P' - Q',\) and 

The intersection of the planes (PQR') and the straight line (ABC) is the point whose co-ordinates are 

The equation of a plane which passes through the straight line (ABC) and is perpendicular to the plane (PQR') is 

14. Two straight lines (ABC) and (ABC) do not generally speaking, intersect at all; their shortest dis-

15. The equation of a plane which passes through the straight line (ABC) and is perpendicular to the plane (PQR') is 

16. The perpendicular distance from the point (abc) to the plane (PQR') is 

where the square of the length of that perpendicular is 

This is sufficient for a specification of the method, and even 

17. The perpendicular distance from the point (abc) to the plane (PQR') is 

\[ \frac{A(l-a) + B(m-b) + C(n-c)}{A' + B' + C'}. \]

ALGERIE, L' (pronounced Algerie; Algerie in Eng-

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79
pristors, inhabitants of Algiers, the quiet subjects of France, whose property was solemnly guaranteed to them by the capitulation, and who let their lands to Arab or Kahyle cultivators or graziers. (Pichon, Alger sous la domination Française, s.v. 1839; a very interesting book for the history of the area.) The French were detested by the inhabitants of the bodying Moorish dynasty of Tunis with the title of Beys, on their paying an annual tribute to France. The Tunisians were to assist the French in dispossessing the refractory Ahmed Bey of Constantina. The treaty was agreed on by the court of Tunis; by Marshal Clausel, the under-secretary for foreign affairs. Meinhep a niece of the Emperor of Morocco at the head of a body of cavalry overran the country of Tlemcan, upon which Marocco had some antient claims, and he invaded the tribes of the west to place themselves under the protection of a Moslem prince of the Arab race. Clausel sent reinforcements to Oran, and, notwithstanding the paucity of his means, was inclined to adopt hostile measures against Marocco, but he was prevented again by the minister for foreign affairs, General Sebastiani, who preferred resorting to diplomatic means to obtain the evacuation of the district of Trencenec or Tlemcan by the Prince of Marocco, who ultimately withdrew to his own country. General Clausel, dissatisfied with the disappointment he had experienced from the French ministry, returned home in disgust, and published an apology of the acts of his administration. (Observations du Général Clausel sur quelques Actes de son Commandement à Alger, s.v. Paris, 1831.)

The military term at Algiers remained under command at Algiers: a temperate sober-headed man, who did not indulge in the sanguine aspirations of his predecessor. He resolved on contracting his line of posts within a narrower compass. He marched at the end of June, 1831, to relieve the garrison of Medjejah, which was closely blockaded by the Kahyles, and having evacuated the place, retraced his steps to Algiers, fighting his way through the pass of Tenfiche, harassed by swarms of Arab tribes, and arrived in the city by the 25th of July, 1831. He had thus crossed the Medjejah plain to within a few miles from Algiers. He wrote in the following month of August a long but interesting report to the minister-at-war, in which he refuted some exaggerated notions of the partisans of conquest and colonization, which letter is given by Baron Pichon in the appendix to his work, p. 44. Berthozéne applied himself to cultivate the friendship of the sheiks of the Arab tribes, who conceived a high opinion of his sense of justice. Unfortunatel y, after the month of July, 1831, Berthozéne went to Savary, Duke of Rovigo, on whose arrival at Algiers found himself beset by a party who talked loudly of exterminating the natives, or driving them back to the Desert, taking possession of their property, and distributing it among the French colonists. General Berthozéne after his return to France published a very interesting and impartial work: "Disparait Moit à Alger, ou récit des événements qui s'y sont passés depuis le 14 Juin, 1830, jour du départemuent de l'armée Française jusqu'à la fin de Décembre, 1831," Montpellier, 1834.

The administration of Savary lasted little more than a twelve-month. Its character was harsh, prejudicial, and disorderly. It alienated the natives of all races and classes. Several Arabs and Moors of distinction were summarily executed. The Oufias, a tribe of unoffending Arabs in the neighbourhood of Algiers, were wantonly exterminated; and sweeping confiscations of private property took place. The result was a general rise of all the tribes round Algiers and Oran, and the stoppage of all communication with the interior. Pichon, in his work already noticed, and General Brossard, in his "Mémoire présenté au Duc de Dalmatie sur les moyens d'assurer la securité de l'Algére," give much information concerning the dismal period of 1832.

In 1833 Savary left Algiers on account of ill health, and returned to Paris, where he died in June of that year. General Voiron remained pro tempore commander-in-chief of the French forces in North Africa. During the session that year in the Chamber of Deputies, Marshal Clausel, who continued to be a warm supporter of the system of colonization, after magnifying the importance of Algiers to France, which he compared to that of the East Indies to England, asked the ministers about their intentions concerning Algiers.

The president of the council replied, that there was no intention of evacuating the country; that France was at liberty to act as she pleased, being untrammelled by any engagement with foreign powers respecting it; that for the present the government thought proper to confine itself to the possession of the three towns of Algiers, Oran, and Bona, but that it might be thought advisable at a future time to occupy two or three more points on the coast, although there was nothing decided as yet on that subject. With regard to the placing of the French at Algiers, the government was ready to favour them if carried on by private companies, but had no intention to pursue them on its own account, or by its own means. These explanations seemed to give general satisfaction to the Chamber. The reverse derived from Algiers, and even to the inhabitants of the hugget city, was that they had not been consulted, whilst the whole annual expenditure required to keep possession of and administer the country was stated in the Chamber to amount to 80,000,000 francs. The army employed in North Africa consisted of 80,000 men, with 2400 were turbulent characters, chiefly from Paris, who had been formed into a fighting corps. A corps of auxiliary native troops, by the name of Zouaves, was also formed, as well as a battalio of Turks, and a foreign legion consisting of men of all nations.

In May of that year, General Desmichels, governor of Oran, sent an expedition against a tribe of Gharbas or nomadic Arabs, who had advanced to within 15 miles of Oran; the French succeeded in driving the enemy within two or three miles of Oran, and attacked the French outpost, but after some sharp conflict the enemy retired with the loss of 800 men. The Gharbas then entered into negotiations with the French, who restored their women and children. In June the French occupied the maritime station of Arzew, east of Oran, and soon after the more important town of Mascara, by the capture of the western side of the strait of Bona. Abd-el-Kader made every effort to recover Xoxamnem, but did not succeed. There was much fighting between the French and the Arabs in the province of Oran during the rest of the year. On the evacuation of Toulon, in September of the same year, landed a body of troops at Bougieh, and after several days' hard fighting against the Kahyles, who disputed every foot of ground, house after house, and garden after garden, the French obtained a footing at Alençon, which was superseded by an intermediate station on the coast between Algiers and Bona.

By an ordonnance of the month of August, 1834, General Count d'Erlon was appointed governor-general of the French possessions in the African provinces of the interior, and lands by the right of the minister-at-war. An intendant or head of the civil department was also appointed, as well as a commissary of justice at the head of the judicature. The military events of this year were of little importance. There was some desultory fighting with the Kahyles in the neighbourhood of Bougieh, and with the troops of Ahmed Bey of Constantina, in the direction of Bona. The sheik of La Calle, a maritime station east of Bona, on the frontiers of Tunis, made his submission to France. In the year 1835, Abd-el-Kader, Bey of Mascara, whose authority was now acknowledged by all the Arab tribes from the river Shelif to the frontiers of Marocco, entered into an agreement with the French governor of Oran, by which he acknowledged the supremacy of France, and was acknowledged by the French as the emir of the province of Mascara, which included the whole western division of the state of Algiers, with the exception of Oran and its immediate territory, and the other points on the coast which were occupied by the French. The Shelif was thus divided on the east. A sort of commercial treaty was also concluded between the emir and the French. This convention was censured at Paris, as giving a political importance to the Arabic chief, of which he would take advantage to consolidate his power, until he should be able to turn his arms against the French: and so it happened. At the beginning of 1835 Abd-el-Kader crossed the Shelif, and excited the Haidouks and other tribes in the immediate neighbourhood of Algiers to rise against the French. He himself collected a force of 9000 men and 4000 foot, of
which 1800 had been trained as regular infantry, in the neighborhood of Oran. General Trézel, the French governor of Oran, marched against him, and met him on the banks of the river Sig. The Arabs fought well, but gave way at last, and retired in service. General Trézel having lost 240 men, thought it prudent to move next day to the south-east coast; but he was attacked by the Arabs at the Pass of Makta, where he lost his baggage, a howitzer, several caisons, and 500 men either killed or wounded. This disaster was the most serious that could have befallen him in the camp. Abd-el-Kader showed considerable military skill in these encounters.

Marshal Clausel, being appointed by the king to succeed Clausel, arrived at Tlemcen, 18 leagues southeast of Oran. The Duke of Orleans sailed from France to Oran to accompany the expedition, which consisted of about 10,000 men. Abd-el-Kader tried to oppose the French on the banks of the Sig, and afterwards at the pass of the river Harbah, but his men were overcome by French tactics and discipline. He then withdrew into the interior, leaving Mascara to its fate. The French found Mascara deserted by its inhabitants, and plundered by the wild Arabs. Being unable to retain possession of the post, he was ordered by the Duke of Orleans to retreat to the town of Tafna, situated about 100 miles south-west of Oran, near the frontiers of Marocco, and which was now the headquarters of Abd-el-Kader. The Meshowr or citadel of Tlemcen was held by a body of Kooloolis, the sons of Turkish soldiers, formerly in the service of the Bey, who had retained possession of it ever since the fall of the regency. These men were on bad terms with the Arabs, who considered them as intruders, and they looked therefore up to the French for support. The troops of General Clausel, an army of 5,500 men, marched for five days entered Tlemcen, which Abd-el-Kader had evacuated with all the Moorish inhabitants. The Jews and Kooloolis received the French with acclamations. A body of troops then moved towards the mountains east of Tlemcen, where the Emir was encamped, and drove him away into the interior.

Marshal Clausel next marched northward of Tlemcen to the confines of the rivers Tafna and Isser, where he defeated another body of Abd-el-Kader's followers, among whom he picked the defectors. These men had come to join in the Djehel or Holy war which the Emir had proclaimed against the infidels. Clausel, having returned to Tlemcen, found that the Moorish population had re-entered the town. He appointed a native Bey, distributed arms among the inhabitants, and left a garrison in the citadel, consisting of a mixed garrison in the citadel, which Abd-el-Kader had evacuated with all the Moorish inhabitants. Unfortunately, the Emir was misled by exaggerated reports of the wealth of the people of Tlemcen, and of the small force of the French; and endeavored to march against them an extraordinary contribution of half a million of frances, leaving three natives, one of whom was the well-known Moorish colonel Jussuf, to collect it. It appears, that notwithstanding many acts of execution and oppression said to have been committed by these men, they could only exact the sum of £5,000 of these women's trinkets. The Marshal being now better informed, remitted the rest of the contribution, but the conduct of the army at Tlemcen was the subject of severe censure in the Chamber, and there was a communication between Tlemcen and the sea-coast, Marshal Clausel established a fortified camp at the mouth of the river Tafna, occupying at the same time the little island of Ragusa, which lies before the town.

On his return to Algiers the Marshal marched southward against the Kabyles, who had collected in the Little Atlas, and had interrupted the communication with the town of Meleyah. After an obstinate fight he forced the pass of Mount Tensend, and entered Meleyah, where he reinstalled the Bey Mohammed whom he had been appointed by the French. Meantime the French engineers completed a military road from Algiers to Meleyah. Having performed all these things, Marshal Clausel went to take his seat in the Chamber of Deputies, and defend the system which he had pursued in government of Algiers.

Soon after the Marshal's departure the French of the Tafna camp attempted to relieve the garrison of Tlemcen, but they were met on the way by Abd-el-Kader, who obliged them to retreat with considerable loss to their camp, where they were closely blockaded and suffered much from want of provisions. The French then sent an expedition direct to the mouth of the Tafna, under General Bugues, who having learnt on his arrival that Abd-el-Kader had moved in the direction of Oran, marched in the same direction by the coast road, and arrived at the town of Oran, which had been closely blockaded for some time. From Oran, Bugues began his march to Tlemcen, but on arriving there he found the whole country around stripped of all provisions and cattle by Abd-el-Kader, and he was obliged to return to the town of Tlemcen, which lay across the Telgoet Mountains, a road as yet untrodden by the French. At the Tafna the French collected provisions from their transports, with which they loaded 500 camels and 300 miles, to supply the garrison of Tlemcen for some time. Having crossed the mountains and the Isser, they found, on the 6th of July, Abd-el-Kader strongly posted on high ground above the steep banks of the Sikkat river. The Ala cavalry attacked the French as they crossed the ravine, and obtained a momentary advantage, but they were at last repulsed, when Abd-el-Kader advanced in good order with his reserve of regular infantry. This body of men fired with considerable precision, and was driven by the French General, who had been routed and driven in their flight down the precipice into the ravine below, most of them were killed. The native auxiliaries of the French were busy cutting off the heads of the dead, and collecting the bodies of their lives of 180 men, and this was the first instance of prisoners being taken in Africa. This was the first approach to a more humane system of warfare, and it led afterwards to an exchange of prisoners between Abd-el-Kader and the French.

At Tlemcen, Marshal Clausel was committed to the general command of the troops, and Constanz was resolved upon Paris, and Marshal Clausel returned to Algiers to make his preparations. Troops were sent both from Algiers and from Toulon to Bona, where the Duke of Nemours, Louis-Philippe's second son, arrived also to accompany the army. On the 13th of November the expedition, about 7000 strong, left Bona, and after two days arrived at Guelma, an old Roman station on the Seyboos river, where a deposit was established for the sick. The troops then marched to Al-Abs, and entered the well-fortified town of Constantina, when they were assailed by a storm of hail and snow, followed by a sharp frost, which reminded some of the veterans of the retreat from Moscow. Many men died, and others had their feet frostbitten. On the 20th of November the army entered the town of Constantina. Marshal Clausel had been told by Colonel Jussuf, whom he had prematurely appointed Bey of Constantina, that the population of the town would open the gates to him; but he found the garrison, consisting of 500 and 900 men, determined upon defence, and the red flag of Algiers floating over the main battery. He had not the means of investing the place regularly, the snow continued to fall heavily, one-half of the men were ill or were left behind with most of the baggage; and the garrison of the town, with 2000 or 3000 people kept the French outposts continually on the watch. After attempting to batter down with his guns the gate of Al-Cantar, Clausel made a desperate effort, on the night of the 23rd, to force that gate and in front of Er Rabah, in Er Rabah, near Constantina, by which the French occupied the town, and men lost their lives. On the morning of the 24th the French began their retreat in the direction of Bona, followed by the garrison of Constantina, and harassed by clouds of Arab cannon, and the population of the country. The French themselves proceeded to Bona. The official statement of the loss of the French stated it at 453 dead and missing, and 304 wounded. The sick were in still greater number. The failure of this expedition produced a very unpleasant sensation in France. Marshal Clausel was recalled and was succeeded by General Danréanet. Upon the whole, this second period of General Clausel's administration was brilliant and bold in a military point of view, and notwithstanding some reverses, it paved the way for the ultimate occupation of the whole state of Algiers by the French.

In the spring of 1837 General Bugues was sent again to Algiers.

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Oran on a special mission to treat with Abd-el-Kader in order to prevent him from joining Ahmed Bey of Constantia, against whom a second expedition on a larger scale was being prepared. On January 18, 1889, the French Army, under the command of General Danormant, took possession of the coast between Bougieyah and Oran, in the country of the Kabyles. General Abd-el-Kader, the representative of Arab nationality, had little sympathy for the Turkish Bey of Constantia, who was besides much inferior to him in character and abilities. Bugeaud, having 9,000 men, made a strong escort to the banks of the Tafna, where he had a remarkable interview with Abd-el-Kader, which Bugeaud managed with considerable spirit and address, and at last a treaty was agreed upon and stamped with the seal of the Bey, dated at Oran, on the 27th of May, 1889. Abd-el-Kader acknowledged the sovereignty of France, retaining the administration with the title of Emir of the two provinces of Oran and Titteri, with the exception of the towns of Oran, Mostaganem, Arzew, and one or two more points on the coast. Tlemcan was given up to him, on condition of his not molesting the Kooloudi and the other friends of France. On the side of Algiers the boundary-line of the Emir’s territories was extended as far as the ridge of the Little Atlas which is nearest to the capital. Medehya of course was given up to him, but Bledah and Cologha remained in possession of the French. The Emir on one part engaged not to code any part of the coast-line to any foreign power, and he also engaged to furnish the French with a cavalry force of 3,000 men and 5,000 mules. This treaty was very advantageous to the Emir, who gained a considerable extent of territory. But the French also obtained their object of being for a time relieved of anxiety from the west, so as to be able to turn all their strength towards the eastern provinces of the country. On the 27th of May, General Danormant arrived at Bona and Guelma to the beginning of October. General Danormant took the direction of the expedition, and the Emir of Nëounou came from France to assume the command in chief. The army met with little opposition in its advance. They formed their batteries on high ground which command the town, and effected a breach in the wall. Upon the 12th of October, the Governor, General Danormant, whilst surveying the operations, was killed by a cannon-shot, by the side of the Duke of Nemours. General Abd-el-Kader, who assumed the direction of the besieging army, and the town was stormed, but the French encountered a stubborn resistance in the narrow streets; the natives sprung a mine, which killed a number of French soldiers, and a high wall which fell down buried many more under its ruins. At last all opposition was overcome, the surviving part of the garrison escaped or threw themselves down the walls of the town, and the Kasabah, or citadel, surrendered soon after. The Duke of Nemours took up his quarters in the palace of the Bey. The soldiers at Oran recommenced acts of violence, but by the exertions of the officers were restored, the Russians were respected, and the inhabitants were assured of protection. Ahmed Bey had left the town previous. Peronneau, a general of the French, established himself in the interior, with a few followers. A native Kaid, or civil magistrate, was appointed, and a French governor and garrison being left at Constantia, the army returned to Bona. The conquest of Oran, and the burning of the suburbs, in which many tribes from the interior, was an important event. It established the French power in the centre of a vast inland region, the antient Numidia, extending to the borders of the Regency of Tunis on one side, and as far as the Sahara, or Great Desert, on the other.

In the following year, 1889, the French sent detachments from Constantia in several directions into the interior, to Milah, Djemliah, and Setef, the antient Statis. The province of Constantia was divided for administrative purposes into two divisions, one of which was given to Bona, and the other divided into three Khiliyas, or Lieutenant Sahels, Sahel, Ferjuda, and Majanah. Native officers were placed at the head of each, to administer justice and collect the tributo from the various tribes. The division of Bona was subdivided into four circles, Bona, Tlemcan, Constantia, and El-Kedira. The head of each circle a French military officer, and a native chief under his orders, were placed. The French occupied the maritime station of Stors, the antient Rousaca, the nearest landing-point to the port of Constantia, and near it they built a town which they named Philippville.

Meanwhile Abd-el-Kader was busy in subduing some remote tribes in the south of his province, which would not acknowledge his authority. After the ratification of the treaty, he sent a detachment to unite with the head of each of the three Khiliyas, and then proceeded to Ain Madh, about 200 miles inland, on the borders of the desert, the Marabout of which had refused obedience to him. He besieged the place for several months, and at last took it by capitulation, in January, 1889, and he sent to General Valdo a journal of his expedition in French, which was written by M. Léon Roches, a young Frenchman commissioned by General Danormant to be secretary. Abd-el-Kader was also forming a cordon of stations in the interior, upon which to fall in case of future reverses: at Boughar, about 40 miles south-east of Medehya; at Messaou, on the road to Constantia; at the south bank of the Shelf; at Saidia, south of Mascara; Tafnez, south-east of Mascara; and Tefzra, south of Tlemman.

In the spring of 1830 the French took possession of Jijel, and immediately established a military station on the coast between Bougieyah and Stora, in the country of the Kabyles. In the summer of 1831, the Bey of Constantia occupied permanently Djemliah and Setef, which last became the head town of the new khaliya of Meliana. In September of the same year the Duke of Orleans arrived at Algiers, and then proceeded by way of Philippeville to Constantia, where he received the homage of the various khaliyas and chief men of the province, as well as of the Ulemas with the Mufif at their head, and of the various corporations and tribes of Constantia. He distributed to several native chiefs the decoration of the Legion of Honor, which he had worn in the service of General Danormant. He proceeded with an exploratory expedition in the direction of Algiers, by way of Milah, Djemliah, Setef, Sidi Embarka, and then through the Billion or Iron-gates, a remarkable defile, and then up the river Tafna, which issues from the rocks from 800 to 900 feet high, a sort of Cheddar cliffs on a more gigantic scale, which the Turks had never been able to pass without paying tribute to the neighbouring tribes. The French met with no opposition, and then by way of the river Jamna and Wadi Zeltun to reach the coast.

There is a well written report, published in 1839, by M. Blanqui, of the French Institute, who travelled through the French possessions in Algeria for the purpose of inquiring into the social and economic conditions of the country: Le Rapport de M. Blanqui, Membre de l’Institut, à l’Academie des Sciences Morales et Politiques, sur la Situation Economique de nos Possessions dans le Nord de l’Afrique. He describes in lively terms the failure of all attempts at colonization in the Medjda plain, and the measures he believes the government to take to the towns of Bledah and Cologha, with their splendid orange, almond, and olive plantations, well irrigated, from the capricity of the squatters and adventurers who had ruined a number of pretty country-houses and hamlets on the Sahel, or table-land round Algiers; he speaks of the alarming mortality among the French troops in the country; he censures the tariff of the customs; he seems pleased with the bustling and life which he perceived about the town of Algiers, which assumes rapidly the appearance of a European town; he laments the stillness and solitariness which he found in the eastern province, at Stora, Philippeville, Bona, and Constantia. On the road from Stora to Constantia, a distance of 20 leagues, he gives a picture of the two roads, the one for the sure or the eye; for many a mile there is not a shrub, not a plant to be seen. The aspect of this undulating barren and deserted region reminds the traveller of the Campagna near Rome. 'The whole of the northern coast-line is the highest point of the system of administration different from that of the rest of Algeria. The old civil constitution of the country has been respected, and European colonists are forbidden to enter the province. The French rule through the means of native authorities, khaliyas, imams, and sheikhs, who have received the investiture of their office from the governor, and have sworn fidelity on the Kora. They retain their former authority, except the power of inflicting death. They raise the taxes and tributes, to which they are liable, in the name of the French, for the maintenance of one-third of the gross amount for their troubles. This understanding prevails between them and the French military, who on their part maintain the strictest discipline. M. Blanqui accompanied the Duke of Orleans to Constantia, and saw all the principal native authorities and other inhabitants of the prince. He remarked that their appearance and manners were far superior to those of the Arabs of the province of Algiers. The whole population of the town he reckoned at about 10,000. The whole appearance of the town was that of a little miserable, dirty, and decaying. He considers it important only to have an advanced military post in the interior, but the doubts whether it is worth keeping. The whole report is very interesting, and is one of the best written papers we have seen on the state of the country. It is reprinted in a graceful volume by M. Blanqui. While Kader ruled over half of Algeria, several of the author’s reflections and suggestions are now out of date, in consequence of the events that have happened since. This document has
been inserted in the appendix at the end of Lescot's 'Annuaire Historique Universel' for 1839.

In October, 1839, the Arabs of Abd-el-Kader resorted however, to Bazille, to cattle, and by this they any previous declaration. They invaded the Mejidia, and surprised and cut to pieces the French colonists, as well as several detachments of soldiers. A subsequent letter of Abd-el-Kader to Marshal Valée was mounted on a raid, and the tribes are again in the south. The Algers were defeated near Bledah, and the Marocco, near Tazn, on the road to the great desert. From his place of retirement within the frontiers of Marocco, Abd-el-Kader not only strove to keep the possession of the tribe of Algiers, but he likewise succeeded in exciting the fanatical population of Marocco itself to a holy war, for the purpose of driving away the infidels from Africa. Some of the emperor's family and court joined in this war. The French, however, had gained a footing between Marocco and the French. Marshal Bugeaud has added to his former successes that of defeating, at the battle of the Ili, the army of Marocco, which had advanced into that part of the territory of Algiers which lies west of the Tafna river; after which the French seized upon Ouehs, a frontier town of Marocco. These events, and the bombardment by sea of the towns of Tangier and Mogador, induced the emperor Abd-el-Rahman to sue for peace, the principal condition of which is that he will not permit his subjects to make any more the French in possession of Algiers. In the debates which took place, both in the British Parliament and in the French Chambers, it was elicited that the French dominion of Algiers has been so extended in both North and South Africa, that on its part, having engaged not to extend its conquests beyond the boundaries of the Algerine territories, either on the side of Tunis or on that of Marocco. Perhaps the best security for this is, as was freely stated by the Journal des Découvertes, that France will not conquer Marocco for the best of reasons, namely, that she cannot afford to do it. 'France,' observed the Journal, 'is already obliged, in order to retain possession of Algiers, to keep there an army of nearly 100,000 men, and to have some 40,000,000 francs every year, and she would require double that contingent in order to effect the conquest of Marocco.' It will take many years of peace before the revenue of Algiers can be raised so as to cover its expenditure, and it is even very doubtful whether it will ever be able to do so. In the year 1840, the revenue of Algiers is undoubtedly of considerable importance to France. Mankind at large, and the nations that border on the Mediterranean in particular, have derived one great advantage from the French conquest, namely, the termination of a century of piracy and the final abolition of Christian slavery.

The high administration of the 'Algérie,' or State of Algiers, is by the king's ordinances managed as follows:—A governor-general, who is a military officer of high rank, has the supreme command of all the civil and military forces, and is also the head of the civil and political administration. He is under the orders of the minister-at-war at Paris, where a department of the War Office is especially engaged with the affairs of Algeria. The governor-general of Algiers is assisted in his duties by a council of administration, consisting of the director of the interior, the commandant of the naval force on the Algiers station, the military intendant, the attorney-general, and the director of the
finances. A secretary-general of the government attends the sittings of the council; the director of the interior has under him sub-directors at Oran, Bona, and Philippeville. Algiers, Oran, Bona, and Philippeville have municipal councils and maires. In the other towns, as at Constantina, there are civil commissioners, most of them Albanian.

The country is divided into three provinces. 1. Algiers Proper, which includes also the old division or province of Titteri. 2. Oran. 3. Constantina and Bona. The principal military stations are: Algiers, Bône, Philippeville, Oran, and Ténez. Algiers has a customs department, and a number of forts, Bôned, Moledy, Milliana, Coléah, Shershel, and Boujeyah. In the province of Oran—Oran, Mostaganem, Arzew, Ténez, Mascara, El Esmoun, Tiemcen, Messerghi, Mazagran, Tiaret. In the province of Constantina: Constantina, Bône, Guemâa, Philippeville, and La Calle. Algiers, Oran, Constantina, and Bône have each a considerable garrison and staff. The naval stations are—Algiers, Oran, with the fine bay of Marsa-el-Kebir, Bône, Shersheh, and Ténez.

For the department of justice, there are courts in the first instance at Algiers, Oran, Bône, and Philippeville. Appeals are made to the Royal Court, which sits at Algiers. There are justices of the peace at Algiers, Bôned, Bône, Oran, Philippeville, and Constantina. Algiers has a tribunal of commerce, and the rest are.

The public instruction is under an inspector. The establishments for instruction are—a college at Algiers with 15 professors; gratuitous courses of Arabic, both vulgar or oral, and Arabic school, at Bône. There is a Roman Catholic bishop of Algeria, and there are consistory for the Protestants at Algiers and Oran.

The European inhabitants, not military, settled in the various towns of Algeria, amounted in 1843 to about 60,000, and those of English or Scotch extraction were about one thousand. French villages have been built on the Sahel, or table-land round Algiers, each of which contains from fifty to sixty families of French colonists, chiefly emigrant farmers with a small capital. The government has granted them allotments of ground, on condition of their cultivating them and building their own houses. These villages have been surrounded by a ditch and towers, thus forming a chain of fortified outposts round the capital. Each village has its fountain, its church, a public house, and a school. The villages, therefore, have been built by private individuals near Bôned and in other places. At Ténez on the coast, about 90 miles west of Algiers, a new European town has been constructed outside of the old Moorish town. From Ténez a road has been made to Or- blouanville, an inland colony of 500 or 600 inhabitants, with a military garrison. More to the east is Miliana, a town built on the declivity of Mount Zakar, more than 2000 feet above the sea, and occupied in the war against Abd-el-Kader, but has since been restored on a much improved plan, and is an important garrison town.

Marshall Bugwood stated lately at a public dinner given to him by the merchants of Marseille on his return from Algiers, that the question of safety prevailed in Algeria, that the public revenue has risen to twenty millions of francs, and that the European population amounts to 75,000 individuals, and is daily increasing. It appears by the newspapers, that in the budget for 1845-6, just laid before the French Chambers, the receipts of Algeria are estimated at six millions and a half of francs, and the expenses of the war department are estimated at 74,465,527 francs, for 60,000 men and 15,896 horses. It appears that one half of the emigrants to Algeria are natives of Spainiards, Germans, Italians, and Maltese. A regular communication by steam-boats has been established along the coast, between Algiers and Bône on one side, and Algiers and Ténez on the other. A diligence runs between Algiers and Bôned in the interior. (Guide du Voyageur en Algérie, contenant l'Annuaire de 1844 et les Lois, Ordonnances, et Arrêtés concernant la Colonie, a very full written and instructive compilation; L'Algérie et le Maroc, 1838; Histoire de l'Algérie, 1831; Histoire de la Régence d'Algérie, 3 vols. 1833; Moniteur Algérien; P. B. Lord, Algiers and the other Barbary States, 2 vols. 1835."

ALIEN. On the 6th of August, 1844, an act was passed (7 & 8 Vict. c. 68) to amend the law relating to aliens. It repeals the clause of 1 Geo. I. c. 4, which enacted that every naturalization bill shall contain clauses to the effect that no person naturalized should be a member of the Privy Council, or of either House of Parliament, or hold any office, civil or military, or be capable of holding grants from the crown, of lands, tenements, and hereditaments, either in his own name or by the right of any other person, until he has been a naturalized person born out of her majesty's dominions, of a mother who is a natural-born subject of the United Kingdom, is rendered capable of taking either real or personal estate by devise, purchase, gift, descent, or inheritance, in the United Kingdom, and a friendly state may take and hold every species of personal property, except chattels real, as fully and effectually as natural-born subjects. The subject of a friendly state may also, for the purpose of residence or occupation, either by himself or by his servants, in the United Kingdom for twenty-one years, and not exceeding twenty-one years; and may enjoy the same rights, remedies, exemptions, and privileges (except the right of voting at elections for members of parliament) as if he were a natural-born subject. An alien residing in the United Kingdom may be naturalized by marriage. The privileges conferred upon aliens by this act may be seen by referring to the former disabilities of aliens. [ALIEN, F. C.] Such of the provisions of the following acts which are still in force are—Mariners Act, 5 Will. III. c. 2; 1 Geo. I. sess. 2, c. 4; 14 Geo. III. c. 84. The Alien Act of 1844 also contains a new provision for the naturalization of aliens. An alien who comes to reside in the United Kingdom with a view to residence or occupation, under the following circumstances, is entitled to claim all the rights and privileges of a British subject, except the capacity of being a member of the Privy Council, or a member of the House of Commons, and except the rights and capacities (if any) specially exempted from and by such certificate. The certificate must be enrolled in the Court of Chancery, and within sixty days from its date the memorialist must take and subscribe an oath of allegiance. The course of proceeding to be adopted by aliens wishing to become naturalized is to be regulated, so far as details are concerned, by the secretary of state, and the amount of fees is to be fixed by the lords of the treasury. Persons naturalized by marriage under the provisions of this act, and who have resided in this country for five successive years, are entitled to all the rights conferred by the new act.

The act at present in force for the registration of aliens is the 8 Will. IV. c. 11, which repealed an act of a similar kind 7 Geo. III. c. 70. Subject to the reservations above mentioned, all parts are to declare what aliens (mariners navigating the vessel excepted) are on board or have landed, under a penalty, for omission or for false declaration, of 200l., and 10l. for each alien omitted. Every alien residing for more than one month is required immediately to exhibit any passport in his possession to the chief officer of customs at the port of disembarkation, and to state to him, either verbally or in writing, his name, birthplace, and the country he has come from, under a penalty, for neglect or refusal, of 5l. The officer of customs is to register this declaration, de-
...the certificate to the alien, and transmit a copy of the de-...
supercritical if allowed to spread. This seems to depend on its strong affinity for water: hence it acts as violent corrosive poisons, and are never used in a pure state, save in surges of its use when to form gaseous mixtures. Diluted with oils they constitute rubefacients, particularly ammonia. Their causticity is also greatly lessened by combination with carbonic acid, and is more subdued by an excess of the acid; hence bi-carbonates are less caustic than the corresponding carbonates, and the latter are the bases.

The carbonic acid is apt to fly off on exposure to the air, so that they regain their causticity. Carbonate of ammonia will altogether disappear if not kept in a well stopped bottle; this tendency is one source of its use when used as uncombined salines. Diluted with water or by combination with carbonic acid, so as to be safely applied to the tongue, alkalies have a taste peculiar, and to most persons unpleasant, which is not only so powerful as to be similar to burning when it is thought to liken it. Ammonia and its carbonates are likewise pungent. They exercise an immediate influence on the fluids of the mouth and alimentary canal, as far as they pass unchanged. They neutralize all acids they meet with in their course, and render the muses, and perhaps some other secretions, thinner and more watery. That they are readily absorbed into the circulating mass, on which they have a marked influence, is certain; but they are for the most part quickly eliminated, their effects seem to be limited to the fluids within which they are thrown out of the system. Many alkaline compounds, as well as the uncombined but diluted alkalies, increase the secretion of urine, and change its nature if long persevered in, altering it from an acid to an alkaline state. This is particularly the case when a bicarbonate is used, one of the carbonates, and of vegetable acid with the base, all of which are decomposed in transit, as first remarked by Sir Gilbert Blane, and produce on the urine and the system generally ultimately the same effects as the pure alkalies. The alkalies possess a power of rendering albumen soluble: unboiled white of egg is an albuminate of soda. The albumen of the blood is rendered more fluid by alkalies; hence in excess they impair the physical power of that fluid.

These and all that are requisite to form a correct estimate of their therapeutic powers and employment. Their caustic and rubefacient properties fit them for external use. Their internal employment is regulated by a variety of indications, but it is chiefly as antacids, or to counteract acidity in the stomach and prismatic visae, as diuretics, and to dissolve calculi in the kidneys or bladder, as a refrigerant or cooling medicine in inflammatory diseases, that they are used. Many persons, soon after food has been taken into the stomach, are distressed with heartburn and other signs of indigestion, and either have the urinary secretion in an unhealthy state, or, if they be of a gouty disposition, have frequent attacks of gout. Such persons feel relief by taking some alkali or a mild diuretic, or having their urine made alkaline; and the use of alkali is still more pronounced to those who desire to prevent the formation of uric, as well as the proper quantity to be taken, requires much judgment. Assuming that some alkali is proper, Sir B. Brodie thinks from three to four hours after each of the principal meals, especially dinner, the most suitable time. (Lectures on the Medicinal Use of the Alkalies, ed. p. 203.) Dr. Prout makes a similar remark with respect to alkaline mineral waters. A variety of circumstances regulate the alkali to be selected. From their greater causticity they are in a greater degree injurious in cases of difficult labour, those of a long, or even when taken in such bland vehicles as veal broth. The alkaline carbonates are better borne, and bi-carbonate of potass more easily than carbonate of soda. Their unpleasant taste constitutes an objection with many; this is in some degree lessened by absorbing them in fruits, with which they are often conveniently disguised by Mr. Brockedon, or in an effervescing state with an excess of alkali, as recommended by Sir Gilbert Blane. If taken unnecessarily or persevered in too long, must be considerably done with. The carbonate of soda, for instance, is reduced to the state of acid carbonic, and as such when used as uncombined salines, diluted with a deposit of the phosphates, as indicated by a white, salted sediment, or an indescribable pellucid on the surface of the urine, but much general debility is caused.

Other ill consequences follow the too liberal use of alkalies: they alter the quality of the blood. After some time the patient is liable to pectiche; he perspires too easily, becomes insipid, apprehensive, susceptible of all inflammations, and, in short, is an almost perfect victim of the "burning desire of evil." (Brodie, l. c. p. 292.) As effervescing or saline draughts, made with a vegetable acid and some alkaline carbonate, are much used at the beginning of inflammatory diseases, the following prescription is worth mention: A grain of the compound, in very hot water, should be given by every person against the abuse of these, yet for such are they unfortunately most employed. Weak vegetable acids will be found more beneficial.

ALK. LOIDS—Medical Properties of. These substances, which modern chemistry has made known, are termed sometimes vegetable alkaloids, as being hitherto found exclusively in vegetables, and also organic alkaloids, from requiring a vital power to effect their formation; but the name given to them above is the most appropriate. They are the properties in the lowest degree, and are either tasteless or have a bitter acid taste, existing generally in a solid, mostly crystalline form; some however are amorphous (Ammonitine), occlusive, or vege-morphous (depolev), which form is very volatile, and readily undergoing decomposition, with an evolution of ammonia, at a moderate temperature. The point in which they differ most from the common alkaloids is their affinity for nitrogen in their composition, one of the constituents of the organic (Caffeina) and inorganic (Carbonic acid) compound known. Sometimes one only exists in a plant, sometimes several in the same plant, e. g. opium. Generally they are combined with an acid; most frequently it is a peculiar acid. Many of them are with difficulty dissolved in water, more so in alcohol; they rarely completely neutralize acids, but the salts which they form are more soluble than the bases; hence various of their salts are used in medicine in preference to the primitive article. Their characteristic is the extraordinary action most of them have on the human system in a very small dose, and indeed several of them are, in very minute quantity, deadly poisons. No remedy, devoid of nitrogen, possesses a poisonous action in a similar dose; but it is certainly not in direct proportion to the quantity of nitrogen. Solanias, and picrotoxias, which contain least nitrogen, are powerful poisons. Quina contains more nitrogen than morphia. Caffeina and theobromina, the most highly nitrogenized of all vegetable alkaloids are not so injurious as the former. (Liebig, Animal Physiology, 1st ed. p. 177.) This author conjectures that they owe this great power to having a composition analogous to that of the nerves and brain; but points so hypothetical need not be dwelt upon to the understanding of the question.

Having been first detected in plants long used as medicines (Cinchona), it is chiefly among medicinal plants that they have been sought after and found. By many they are regarded as the active principle of those, and their extraction has had the great advantage of enabling medical men to administer their remedies in a smaller bulk and more convenient form. As the most important of them have been already treated of under the names of the plants which yield them, it is not necessary to notice any of them further here; except to state that chemists have recently rendered a great service in forming a neutral sulphate of quina, which is much more soluble than the diaphane.

ALLAN, DAVID, called the Scottish Hogarth, was born at Allola, in the parish of Holborne, near the Maidstone, in 1744, where his father was shoemaker. The choice of his profession was partly owing to an accident; he burnt his foot, and while he was being nursed at home, having nothing else to do, he amused himself with drawing. He afterwards entered for a time the university, and there he got so much attached to that, when he recovered he had a very great objection to going to school. But he soon obtained a happy release from this obligation, for his old schoolmaster turned him away from the school, for making a caricature of him; but what Mr. Allan likes best is to see him well done, for himself. He was apprenticed to Mr. Stuart, the collector of the customs at Allola, was so much struck with it, that he recommended Allan's father to send him to the academy of Robert and Martha Faulis, to learn drawing, painting, and engraving. Allan remained at this academy nine years, and when he re-
turned home, he had the good fortune to be introduced by Lord Cathcart as a native prodigy to Erskine of Mar, on whose estate he was born, and by whom he was generously set as a pensioner to prosecute his studies at Rome. At Rome he lived under the protecting eye of Gavin Hamilton, to whom was due a great assistance to him in his professional pursuits. Allan proved himself worthy of the generous patronage he enjoyed: he raised hopes however at Rome which he never realised afterwards.

He first received a silver medal for a drawing in the Academy of St. Luke, and afterwards the gold medal for painting. The subject was the legend of the Corinthian maid who drew the profile of her lover around his shadow cast by a last sun's lingering picture was worked up into a good engraving of it by Canego spread Allan's reputation throughout Italy; and his praises reached even his own countrymen; it was however the first and last good picture he ever painted. His subsequent works were distinguished for the advisement of feeling, but in execution, whether as paintings or engravings, they are very inferior.

He painted two other pictures at Rome, the Prodigal Son for Lord Cathcart, and Hercules and Onophaele for Erskine of Mar; and he made also four humorous designs illustrating the Roman Carnival, which through Paul Sandby's prints of them became very popular, and they gained Allan a considerable reputation for broad humour. But he no more deserved the title of the 'Scottish Hogarth,' which for these few broad prints he was permitted to coin, than his historical pictures would warrant his being called the Scottish Raphael. 'He is among painters,' says Allan Cunningham, 'what Allan Ramsay is among poets—a fellow countryman in any tailoring in all but spirit of rustic droolly, but deficient in the sensibility of conception, and little acquainted with lofty emotion or high imagination.'

In 1777 Allan visited London, which however he left for Edinburgh, after practising there for a short time as a portrait painter. After the death of Runnemede in 1786, Allan succeeded him as master of the Trustees' Academy, which office he held for ten years, until his death in 1796. He left a son and daughter; the former went in 1806 as a cadet to the Royal Military Academy, Woolwich.

Allan's most popular designs are his Twelve Illustrations of Ramsay's Gentle Shepherd, which be engaged himself in aquatint, and published with an edition of the poem, with some prefatory remarks, as a sort of apology for the humbleness of the style of his designs. He made also some designs for the lyric poems of Burns, which complimented the painter in his letters to his friend Thomson, on more than one occasion. Burns also found fault with Allan's stock and horn,' a rude manner of instrument which he put into the hands of some of his characters. Burns often says, 'Get thee for a shepherd the used in the brases of Atholl.' 'If Mr. Allan chooses,' says Burns, 'I will send him a sight of mine, as I look on myself to be a kind of brother brush with him.' But neither are his original sketches clear of divergences, and the slight difference that I look on Mr. Allan and Mr. Burns to be the only genuine and real painters of Scottish costume in the world.'

Allan however did not think that Burns's stock and horn were a humour appropriate to his own; he said it was only fit for 'reading and roasting.'

In another letter, Burns, speaking of Allan's illustrations of his works, says, 'Wool and married an' a' is admirable; the grouping is beyond all praise; the expression of the figures, consummately delicate, is absolutely faultless perfection. I next admire Turnermipe.' Others of these designs which were successful were the 'Gaberlunzie Man,' 'Maggie Lauder,' and 'John Anderson my Jar.' Allan designed several designs of another description, as the Escape of Queen Mary from Lochleven Castle; several homely scenes, as the Scotch Wedding, the Highland Dance, the Repentance-Stool, &c., and some sketches of Scotch scenery.

(From 'The British Painters,' &c.)

_ALLEGATION, ECCLESIASTICAL_ is the term applied to the first plea in litigations ecclesiastical: in criminal proceedings (ecclesiastical) the first plea is called _allocution_; in plenary or ordinary causes the first plea is called the _defension_, which is a statement of the law or of the common law or to a bill in equity. The term Allegation is also applied to every subsequent plea, in all causes. The first plea given in by a defendant is called a _Responsive Allegation_; the plaintiff's answer to that is called a _Counter Allegation_. The headings are not usually carried beyond this step. Besides these allegations, either party in the case is allowed to except to the credit of any witness upon matter contained in his deposition. These exceptional allegations, when admitted, are proceeded upon in the same manner as other pleas.

(Phillimore's ed. of Burn's _Eccl. Law._)

ALLEN, JOHN, M.D., a writer on subjects connected with metaphysics, history, and physiology, was born in January, 1770, at Redford in the parish of Colliston, near Edinburgh. The seat of his family, called Townfield, is at Redford, situated on the slope of the Pentland hills, was his birthplace. The mansion-house still attests the moderate but substantial wealth of his ancestors. He studied at Edinburgh, where he took a degree in medicine in 1791. He soon afterwards continued his studies in London, and entered into a connection of parliamentary reform, which called down the vengeance of the government. In 1795 he published 'Illustrations of Mr. Hume's Essay concerning Liberty and Necessity,' in answer to Dr. Gregory of Edinburgh, by a Necessitarian. This small tract is in many respects characteristic of his subsequent more distinguished works, in the felicity with which it adopts a broad and comprehensive view, as well as in the clearness with which it adheres to one unbroken line of reasoning, and keeps to the same ground in all his arguments.

It is an exposure of the fallacious assumption that Hume's theory of cause and effect did not make allowance for uncaused causes. This celebrated theory had been deemed a principal one in his system, in nature, that in all cases the same event is caused by following those apparent effects. Gregory's attack was made in diatribes, and Dr. Allen's answer was in the same form, showing that Gregory's reasoning was accurate, but his description of Hume's system erroneous. He stated the doctrine of the common man in a manner simple, and in that simplicity of style he the trueprovince of a popular writer. Without the help of the friendship he enjoyed, 'An Introduction to the Study of the Animal Economy,' it appears to have been about the commencement of this century that he formed an intimacy with Lord Holland, with whom he continued to reside until that nobleman's death. The connection between the two he was permitted to have rested on the foundation of common tastes and opinions and mutual esteem, not on patronage on the one hand and servility on the other. After the peace of Amiens Dr. Allen accompanied Lord Holland to Ireland, and resided with him and Spain, and resided with them in the latter country until the year 1805. He made large collections relating to the past history of Spain, and to its social and political position. He had formed high hopes of the prospects of the Spanish people—hopes destined to be bitterly disappointed, as each effort to regenerate them sunk under anarchy and despotism, and the mortifications to which his zealous feelings in their favour were exposed, appear to have in his latter days damped his ardent admiration for two institutions of whose far reaching influence this extensive contributor to the 'Edinburgh Review,' on subjects chiefly connected with the British constitution, and with French and Spanish history. Forty-one articles in that periodical are attributed to him, and they will serve to establish and characterize his opinions on constitutional questions. His earliest papers were on Spanish and South American subjects, and among those attributed to him are—'Bourgeois, Tableau de l'Espagne Moderne,' October, 1804; 'Helm's Travels from Buenos Ayres,' October, 1806; 'Mercurio Peruano de Historia,' &c., January, 1807; Molina's account of Chili, July, 1809; Laborde's View of Spain, October, 1809; Humboldt's 'Essai Politique sur la Nouvelle Espagne,' April, 1810, and his poem on the History of England by Lingard, which occasioned a pamphlet controversy with that author, chiefly relating to the massacre of St. Bartholomew, the authorities for which charged Lingard with having roused the populace. The latest article which he is supposed to have contributed to the Review is that on Church Rates, October, 1839. He wrote the History of Europe in the Annual Register for 1806; and in 1809 a 'Biographical Sketch of Mr. Canning.' In 1819 he published a small work on Parliamentary constitutional work, called an _Inquiry into the Rise and Growth of the Royal Prerogative in England_. He maintains that by the older constitution public acts were not performed by the English kings until after their coronation; and it is a remarkable circumstance of a general constitutional doctrine stand-
ing the test of minute chronological inquiries, that while Dr. Allen states the reign of Richard I. to be the only exception to this practice; Sir Harris Nicolas, in his ‘Chronology of British Painting’, 1727, has deduced other collections of documents, the regnal years of that reign are antedated by a year. Dr. Allen published several other pamphlets, some of them on subjects of comparatively temporary interest. He was a member of the Royal Society, and the only other person he ever appointed was that of under-secretary of the commissioners for treating with America in 1806. He died April 3, 1843. He left his medical books and MSS. to his early friend Dr. John Thomson, of Edinburgh—and his other MSS. he bequeathed to Colonel Fox. W. believe it is in contemplation to print a collected edition of his works. His character has been eloquently drawn by his friend Lord Brougham, in the third series of the ‘Essay on the Euphones of the Statesman of the time of George III.’ p. 342-348.

Judith. His, his, 1829. The 1806. Heretic. Magdalen, is establishing it the (Pharmaceutical galvanic desirable his Philosophical Plough-court, cleaning Historical 5000/.

Allen’s, both in oil and fresco, are numerous, and many on a large scale; his greatest work is the Montagni Chapel in the church of the Annunciata, painted in oil in 1855. He has painted the Goodwin’s Christ disputing with the Doctors, and Christ driving the money-changers from the Temple. In the second he has introduced the portraits of Micheangelico and Giacomo da Pontorn to their own costume, besides several other portraits of his contemporaries in the character of dilettanti. He constantly introduced portraits of his friends into his historical pieces.

The son, Cristofano Allori, born at Florence in 1677, was a painter; and, as his father, he is said to have been a fastidious, and his works are scarce. In execution he was equal to anything, and he had (of course) a corresponding skill in copying. He is said to have made some copies of Correggio’s Magdalen, with slight alterations in the background, which now pass as duplicates by Correggio; he generally signed his own name on the back of the picture, but of this original work at Dresden; that which the Roman government recently forced Vallati, an animal painter, to return to its former owner, from whom he had purchased it in a disfigured state some months before for 15 scudi, may be one of these copies by Allori. It seems it had been carefully but badly painted over, probably during the French revolution, to preserve it. The fact was forgotten by or unknown to its present possessor, a few years ago, and he sold it as a picture of no value. Vallati, who bought it, discovered its identity, and paid £500 for it; but the Roman government has now recovered it to its original owner, who has since recovered the original work at Dresden, and is now valued at 5000l. sterling: the background differs slightly from that of the Dresden picture. Cristofano was an excellent landscape-painter. His masterpieces are considered the ‘Miracle of San Giuliano, in the Pitti gallery: San Manetto, in the church de’ Servi, and Holophemes; and a Magdalen, which was the portrait of his own mistress, a very beautiful woman. The Judith is also her portrait, and the Holophemes was painted from life. It is described as having been an important event that Cristofano became ‘reputed for the Venus Napoloni.’ He died in 1621: his portrait is likewise in the Florentine portrait gallery.

(Baldinucci, Notizie de’ Professori del Disegno, &c.; Landi, Storia dell’arte, &c.)

ALLOTMENT SYSTEM. The allotment system may be defined to be the cultivation of small portions of land by agricultural labourers and other classes of workmen at their leisure, and after they have performed their ordinary daily work. It is desirable that every smallholder should be entitled to the occupation of a certain allotment of land, and the right to cultivate his cottage for the growth of vegetables. In villages where the houses are not detached this cannot always be done, and the most convenient mode of giving them gardens is to divide a field near the village into small allotments. The allotment system is the most satisfactory mode of providing for the non-agricultural classes of the community of the town having ceased, to about the close of last century, and the bishop of Bath and Wells commenced the setting of allotments in 1807: but it is only since 1830 that its adoption has become common. In 1800 the agricultural labourers were in the habit of destroying thrashing-machines, and demanding higher wages; and at night the country was lighted up by incendiary fires.
Under the impulse of fear the farmers increased the wages of the labourers, but on the suppression of the disturbances they generally returned to the old rates. The season of alarms did not however pass away without some attempts being made to improve the lot of the labourer, and the extension of the allotment system was the most general mode by which an attempt was made to accomplish this object. A society, called the Labourers' Friend Society, was formed to promote the objects of the system, and to circulate information respecting it. Allotments (garden-allotments, or field-gardens, as they are sometimes termed) are now common in all the agricultural counties in England; but they are nowhere universal. In East Somerset there are to be found in the allotments, and the quarter of land devoted to allotments is said to be equal to the demand. At Farnley Tyas, Yorkshire, the tenantry of the Earl of Dartmouth have agreed to allot a road of land to the cottage of each labourer employed on their farms, the rent to be charged at the average rent of the farm, with the addition of rates and taxes.

In several of the northern and midland counties the allotment system is promoted, and in some degree superintended, by a society called the Northern and Midland Counties Ari- sans' Labourers' Friend Society. The number of acres under allotment, according to the report of this society, in June, 1844, was 1082. There are several similar societies in the market towns, and in the district in which his plot of ground was cultivated, and are not much differ from the social schemes of Mr. Owen. The Reddington Land Allotment and Provident Fund Society, in December, 1844, purchased forty-two acres of freehold land, on which it is intended to erect 160 five-fooled cottages, besides allotments for the use of the labourers. The allotments consist with the freehold of his cottage and garden, at the cost price. An industrial school is to be erected in the centre of the allotments. At Rotherham a Land Allotment Society has been established for the purpose of purchasing one road of land for each of its members by payments of seven pence a week. The society has already obtained possession of four and a half acres, which, in the last week of December, 1844, was divided into fourteen allotments and balloted for. The road of land that constitutes each allotment is to be let to the applicant, the object is to become proprietors of land. It is scarcely necessary to remark that the members of these societies are not agricultural labourers. Allotments are also found in the neighbourhood of several large towns, and the proprietors of factories have in many instances granted allotments to their workmen; but in both these cases the land is more frequently cultivated rather as a recreation than as a view of the means of subsistence. It has happened however, that in the Midland Counties landlords and farmers have employed in factories have been enabled to keep out of the workhouse with the aid of an allotment. At Nottingham land belonging to the corporation is divided into about 400 gardens, which are let to the tenant at a rent for the year of 1s. 3s. 4d. The greater number of these gardens have been cultivated for about 50 years. Where the tenant is an agricultural labourer, the main object is to increase his resources, and thus enable him to maintain himself without assistance from the poor's rate. There seems to be good authority for stating that the allotment system has been successful in this object; and that it has not only diminished the incentives to crime, but has encouraged habits of sobriety and industry, and led to a general improvement of character. Of the heads of families holding allotments of land in West Kent, not one was committed for any offence during the years 1841 and 1842. In the parish of Hallow, Kent, there were 35 commitments in 1835, and on the allotment system being introduced in the village of Ditton, commitments were reduced in 1837 to one, and from 1837 to 1843 there had been only one. About 15 of those who were committed in 1835 became holders of allotments, and up to June, 1843, no cause of complaint had arisen against any of them.

Of course it is not to be supposed that the administration of this system is perfect. Hence the tenants have not been able to obtain their allotments in the same manner as in the principal towns and cities; but it has been found that the landowners have been willing to grant allotments without the usual conditions of mortgage or lease, and that they are not always set at a rack-rent. Many persons recommend the landowner to take the cottages on each farm into his own hands, instead of allowing the farmer to let them. It is usual to let the land tenant to a tenant on his own responsibility for the rent, in order to save trouble, and to prevent the tenant being unexpectedly and frequently called upon for money.
payments. The rent of 137 acres belonging to Mrs. Davies Gilbert, divided into 419 allotments, is 428l. 8s. 54d., or nearly three guineas per acre, which includes rates, tithes, and the payment of the cost of improvements of houses and buildings, whose increase is paid for separately. The rents vary from 6s. up to 8l. an acre. The rent of 15 acres of land belonging to Mrs. Walker Ferrand, near Bingley, which are divided into 59 allotments, is 32l. 8s., or 1l. for each allotment, averaging as nearly as possible a rent of one guinea per acre. With the addition of rates and taxes, the cost of the 15 acres amounted to about 40l. per annum. The value of the crops for 1844 was estimated at between 400l. and 500l., or between 7l. and 8l. each. The tenants are chiefly employed in the worsted factories, and the form of agreement, which is usually signed by allotment tenants, embodies rules for the management of the land, and fixes other conditions for their observance. Spade-culture is invariably (except in the case of the prohibited) to underletting and working on Sunday. There are instances in which attendance at the parish church is enforced; and in other cases it is merely stipulated that there shall be attendance at some place of worship. The allotment is usually forfeited for non-payment of rent, gross misconduct, commitment for any crime, or wilful neglect of the land. Cottagers without families, those whose circumstances are considered tolerably comfortable, and those whose character is not good, are in some cases allowed to have a separate rotation of crops is sometimes required in the agreement. The growth of wheat is not allowed in some cases. Where it is encouraged, it may probably be safely assumed that in that particular district the labourer is worse off than usual. Some reckoning is made of the half-acre in one hand and the other half in potatoes; and it is assumed that other vegetables are grown in the garden attached to the labourer’s cottage. Captain Scobell thinks it unadvisable to exclude any one from holding an allotment on account of previous bad character, as there is a chance of his being reclaimed. Becoming permanently a pauper is a fit ground for exclusion; but when the tenant receives casual relief on account of sickness or accident, he is not excluded. So long as the tenant observes the conditions of his agreement, the landlord is not permitted to stipulate that he shall on no other account be ejected from his land.

There seems to be no doubt that the absolute produce of the soil when cultivated in small allotments is greater than the same land would produce under the ordinary course of tillage by farmers. A much larger quantity of manure is used; in some cases four times as much as farmers are enabled to put upon their land, and a single rod is frequently made to produce vegetables of excellent quality. The consumption of a labourer’s family for six months; but if every labourer had an allotment, the quantity of manure collected could not be so great as it is at present. The disposable produce per acre of land is of course much greater when the same quantity of land is divided into small holdings.

Captain Scobell estimates the average value of an allotment at 2s. per week, or about 5l. per year, and that during the year it is required. The rent, seed, and other expenses, it is said, will amount to 3l. 10s., leaving a profit (without deducting the cost of labour) of 15l. 10s., which is equal to 6s. a week for a whole year. Such an allotment as the above allowed to will require about 30 days’ labour in the course of a year; but it is necessary that the chief part of this labour should be given between Ladyday and Michaelmas. One of Mr. Sutton’s allotment tenants at Wigginton, near Tring, stated at the Michaelmas rent-day, 1844, that the total of potatoes, and of all the increase of vegetables, on an acre was between 6l. and 6l. Supposing that there are a million families in England and Wales who are in the same circumstances as the tenants of existing allotments, and that four times as much ground as is at present cultivated by allotments, 2,500,000 acres, or nearly 400,000 square miles, which is one-third more than the area of Middlesex, and about the 128th part of the area of England. This would be equal to about 43rd of all the arable land in England. At three guineas an acre, this would amount to 787,600l., and the value of the produce, according to Captain Scobell, would be about 5,000,000.

From the Anglo-Saxon period to the reign of Henry VII, nearly the entire population of England derived their subsistence immediately from the land. The great landed gentry consumed the produce of his demesne, which was cultivated partly by himself and his serfs and cottiers attached to the manor. These tenants occupied small farms, and paid their rent in kind or in services, or in both. The cottagers had each a small rent or parcel of land attached to his dwelling, and the right of turning out sheep and cattle, of cutting wood, and of gathering common woods, commons, and wastes of the manor. While working up the lord’s demesne, they generally received their food.

The occupation of the land by allotments in the form of 120 acres, and there is a discussion in existence which contains 21 distinct conveyances of the land, the soil has been traced at various dates between the years 1200 and 1400. During the thirteenth and fourteenth centuries, this farm, which is now occupied by one tenant, or there is some evidence of its existence which became the property of one owner, who let it as a farm to one occupier. (Quarterly Review, No. 81, p. 250.)

In the history of the parish of Hawsted in Suffolk, by Mr. T. Collinson, the cultivated land is called a cottager’s or labourer’s allotment land. The right of the occupant, which is a separate individual, to cultivate the land is called a “labourer’s allotment.” The same term is used of the right of some persons to cultivate the land, which was divided into small portions, or parcels of land, at a later period. The labourers, who cultivated the land, were also entitled to a portion of the produce, and by this means of cultivating the land, they became the property of one owner, who let it as a farm to one occupier.

The number of properties began to decrease; by the year 1520 it had been reduced to six; in the reign of James I. the six were reduced to two, and soon after this restoration, when the land became the property of one owner, who let it as a farm to one occupier. (Quarterly Review, No. 81, p. 250.)

The distribution of small farms in the sixteenth century, and the altered social state of the country which took place at that period, from a variety of causes, disserved to a great extent the labouring classes from the soil which they cultivated. They had produced previously for their own consumption, and as domestic manufactures were common, each household possessed within itself the means of satisfying its principal wants. They now more generally worked for money wages; and in some districts the legislature attempted to preserve them from dependence on this source of subsistence, by enacting penalties against building any cottage without laying four acres of land therefor. (51 Eliz. c. 7.)

There were on the farm of Captain Scobell more than 88 acres occupied in disbanding about one third of the tenants who could not be benefited by the local government. It was desired to secure that thecottager could turn a cow, a pig, a few sheep, or goose, and this right also gave him a portion of subsistence directly from the land. The division and enclosures of these cottages, which had been completed the process by which the labourer was thrown for his own dependence on the sale of wages. From the reign of George I. to the close of the reign of George III., about four thousand inclosure bills were passed. Under these allotments were made, not to the occupier, but to the owner of the cottage, and this compensation for the extinguished common right generally benefited only the large landholder; and when this was not the case, the cottage was tempted by a high price offered by his richer neighbour, and this was a step in the direction of the abuses of the old poor-law, to part with his patch of land.

So long as the labourer is paid fair wages, he can obtain the chief necessaries of life; yet it happens that in most parts of the country he would be unable to procure any other food when potatoes, which are but poor in his own consumption, though if potatoes for winter storing can be purchased from his employer, or grown under the usual conditions on a patch of his employer’s land, it will be as profitable as growing them himself, that is, if he is paid a certain price above the market. The necessity for cultivating the land on his own account, further than for the purpose of raising sufficient vegetables for his own consumption, and of looking to the allotment system as
great, that there is in small manufacturing establishments compared with large ones. Profitable production is carried on better on a large farm when proper capital is employed (and indeed a large farm without proper capital would ruin an owner), than if it were divided into a number of small farms and the same amount of capital was employed for it. It is obvious that the amount of fixed capital in buildings, agricultural instruments, and animals must be greater on the small farms than on the large one. There are many other considerations that show, as much as the climate, the economy, the large farms are best for the public, and consequently for the holders of such farms. The small farms, if stocked sufficiently, would pay the farmer, not equally well nor with large farms but they might easily well to make his investment profitable. But such farms are generally understocked. In fact it is only in those cases where the cultivation is with the spade, and the land is managed like a garden, that such small holdings can be made profitable: the holder cannot, as a general rule, enter into competition with the large producer as a supplier of the market.

In some countries, where there are numerous small landholders, and it is usual for the estate to be divided on the death of the head of the family, the tendency must be, and is, to carry this division further than is profitable either to the community or to individuals. But in such case the evil may correct itself: a man can sell what it is not profitable to retain, and sometimes it may be possible that the land has been long attached to a small plot as a tenant, and mainly or entirely depends on it for his subsistence, will not leave it till he is turned out.

The allotment system, when limited to the giving a labourer a small plot of garden-ground, presents many advantages. But the object of making such allotments is moral rather than economic: the cultivation of a few vegetables and flowers is a pleasing occupation, has a tendency to keep a man at home and from the public-house. In many cases also, a small plot of ground can be cultivated by the labour of the wife and the young children, and a pig may be kept on the produce of the garden. The agricultural labour of young children is very valuable but charitable labour cannot be employed on a small plot of ground. Such employment is better than allowing the children to do nothing at all and run about the lanes; and if their labour is well directed to a small garden, it cannot fail to be productive, and to add greatly to the supply of vegetables for the poor.

Any extension of the allotment system beyond what a labourer can cultivate easily at his leisure hours, or with the assistance of his family, may be for a time a specious benefit, but if carried too far it might be a temporary advantage to themselves and to the neighbourhood. But a continual extension of such allotments in the same neighbourhood, though it might be called for by the wants of the labourers, would be of no benefit to that neighbourhood. It involves sufficient capital, and the natural ends would be that many of them would be reduced to get their entire means of subsistence out of a small plot of ground. The allotment system then, if carried to this extent, involves the question of the advantage of very small farms as compared with large ones; a question that cannot be discussed satisfactorily without a consideration of the general economic condition of each particular country. But it may be laid down as a sure principle that in a country where a large part of the agricultural labour is employed in pursuits other than those of agriculture, the necessary supply of food and other agricultural produce, for those who are not agriculturists, cannot be raised so profitably in any way as by the system of large farms.

The system of allotment of land and the small farm system, on which the large part of the population in this country depends for their means of subsistence, will very probably continue for a long time. But it is, in the course of this distribution, have just as much as would raise produce enough for himself and his family; and ultimately, he must be content with less than is sufficient, and it would be reduced to the condition of the Irishman who lives on his own plot of land.

There is a difference between small farms of a few acres which are let on lease, and small farms which are a man's property. If all farms were divided into small holdings, there could be little accumulation and little improvement.

There is the same disadvantage in small farms compared with
to the advantage of letting such land 'at a fair rent, and in small portions, to industrious cottagers of good character.' The act is to be carried into effect by the trustees appointed by the Act of Inclosure, and by the parish officers in vestry assembly. The allotments are to be the fourth of an acre, and will not exceed an acre, and the rent is to be the average rent of land of similar quality in the neighbourhood. It must be let to industrious cottagers of good character, being day-labourers or journeymen, and not to be let by the holders of cottages. The tenants must cultivate their allotments in such a manner as to preserve it in a due state of fertility; and non-payment of rent or improper cultivation subjects them to be ejected. In case the land which the trustees are not able to let in a sufficiently profitable manner, it may be let, and other land for the cottagers may be hired. No habitation is allowed to be erected by the tenants.

The provisions of this act are extended to the acts 1 & 2 Wm. IV. c. 42 and c. 46, already noticed. The 5 & 6 Wm. IV. c. 69, § 4, places the working of the various acts quoted above under the control of the Poor Law Commissioners. In the session of 1844 a bill for the promoting the letting of allotments to the labouring poor was introduced into the House of Commons, which contained regulations and provisions for the superintendence of a very complicated nature. When a cottager has a garden attached to his dwelling, he may manage it as he pleases, and it may or may not be well cultivated, but his independence is not interfered with by the municipal or parish authorities. The bill in question, which is likely again to be brought forward, proposed to delegate the powers conferred upon parish officers by the acts already quoted to five 'wardens of field-gardens,' who were to be appointed by the local ratepayers for every meeting assembly, and who are to act in conjunction with the officiating minister of the parish. The wardens are to be authorised to take land belonging to the parish or to hire land to an extent not exceeding half an acre for every ratepayer assessed at not more than 10s. This land are they to let in field-gardens or small plots.

ALLSTON, WASHINGTON, a distinguished American historical and landscape painter, was born in South Carolina, in 1763. He was educated at Harvard College, which he entered in 1796, having spent a preparatory term, by the advice of his physicians, at Newport, Rhode Island. Having determined to follow painting as a profession, he resolved to visit England for that purpose; he accordingly set out in 1801, with another artist, for London, and 'entered the Royal Academy of Arts of London as a student, in which he remained three years, during the presidency of West.

In 1804 he went with a friend to Paris, and thence to Rome, where he remained two years. In the latter year he exhibited a considerable notice there by a picture of Jacob's Vision. He excelled chiefly in colouring, and is said to have created considerable sensation among the painters in Rome, by the peculiar and accomplished manner in which he treated asphaltum, after the manner of Rembrandt. Many of the German and Italian painters endeavoured to imitate his effects; they however failed, says the 'Morganbatt' (1807), and spoilt several of their pictures.

He painted several pictures at Rome, which were admired for their colour and chiaroscuro; among them a portrait of himself, and several landscapes.

In 1809 Allston returned to America, and at Boston married the sister of Dr. Channing. In 1813 he again visited England, where he obtained the 500 guinea prize from the British Institution for a picture of 'The Dead Man raised by Elisha's Bones,' which was afterwards bought by the Public Library of the Art Institute. In 1818 he was a member of the Royal Academy. In 1819 he received the following letter to his wife, at a time when he was himself in a very weak state of health. In 1814 he published a book entitled 'Hints to Young Practitioners in the Study of Landscape Painting.' In 1817 he paid a second visit to England, and he returned to America the following year, to America, to Cambridge in Massachusetts, where he resided until his death in July, 1843. He was an Associate of the Royal Academy of London; his election to which was owing to the high estimation in which he was held by his contemporaries. Fiorillo, in his history of painting in England, speaks of a clever picture by Allston, of a French soldier recounting his deeds of heroism to a circle of listeners around him. Two pictures of Jeremiah and Uriel are noticed in his Journal of Selected Artists, as having been painted by Allston in 1821. Shortly after his death a large unfinished picture of Balsamuz's feast by him was exhibited at Boston. He has left several other unfinished works. He is spoken of as having been a very accomplished man and an elegant writer.

(Act Union, 1843; Fiorillo, Geschichte der Malerei, v. v.)

ALOES—Medical Properties of. Though known to the ancients and largely used in modern times, the sources of this drug are not accurately determined. It seems better to follow the plan of the 'Edinburgh Pharmacopoeia,' and assign it to the families by which it is supposed to be produced. It is a thick, round, hard, and particular genus of plants, and is not at all difficult to distinguish, as done by the London Pharmacopoeia, to the A. spinata, which, though it may yield Socotorine and some Cape aloes, is not the source of Barbadoes aloes, which last would appear to be produced in Asia Minor, an plant very rare of Greece, and which furnished the aloes of the ancients, and which is now cultivated in the West Indies, as well as in Spain, Italy, and Sicily, from which latter countries France and other continental nations, but not Britain, are often supplied. This plan seems the more judicious, as the commercial varieties, however designated, or whensoever derived, are to be found of nearly every degree of excellence or worthlessness, if care be not taken in the mode of obtaining the article. Dr. O'Shaughnessy, whose position in the East gives him good opportunities of observing states, in his 'Bengal Dispensatory,' that 'the quality of the product is apparently more dependent on soil, climate, and preparation than on specific differences of the plant itself.' Not only has Barbadoes aloes become less valuable from changes in the mode of collection; but even the real Socotrine aloes has become deteriorated, from any person in the island of Socotea being at liberty to cut as many leaves of the now neglected plant as he pleases, and prepare it in any manner he may. When the real aloes was a very valuable commercial product, it was extensively used in Europe, not only as a medicine, but as a food. It 'Formerly every part of the island produced the aloe; and the whole was farmed out to different individuals, the produce being monopolised at a fixed price by the Sultan.' The boundaries however thus set up which consisted of loose stone walls, and were carried with immense labour over hill and dale, though they still remain, under the present unsettled government no longer distinguish property. The descendants of the owners to whom the several fields were formerly allotted have never been able to recover the aloe, therefore it has been forgotten. At present, any one collects the aloe leaves who chooses to take the trouble, and nothing is levied on account of the Sultan. (Lient. Welsted, 'Memoir on the Island of Socotea,' in Journal of Royal Geogr. Society, vol. v. p. 197.) In the language of the island the aloe is called Tayef; by the Arabs, Sooboth. Though this island possesses plants sufficient to yield nearly all the aloes required in commerce, very little is now obtained from it; and what passes under the name of aloes has been almost entirely attracted almost exclusively by the cultivation of the Aloe vera, the East Indian sort, as is rendered further evident by its being exported from Bombay. When one source of any article of commerce is dried up, it is the custom of the dealers to beget a new source, with a great advantage to the possessors; meaning, not that it is the produce of the place the name of which it bears, but that it possesses the qualities of the kind originally obtained from that part. Alterations in commerce, dependent on a variety of causes, are constantly rendering imperil its reliance on names a very unsafe guide.

Attention to the mode of extracting the juice might render aloe, whenever procured, of excellent quality; but it will be seen presently how little the ordinary methods are calculated to ensure this end, quantity rather than quality being aimed at by the preparers. The aloe, like the hyacinth and many other luscious plants, contains a vast quantity of a mucilaginous matter (vegetable albumen?), more abundant towards the centre of the thick fleshy leaves than near the surface. The mucilages of the aloe are altogether different from those contained in a distinct set of vessels (Ompangia, Link; Opophora, vasa laticiferis), which are distributed chiefly under the thick cuticle of the leaves. Out of these vessels the juice containing the mucilages is drawn out, and it is from these vessels that any foreign bodies or substances are carried to the aloe juice. The juice of the aloes of the Cape aloe, but it is quite distinct from that now spoken of.) It transverse but not deep incisions were made at various points and at proper distances in the course of the leaves while yet attached to the stem, much finer aloe could be procured by scraping off the juice from time to time as it flows, than by allowing it to become concrete and then picking it off. The general practice however is to cut off the leaves near the base, and put
their open ends into a skin, into which the juice flows. This is afterwards inspissated, either by spontaneous evaporation in the sun, or promoted by a gentle heat. When the leaves are sometimes made to assist the flow, but by this means 'large quantities of viscid mucilage are forced out, and mix with the proper bitter juice, which is proportionately deteriorated.' (O'Shaughnessy.) Dipping the leaves into hot water, by this preparation, heightens the action of the juice. When hygroscopicity is diminished, is equally objectionable, as the viscid mucilage then flows out more freely. Worst of all is the plan now, but not formerly, pursued in Barbadoes. Barbadoes is one of its effects of the oil. It is made by immersing for ten minutes in boiling water the chopped leaves previously enclosed in cloths or wicker baskets, increasing the strength of the decoction with repeated supplies of chopped leaves till the water is fully charged; then allowing the mixture to stand for 24 hours, finally evaporating the clear liquor with caution till it is concentrated sufficiently to become solid on cooling. The hot liquor is allowed to coagulate in large gourd-shells, in which it is always transported to Europe. (Christison.) From these different plans of collecting and inspissating the juice, results an article which differs considerably in appearance and greatly in value. Aloe is one of the few drugs in which adulteration is not extensively practised further than by substituting the inferior for the finer and more valuable. With properly prepared, sand and fragments of leaves and skins are frequently found in the samples.

A few of the most important sorts found in commerce may be enumerated: 1. The cost of true or natural aloe, as it is given, can scarcely be regarded as one of daily occurrence, and is noticed merely as a standard of excellence by which to judge of others according to the degrees in which they approach the standard. It is prepared by chopping a deep garnet-red colour, altered somewhat by exposure to the air; a coiled fracture, a resinous lustre, very translucent in thin layers, a beautiful garnet-red line by transmitted light, and a peculiarly fragrant odour. It is brittle, easily pulverizable, and of a fine golden-yellow tint when in powder. It is almost entirely soluble in spirit and the density of 1.050, a very scanty light flocculent matter being left. (Christison.) As specimens decline from this unusually high standard, the actual fracture becomes rougher, the colour less pleasant, the solubility less, they are not so readily pulverizable, the powder is of a deeper colour, inclining to brown, the residuum greater, and consisting of more of the flocculent matter, as well as incidental impurities. In regard to the amount of insoluble matter, Barbadoes aloe contains the most, varying from 5 to 12 per cent.; and it is much more difficult to reduce to powder, as the mode of obtaining it explains.

Varieties go by the name of —Socotrana; East Indian, called also frequently hepatica; and Cape aloe (Aloe tetracantha of Geiger and Theol. Martinus,) also called A. Cabo. Insoluble subvarieties of these are found. Caballine, or laevigata, has nearly disappeared from commerce, refinement or fashion in veterinary medicine deeming it not fit for horses.

Barbadoes aloe comes to this country in the gourds and calabashes into which it is poured when prepared. Each of these weighs from sixty to eighty pounds. When broken, the fracture is sometimes coiled, seldom lustrous, and having a more liver-like aspect, better entitling it to the designation of hepatica, by which it is frequently called, than any others.

The most critical chemical analyses of aloe have been made by continental chemists, and although they designate the species analysed, it cannot be accurately known how far they correspond with the kinds so called in Britain. The chief constancy is the presence of aloin, which is present sometimes to the amount of 81 per cent.; resin, varying from 25 to 50 per cent.; vegetable albumen, absent from the best kinds, present in others from 5 to 12 per cent.; gallotannin, present in eight to twelve per cent. of the aloe, according to Ferreira. Aloe is however of rather a more complex nature than appears from this view. Aloelin, or aloe-tannin, is entirely soluble in cold water, but not in absolute alcohol. When hot water is used, something is taken up, which is deposited as the water cools: to this the name of aloe-tannin has been given, perhaps not with perfect propriety. The aloelin is looked upon as the cathartic principle of aloe, rather than the irritant and objectionable ingredient. Hence in some of the 'Pharmacoceutica' an extract is ordered to accomplish their separation, a proceeding altogether unnecessary, when aloe of the best quality can be obtained by giving a proper price for it. The formation of a decoction by heat is still more objectionable, as a much superior preparation is made by cold water alone, more grateful to the stomach, and not less effective if given in larger doses.

Few more valuable drugs exist, as is proved by thenumerable subvarieties of aloes, as well as by the other articles combined with it. These combinations have various objects in view, some to heighten its powers, others to modify, and some to get rid of certain well-founded objections.

In large doses it is decidedly aperient, but is unlike many other cathartics in so far that increasing the dose beyond a certain point by no means increases the effect. This can be accomplished however by associating it with other cathartics, and still more decidedly by uniting it with astringents or iron or quina. Aloes and quina with antimonial powder, and aromatic powder to cover the unpleasant taste, form a combination of great utility in many gastrick derangements, especially where the head is implicated. When persons are so fortunate as to be rallying from the stage of collapse in Asiatic cholera, this combination given frequently improves the secretions and abates the fever. In some fevers with numerous liquid motions it may also be given with striking benefit, the motions lessen and disappear, the pulse becomes stronger and quicker, as well as becoming of a more healthy appearance.

The constitution of the bowels and brain which precedes water in the brain, aloes, either in this combination or in some other form, is of great utility. On the bowels, it is a sure means of increasing the power of the bowels, and of clearing the inspissated, or dried up stools, which has been frequently subject to a hemorrhoideal flux which has been suppressed.

The combination which increases the purgative power of aloes in the most remarkable degree is formed by adding one drop of strong (undiluted) sulphuric acid to four grains of Barbadoes aloe, and forming a pill, two of which, given every two hours, or six hours, will almost invariably produce the most of the most objectionable cases of constipation, such as occur in painters' cholie, ileus, and other diseases. It is even more efficacious than croton-oil, and so apt to excite inflammation of the intestines. This superior power is possessed of them, and with a general law, by which many vegetable principles have their properties heightened by adding an acid, either mineral or vegetable. Thus ammoniacum becomes a more powerful expectorant by adding dilute nitric acid to the mistsors ammoniaci; and the folic acid, such as ammobotul, are rendered more potent by solution in vinegar. (Acetum Anthystericum, formula No. 1, in Copland's 'Dictionary of Medicine.')

Aloe, especially the compound decoction, is a most valuable emmenagogue, particularly when combined with tincture of ergot or preparations of iron. From its action on the lower part of the bowels it is deemed an improper purgative in pregnancy or during the menstrual flux. It is also considered a dispensor for poison, and is ordered to be given when it is attempted to be obviated by various means, but the best way is to combine it with other agents, as stated by Dr. Christison, as many persons can take the compound gummo-poll, or compound extract of colocynth, who cannot take aloes alone. The best means of covering the unpleasant taste of aloes when given in the liquid form is the compound tincture of lavender.

ALPACA, or PACO. The natural history of this animal is treated of under ALPACA, A. P. C. P. The introduction of alpaca wool in manufactures has attracted considerable attention, and the question of naturalizing the alpaca in this country, in Germany, and in Australia, is also an object of much interest. The wool of the alpaca is superior to that of the Angora, and has a much longer staple. The weight of the alpaca averages from 10 to 12lbs, while that of our sheep is seldom more than 8lbs; and while the staple of English wool does not often exceed six inches in length, that of the alpaca varies from six to eight inches. The quality of the alpaca wool renders it applicable to many of the purposes for which silk is usually employed in textile fabrics; and it is found a useful substitute for Angora wool. The manufacturer of plain and figured stuff from the fleece of the alpaca was commenced first in Yorkshire, and the articles which were manufactured in this manner have been much admired. The consumption of alpaca wool in this country in the seven years ending December, 1843, is estimated by Mr. Walton at 12,000,000 lbs. A Parliamentary paper (197, Sess. 1844) gives the import...
of wool of the llama and alpaca tribe for the year 1843 at 1,485,032 lbs., and the consumption was probably higher in that year; for this wool is yet being produced in the Andes from 2s. to 2s. 6d. per lb. Towards the close of 1844 different articles were manufactured at Bradford for her Majesty, from the wool of an alpaca which had been kept at Windsor. The fleece weighed 164 lbs., and when sorted and combed 10 lbs., increased in value by the addition of a good deal of wool, the material being entirely jet black. One of the articles manufactured was an apron, in which the wool of the alpaca, without the admixture of any other wool, was used for the first time in this country; for, though large quantities have been woven at Bradford, it has usually been in fabrics where the warp was of cotton or some other material, and the weft only of alpaca. Amongst the other articles manufactured for her Majesty were a striped and figured dress; the warp consisting of roseline wool, and the weft of black and white plaid with figures on alternate grounds of alpaca and silk. This dress, which measured 12 yards, required 24 lbs. of alpaca. A plaid dress, measuring fifteen yards, and containing 24 lbs. of alpaca, was woven with an intermixture of silk and worsted. Another article was a plain black alpaca lustre dress, the warp of fine cotton twist, and the weft of alpaca. This required 24 lbs. of alpaca, and when taken from the loom it resembled silk from its impressing the same mark of its manufacture. Besides the use of the wool in textile fabrics, the fleece of the alpaca is also wholesome and palatable. The carcass weighs on an average about 180 lbs.

The question of naturalizing the alpaca has been taken up with some little pertinacity; but very little progress has yet been made in convincing the country of its practicability. The alpaca inhabits the mountainous and inhospitable regions of Peru, and is remarkable for its alophobia; but it has been domesticated and reared on the farms which have been brought to this country have been confined in parks and richly cultivated lands, and have been treated with too much care and tenderness. Mr. Walton asserts that they will live where our hardest sheep would starve, and that they will find as much food in Great Britain as in their native country.

In the Transactions of the Highland and Agricultural Society, 1844, there is an account, by Mr. Stirling, of the attempt which is now making to introduce the alpaca into Scotland. During the severe winter of 1843-4, when sheep required to be regularly fed with turnips and hay, the alpacas perseveringly sought their own food, and did not experience a single day’s illness. Mr. Stirling says that they were kept within enclosures better than sheep, and never attempted to leap a fence. In 1841 the Highland and Agricultural Society offered their gold medal for ‘a satisfactory account, founded on actual observation and experiment, of the attempt to naturalize the alpaca in Scotland;’ and in 1844 a prize was offered, at the same meeting, ‘for the best account of alpacas which have been naturalized and bred in Scotland, and the best two, male and female, imported. If, as Mr. Walton states, the alpaca may be pastured on lands which are now waste and unprofitable, and where the sheep would starve, the naturalization of the animal would undoubtedly prove a profitable object of enterprise;’ but if this is not the case, it is a question whether a constant demand for the wool as an article of import would not be quite as beneficial. The Peruvians would be induced to bestow greater care on the management of their flocks, and the possession of so valuable an export would bring them under influences of a civilizing nature, which would render them better customers for our commodities. The expense of introducing the animal is very great, and the long voyage kills more than two-thirds of the number shipped.

(Walton On the Alpaca; its Naturalization in the British Isles considered as a National Benefit.)

ALTDORFER, ALBRECHT, painter and engraver, a native of Regensburg in Bavaria, was born at Altдорfer in Bavaria, in 1488. This has been shown by Heinke, who acquired his information from a senator of Regensburg (Hatzliu), who found documents concerning the family of Alberti, which had a seat in Altдорfer in that city. Those who speak of him as a Swiss have been misled by Sandrart, who was the originator of the error.

Altdorfer was himself a member of the imperial senate of Regensburg, of which city he was an officer in 1511; he also archbishop of the city of Regensburg. He was probably the son of Ulrich Altdorfer, an artist of Regensburg, who gave up his right of burghership in 1491.

Altdorfer did not paint much, but his pictures show a surprising Residence and industry. There is in the Pinakothek at Munich a picture by him, representing Alexander’s battle of Arbela, of which the labour is prodigious. It bears the date 1529; it was perhaps ordered by way of war against the Turks, and is an innumerable mass of small figures, all in the German military costume of the day, every article of dress or military implement being made out with the greatest exactness; and all the various and probable incidents of a battle profusely introduced. One may almost fancy that this painting was not an attempt to represent actual incidents, but to imitate the whole of a historical picture which contains so many figures; the design is however strictly Gothic, and Altdorfer has wholly neglected the powerful aid of aerial perspective. This picture was formerly at Schlissel- burg, where it was burned to the ground. This picture was ordered by Holy Roman Emperor Charles V., at the request of the French king Robert Second, to be executed with the most accurate engravings, the engravings, the engraving of which would probably appeal multitudes to many engravers. His other pictures are in a similar style; he scarcely ever painted large figures: the Savoir with Mary and John, St. Peter, St. Catherine, and another saint, at the shrine of Molk, which are the only known exceptions, and these have been attributed to Albert Dürer, who is supposed by some to have been the master of Altdorfer, but it is a mere conjecture.
contemporary. Mariotti however, in his 'Lettere Pittoriche Pergino,' states that Alunno was established as a painter at Foligno as early as 1460, and that he painted at least two years before that date. He was a native of Foligno, and his workshop was in Assisi, the city of Nicolò Fi- 
giato Opus; but there was a Niccolo Deliberatore, likewise of Foligno, and therefore all the works with this signature may not be by Alunno.

His father, Alunno lands in a chapel of the Assisi of which there is now scarcely a trace left; Vasari speaks of a Pietà as a part, with two angels bearing torches, and weeping so naturally, that in his opinion no painter could have done them much better. Besides which Vasari mentions a painting by his father of the Virgin and Child in a frame of Saint Agostino, at Foligno; an alter-piece for San Francesc, and another for the high altar of the cathedral of Assisi. There is still at Foligno, over a side altar of the church of San Pietro in Montorio, a fresco painting which was attributed to Alunno in 1492: it had formerly a predella, or a long picture in various compartments, which served it originally as a base, according to the old Italian custom with altar-pieces; but being one of the paintings which the French thought fit to send to Paris, it was returned at the general restoration of the plundered works of art, without its predella, which is now in the gallery of the Louvre. It contains six pictures, one of which is an allegory of the history of its works, and was written some verses which are legible with difficulty, celebrating the abilities of Alunno, and the generosity of a lady of the name of Bressola. The other five pictures are from the life of Christ. They are drawn in a dry and meager style, they have very broad outlines, and very contrasting lights; but they have much expression, and are executed with facility. Alunno excelled in expression; he was in the habit, in his large pictures, of painting the heads from the life, which gave them a truth and reality not found in the works of many of his contemporaries. The period of his death is not known, but he painted after 1600; he painted in the old manner in water-colours, or a tempura. Alunno painted his own portraits, and religious pictures which are called gonfalone. There is still with a gonfalone of this inscription by him made of very fine canvas, in the church of Santa Maria Nuova, at Perugia, with the inscription—
'Societas Annunciate fecit fieri hoc opus, 1466.'

(Vasari. Vite de' Pittori, etc.; Landi, Storia Pittorica, etc.; Rumoh, Italienische Forschungen.)

ALVAREZ, DON JOSE', a very distinguished Spanish sculptor and one of the most eminent artists of the nineteenth century, was born at Priego, in the province of Jaén, in 1798. His father, Jeronymo Alvarez, was a sculptor, whose youth was spent as a labourer in that business, as his father was too poor to send him to school. However, in 1825, a public competition for the best sculptor was held, and Alvarez was awarded the first prize. In 1826, he was elected a member of the Royal Academy of Fine Arts, and in 1827 he was appointed professor of sculpture at the School of Fine Arts in Madrid. Alvarez excelled in every branch of sculpture, and his work was recognized throughout the country. He was especially noted for his portraits and busts, which were considered the best in Spain. In 1848, he was appointed professor of sculpture at the Royal Academy of Fine Arts, and in 1850, he was elected a member of the Royal Academy of Fine Arts. He was also a member of the Royal Academy of Sciences, Fine Arts, and History, and the Royal Society of Sciences.

ALVILLOTES (Lamarck), a genus of fossil Polypriaria, from the cretaceous and tertiary strata.

AMALTEO, POMPEIO, a distinguished painter of the Neapolitan school, born at San Vito in the Frati, in 1505. He was the son of Giovanni, who had painted in the style of that master, though he was less bold in execution and inferior to him in invention. His Three Judgments however, in the court of justice or loggia at Ceneda, which were completed in 1536, were long supposed to be by Pordenone, both through their style and the mistatement of Ridolfi. They are the Judgment of Solomon, the Judgment of Daniel, and a Judgment of Trajan, and are considered Amalteo's masterpieces.

Vasari, in the Life of Pordenone, some frescoes by Amalteo in the Castle of San Vito, for which he was ennobled by Cardinal Grimani, the signor of San Vito, and patriarch of

of the value of 500 francs. Notwithstanding this personal honour, Napoleon's after-conduct regarding Spain excited in Alvarez an irrevocable aversion to him: he would never model his bust; and when Joseph Bonaparte was proclaimed king of Spain in 1808, he left Italy, and entered the castle of St. Angelo for refusing, as a pensioner of the Spanish government, to take the oath of allegiance to the new king; he was however released shortly afterwards. After the completion of his statue of Ferdinand VII, Alvarez's pension was increased to 28,000 reals, and he left Paris for Rome, where he hence forth chiefly resided. In Rome he executed or modelled many much admired works, the best of which was a group of Amlothous and Memnon in 1818, for which he was nominated Knight of the Order of St. Louis. He commissioned him to execute the group in marble: it is now in Madrid.

In 1825 he was appointed principal sculptor to the King of Spain, and was decorated with the cross of Civil Merit. In 1836 he visited Rome with the purpose of selecting the best statues and other sculptures in the king's palaces to be placed together in the museum of the Prado; but he died within twelve months of his arrival, in the sixteenth year of his age. From his office, the circumstances connected with his death, and the honourable commission about which he was engaged, it is evident that the reports which appeared in the French newspapers at the time of his death about his extreme poverty bordering upon destitution must be false. There are no facts to support the extreme poverty which is hinted in some of his letters; for during his long residence in Spain, he was possessed of a large fortune, and the best of his works were executed for the favourite Guzman; of whom he was appointed principal sculptor to the King of Spain, and given the commission to execute the group in marble: it is now in Madrid.

It is generally admitted that Alvarez excelled in many qualities of a high order, in invention, in expression, and in design; and he is by his admirers compared with Canova. That he is less generally known than many of his more for- tunate or more renowned contemporaries, is probably more owing to an ignorance of his works than to their inferiority. He was a member of the Institute of France, the Academy of St. Luke of Madrid, and of the academies of Carrara and Naples. He left behind him a large and valuable portion of their father's pension. The eldest, who promised to be a sculptor of ability, died at Burgos in 1830, in his twenty-fifth year.

There was another distinguished Spanish sculptor of this name, Don Manuel Alvarez, who was born at Salamanca in 1727. After acquiring the rudiments of his art with two sculptors of Salamanca, he repaired to Madrid, and became a member of the Royal Academy of Fine Arts, the first sculptor, whom he assisted in many of his works. He obtained the prize of the academy of San Fernando in 1754, by which he was entitled to study in Rome, with a pension from the Spanish government, but he declined the advantage on account of the weakness of his health and the disapprobation of his father. He was elected a member, in 1762 vice-director, in 1786 director of the academy of San Fernando; and in 1794 sculptor to the king. He died in 1797, generally regretted, in the seventieth year of his age. His busts and vases are very numerous in the churches, palaces, and monasteries of Spain, especially at Salamanca, Toledo, Zaragoza, and Madrid. Alvarez was commonly called by his fellow-artist El Greico, or the Greek, on account of the purity and vigour of his design, and his accuracy of execution—a great compliment.

(Archivo für Geschichte, etc., 1829, No. 15; Seminario Pintoresco Español, No. 62; Cezar Bermudez, Diccionario Historico de las Ilustres Profesores de las Bellas Artes en España.)

ALVEOLITES (Lamarck), a genus of fossil Polypriaria, from the cretaceous and tertiary strata.
Aqulca. Amalteo was distinguished for good drawing, a quality rare among the Venetian painters.

Pompion's brother and pupil, GIROLAMO, had also great ability for painting, but he generally painted small pictures, his best being those of the Madonnas. Otherwise, says old writer, he would have rivaled Pordenone in reputation. By which observation we may infer, with Lanzi, that the story told by Ridolfi about his being induced to give up painting and to study law, through a promise of an allowance of 100 ducats per annum from Pompion, is not true. The meaning of the story is, that Pompion was jealous of his brother. It seems that such a transaction did take place between Titian and his brother. Amalteo was a great practitioner of the latter art, and was numerous in Italy about the district of Friuli, but he was unequal: many of his pieces have very little merit. He had several scholars, some of whom distinguished themselves. One of his pupils, Giocoferto Moreto, made a good painter at Quintilla, who likewise painted and executed some works in sculpture. The date of Pompion's death is not known, but it was probably prior to 1588, according to the following inscription upon a picture at San Vito, in Inchiostro, Pompionus Amalteus, perfect Joseph. Mortius, A. 1588.

(Altan, Memorie interno alla Vita di Pompionio Amalteo, in the Opuscoli Cologeriani, vol. xliii.; Renaldis, Della Pittura Friulana; Lanzi, Storia Pittorica, &c.)

AMALTO, ANTONIO D', a distinguished painter of the early half of the sixteenth century, and one of the best of the Neapolitan painters, was born at Naples in 1475. There is not much that has been related himself chiefly by studying the works of Maestro Bertrami, to whom he was taught all that he had, and whom he served at Naples in 1485, and an altar-piece of Pietro Perugino, which is in the Cathedral of Naples.

Amato was a remarkably pious man, and probably respected by the clergy for the fidelity he had shown in the picture of the Madonna and Bambino, his most favourite subject, without first taking the sacrament, and thus purifying himself for the holy use. He carried his feeling of propriety so far as to consider it wrong even to show a naked woman; and insomuch with this feeling he refused to paint the decorations of the triumphal arch which was erected in honour of Charles V. when he visited Naples: he recommended Andra de Salene to the authorities in his place.

The painter he lived chiefly in the sixteenth century, his style is more that of the quadracoastitis, and is very similar to that of Perugino, but, with equally good colouring, the forms of Amato are fuller than those of Perugino. He painted in oil and in fresco, but his frescoes have almost all disappeared: they have either been whitewashed or have disappeared in the repairing of their localities. His best picture is considered to be the Dispute on the Sacrament, in the Cathedral of Naples.

Amato's numerous scholars, his own nephew of the same name, born in 1555, was one of the most distinguished. He was called II Giovane, to distinguish him from his uncle, who however was himself sometimes called II Vecchio, or the Elder. The nephew after the death of his uncle was called theNephew of the Elder Amato. His best work is a large and admirable altarpiece of the Infant Christ, in the church of the Banca dc' Poveri at Naples: he was a beautiful colourist. He died at Naples in 1590.

(Dominici, Vita de' Pittori, &c. Neapolitani.)

AMBERGER, CHRISTOPH, a celebrated old German painter of the sixteenth century, was of a family of Amberg in the Ober Pfalz, whose name; but Amberger himself was, according to Giorgi Bernoldi, an older scholar of the elder Amato. His best work is a large and admirable altarpiece of the Infant Christ, in the church of the Banca dc' Poveri at Naples: he was a beautiful colourist. He died at Naples in 1530.

(Dominici, Vita de' Pittori, &c. Neapolitani.)

Amberger painted also in oil and in fresco. His oil pictures are chiefly portraits, much in the style of Holbein, whose portraits he studied and copied. Fiorillo states that many of Amberger's copies pass as the originals of Holbein. He is himself a painter of history, and executed in the hard manner and sharp Gothic style of the period in Germany, without any feeling for aerial perspective, though the rules of linear perspective were well observed in his works: his compositions are well wrought with the utmost care. He has painted in his time portraits of Charles the Fifth, Charles the Ninth, and Charles the Second, King of France, and Portraits of the Emperors Maximilian and Charles V., and Portrait of a Lady, with landscape, in the Museum of the picture gallery of Berlin, and according to the inscription upon it was painted in Charles's thirty-second year, or in 1632. Sandrart speaks of a portrait which was painted in 1530; but from the fact that Charles the Fifth went in the year 1537 to Pavia, Bologna, he showed himself to be painted again so soon, and Sandrart's date may be wrong, and the portrait he speaks of may be that in the Berlin gallery painted in 1532. However, about the portrait

(Nagler, Künstler-Lexicon; Conversation-Lexicon für Bildende Kunst.)
of which he speaks, he says that Charles expressed himself highly satisfied with it, ordered thirty-six rix-dollars, three times what Amberger asked, to be paid to him, gave him a cold chain and medal, and said that it was as good a picture as the one Holian had made of it, which had cost him one hundred rix-dollars.

Amberger is generally supposed to have died about 1563 at Augsburg: he was however still living in 1568 according to some judicial records in that place. As in type 3 is often mentioned the date 1563 of earth, some scholars may be led to conclude that 1563 may have originated in a misprint of 1568, which was probably the year of his death.

(Sandurt, Zeitschrift, etc.; Michel, Catalogue des Tableaux, etc.; Künstlerischen Sammlung zu Berlin: Nagler, Künstler-Lexikon.)

AMBLYPTERUS (Agassiz), a genus of fossil Ganoid fishes, from the coal formation of Edinburgh.

AMBLYSEMIUS (Agassiz), a fossil fish, from the sediments of Somersettshire.

AMERICAN ANTIQUITIES. At the commencement of the present century the existence of antiques in America was hardly known in Europe, if we except those in the vicinity of the town of Mexico, and at a few places in the Andes of South America. But since that time we have become acquainted with such a number of ancient monuments, that not only Europe, but nearly every part of the globe, except Spain and Africa, have been opened to unlimited investigation, and these parts of North America where antiques exist have only been discovered by the eye of the American.

In the last-mentioned countries the monuments of the ancient population are generally overgrown with forests, which concealed their existence until the country was fully explored.

The North American antiques are of two descriptions: they are either fortifications or mounds. The fortifications are not found to the east of the Appalachian Mountains; but on the west of them they occur in many places. The most remarkable is that of the Basket Rock, which falls into Lake Ontario at its eastern extremity; but here, as well as in the Genessee county and other parts of New York they are small and difficult to trace. Further west two extensive systems of fortifications may be traced. One extends over the southern portion of the state of Ohio, and is enclosed on the east by the course of the river Muskingum, and on the west by the Miami. The most northern fortifications extend into the county of Lieking, to the vicinity of the place where the Miami and Great Black river, which falls into Lake Erie, unite. These fortifications have four forts, enclosing from twenty to forty acres each, and consisting of earthen walls from eight to thirty feet high. Two of these forts are perfect circles, one a perfect square, and the fourth is an octagon. These forts are severally connected by roads as far as thirty miles long, which are divided by similar roads with some creeks. Other less extensive fortifications are in Perry county, but those near Marietta, near the confluence of the Ohio and Muskingum, occupy a considerable space. These are the ancient fortifications in the valley of the Muskingum.

In the valley of the Selot a square fort with eight gateways is united to a circular fort surrounded by two walls and a deep ditch between them. The town of Ogdensville, in the county of Ficksayar, is partly built in the circular fort. Extensive works of a similar kind exist on the Paint Creek in the county of Ross, west of Chillicothe; and others at the confluence of the Selot river and the Ohio, near Portsmouth. There are several isolated fortifications to the east of the Little Miami river, and in the country between this river and the Great Miami.

The other system of fortifications occurs on the banks of the Mississippi, but we are not so well acquainted with the locality. There are several forts in the vicinity of St. Louis, one of which extends a long distance toward the south, about a quarter of a mile from the river.

The square forts, like the pyramids of Mexico, face the cardinal points. When they have only one entrance, it looks toward the east. The walls are usually made of earth, but there are also one or two instances where they are of stone.

To convey a more precise idea of their construction and disposition, we shall give an account of the works near Marietta. They consist of several walls and mounds of earth, in direct lines, and in square and circular forms. The largest square fort contains 40 acres, encompassed by a earthen wall from 20 to 30 feet high, and from 30 to 80 feet broad at the base. On each side are three openings, at equal distances, resembling 12 gateways. The entrances at the middle are the largest, particularly on the side next to the Muskingum. In front of this gateway is a covered way, formed of two parallel lines of earth, 48 feet broad. The side nearest the Muskingum the most elevated part on the inside are 21 feet in height, and 42 in width at the base, but on the outside they average only about 5 feet in height. This covered way forms a passage of about 200 rods in length, and 4 rods in breadth, passing over low grounds, where at the time of its construction it probably reached the river. The walls commence 60 feet from the ramparts of the fort, and increase in elevation as the way descends to the river, and the bottom is rounded in the centre in the manner of a well-formed turmunk.-Other mounds in front of the fort are three square mounds. One at the north-west corner is an oblong square, 190 feet long, 132 feet broad, and 9 feet high, level at the summit, and even now nearly perpendicular at the sides. Another elevated square is 150 by 120 feet, and 8 feet high, and similar to the other, except that of instead of an ascent to go up by on the side next the wall, there is a hollow way 10 feet wide leading 20 feet towards the centre, and then rising with a gradual slope to the top. The third square mound is 100 by 50, and 20 feet high, at the ends 10 feet wide, but it is not so high as the others.

At a short distance to the south-east is another smaller fort, containing 20 acres, with a gateway in the centre of each side, near which are two other mounds, and in front of these mounds in front of them, either within or without the enclosure. Still farther to the south-east is a mound in the form of a sugar-loaf. Its base is a regular circle 150 feet in diameter and 21 rods in circumference. Its altitude is 30 feet. It is surrounded by a ditch from 5 to 10 feet deep, protected by a parapet four feet high, through which is a gateway towards the fort 20 feet in width.

These fortifications are peculiar to the plains drained by Ohio and Miami; there are no others near the Indian tribes. These mounds are similar works found. Mounds or tumuli however occur in many other countries of Europe and Asia. In the countries bordering on Lake Erie they are of inferior size and fewer in number than in those which lie nearer the banks of the Ohio. It is believed that these mounds exist all over the countries between the Appalachian range and the Rocky Mountains, and as far south as the Gulf of Mexico. They vary greatly in their dimensions. Some are only four or five feet high and ten or twelve in circumference, whilst others have 100 feet in diameter, and 40, 50, 80, 90; and some more than 100 feet, and cover many acres. Their base is round or oval, and their shape that of a cone, but sometimes flat at the top. They are made either of stone or of earth. Many of them are in the vicinity of, and sometimes within the towns and villages. It is certain that of some that thus situated have been used as stations to discover the approach of an enemy. But it is evident that the greater number of them are sepulchral monuments. In most of the lower ones great numbers of bones have been found. In the more elevated tumuli only a skeleton or two have been found. In the monuments of the last description, some utensils and trinkets are usually found, as hatchets made of stone, vases of earthenware, vases and ornaments of copper, a little iron sometimes, and sometimes fragments of earthenware, plated, and very rarely a little gold. One of the larger of these tumuli is found on the banks of the Ohio, 12 miles below the town of Wheeling in Virginia. Its figure is a truncated cone, measuring 280 feet in the East and 210 in the West, and 180 feet in perpendicular height. The height appears to have been originally greater, and the form more regular. This mound was opened in 1839, and there were found in the centre two cavities, one towards the base and the other towards the top. In the lower cave were several vases, and in the upper one in a state of position, but nothing else. In the upper cavity was a single skeleton and along with it 1700 ivory beads, 500 small shell-sheaths of the value class; 66 pieces of mica, each of which contained four perforations, and an arrow-head, a flint hatchet, and five copper bracelets or arm-bands, but without being soldered at the points of junction. None of these relics evinced any artistic talent or acquirements beyond what are possessed by every Indian on the frontier. But there was also found in this mound a small elliptical stone table, with 24 distinct characters arranged in parallel lines. It appears
that they are not letters, but hieroglyphics. Some very high tumuli are found in the neighbourhood of St. Louis, and among them are a number of large pyramids, which are considered as important in an historical point of view, as they seem to connect the antiquities and consequently also the civilization of the ancient tribes that inhabited the United States with those of Mexico; for these tumuli appear to be the remains of the teocallis of the Spaniards.

We pass to the Mexican antiquities. On the river Gila, which falls into the Rio Colorado, some large ruins are said to exist under the name of Casas Grandes. Humboldt considers these as early as the first temple of the Aztecs, and that they were the remains of the migrations from the north to the south, and he has given some account of them and the surrounding population according to the information published by two monks in 1792. These ruins have not been found since. It is true that nobody has ever seen them, but the country in which they are supposed to have existed has been traversed by several persons, who do not mention the high civilization of the Indian tribes inhabiting these regions. It appears that the country is uninhabited, and that being the case, ruins may escape the attention of travelers for a long time. But there are Casas Grandes in the state of Chihuahua between 30° and 31° N. lat., where for several leagues the country is covered with the ruins of buildings, among which some edifices of a very considerable size are included. The ruins of ancient edifices are evident in many other parts of the United States, and it is not improbable that, if the site of each ruin could be accurately surveyed, a monument of a great extent, if not of the whole, might be discovered.

The ancient monuments of Mexico, in this respect, differ very much from those of the Old World. Indeed, Humboldt finds a resemblance between the Mexican teocallis and some of the pyramids of Sakkara in Egypt. But there are also ruins of buildings, which evidently have not been very different from those of the Aztecs, and which appear to have been erected at a period when Humboldt visited America only one group of ruins of this description appears to have been found in Mexico, at Mitla or Mijuatlan, south-east of Oaxaca, which the author of his "Vues de l'Amérique centrale" describes as a place surrounded by ruins of a large building, 386 feet high, which has been surrounded by a ditch, and divided by the work of man into five stages or terraces, which are covered with mosaic. The whole forms a truncated pyramid, whose four sides exactly front the four cardinal points. On the top of the hill is a flat space, containing more than 12 acres, on which there are the ruins of a small building, which may have been a kind of watch-house.

The antiquities of Meso-America are of a different character, and very much resemble those of the Old World. The Teotihuacán race, whose ancient city is situated at a few miles from Mexico, has built temples and palaces of gigantic dimensions, and which are not inferior in size to the largest in Egypt or Asia. The Pyramid of the Sun is 205 feet high, and that of the Moon, 138 feet high; and both are surrounded by an area of 69 acres. The step-pyramid of CholulaJimenez or Zeki has been built by the Aztecs, and is the largest of those described by Humboldt. It is built around a hollow square, and is 200 feet long on each side. It has four stories, of 20 feet, 30 feet, 100 feet, and 50 feet high, and it is situated in a most picturesque situation.

To every one who has been on a vantage point, the view of the great Pyramid of the Sun, and of the whole of the city of Mexico, with the other ancient monuments, is one of the most sublime and magnificent which the eye is capable of admiring. There is nothing in human art which can equal the grandeur of those works, which were erected in a period when the sciences and arts were at a very low state. The monuments of the old Egyptians, for instance, are of a more elevated and sublime kind of art, but they are less considerable in numbers, and in extent.

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upon which the inhabitants had acquired was certainly such as to imply the existence of several mechanical arts and trades, but it is not easy to comprehend how any article could have been required to such an extent as to constitute a regular branch of manufacturing industry. The state of society therefore did not require towns; nor did the account of commerce nor for the establishment of manufactures, and yet we find it stated that the number of towns is great. It is evident that for the government of the country a single town would have been sufficient. We may therefore presume that these ruins are the remains of towns; and of what kind of buildings they are the remains is very difficult to ascertain, as we are entirely unacquainted with the state of society in those countries when those structures were erected.

The three high pyramids, the top of the whole being a large square, constituted the main part of the front wall. The front of these buildings is generally ornamented with numerous sculptures. This edifice is evidently the principal object in every group of ruins. It is surrounded by some ancient temples once occupied, or at least not occupied. Among these outbuildings, as it were, sometimes an edifice is found which, according to our ideas, may have been a temple; but nothing has been produced which proves them to have been places of public worship. Generally there is one, and sometimes two temples, connected with the bulk of the ruins, but even their use is uncertain. As the ruins are not found in places where there are many of the town, we are inclined to think that they were the residences of a ruling priest-bishop, for the political constitution has been founded on theocratical principles. But perhaps they have been baronial establishments. It is known that the political constitution of Mexico rested chiefly on feudal principles, and that the bulk of the nation were bound to give a considerable part of their time and labour for the advantage of an hereditary nobility. We may therefore presume that this was also the case in Yucatan; and such a state of society appears to have been much favoured by the peculiar character of the country, there being water for irrigating the fields, which can only be obtained at the expense of great labour. [YUCATAN, P. C. P. 722.]

The most famous of these ruins are those of the city of Palenque, as it is called, which lies near the boundary-line between Mexico and Guatemala. The whole of the town was covered in the middle of the eighteenth century, and from that time it has been always stated that they cover a space of six leagues in circumference, and contain public works of great magnificence. We now know that the ruins consist only of a large building called the Palace, and four or five other buildings of inferior size, in a tolerable state of preservation, with the remains of a few others so utterly dilapidated that it is impossible to say what they have been. The palace stands on an artificial foundation of earth and stone, which has remained without injury for about two thousand feet in front and rear, and 260 feet on each side. The palace itself stands with its face to the east, and measures 528 feet in front by 180 feet deep. The height is not more than 26 feet, and consists of three stories. The principal building is a tower, or court-yard.

There are no windows. The front contains 14 openings resembling gates, each about nine feet wide, and the intervening piers are between six and seven feet wide. The building is ornamented with stone, with a mortar of lime and sand, and the whole front is thrown over with a painted coating. The piers are ornamented with spirited figures in bas-relief, but only six of them remain. The outer walls of the palace, as it were, are formed by two parallel corridors running north and south and connecting a large open court on the east side. The floors are of cement, as hard as the best in the remains of Roman baths and cisterns. The space enclosed by these corridors contains four court-yards, separated from one another by corridors of less extent, several sets of apartments, but connected again by passages between the corridors and rooms. The number of the apartments exceeds 90. The bas-reliefs in stone and in stone, in the court-yards of the palace, attract attention partly on account of the manner in which they are executed, and partly on account of the style of the figures. In one of the court-yards is a tower whose base is 80 feet square, but it has three stories, and is conspicuous for its height and proportions. Nearly contiguous to this great palace is one of inferior dimensions. It stands on a pyramidal structure 110 feet high on the slope. This building is 76 feet in front and 20 feet deep. It has five doors and six piers, all standing. The piers, without exception, are octagonal, and the corner piers are covered with hieroglyphics, each of which contains 96 squares. Besides these two tablets, there are in the corridors of the interior three others, likewise covered with architectural designs. Two or three buildings of this kind are remarkable, but they also contain a few bas-reliefs of value. All these buildings stand on the top of artificial mounds resembling pyramids, and the slopes of these mounds have evidently been faced with stone, which however has been thrown down by the growth of the trees which now cover them.

The ruins of Santa Cruz del Quiché are connected with the conquest of this part of the country by the Spaniards, and are therefore the only remains which have an historical value. These ruins are situated on the north-western extremity of the peninsula of Yucatan. These ruins are far from being extensive, and very little remains of the work erected by them. The natives before the arrival of the Spaniards, for the purpose of rendering this place impracticable. These ruins are on a hill nearly 100 feet square at the summit, and are surrounded by extensive ruins. A part of one of the ravines is stated to have been made by the natives; and it is said that upon it 40,000 men had been employed at one time. The flat top of the hill is surrounded on the south by the ruins of the pyramid, and on the north by the ruins of the governor’s palace, and on the east and west by the ruins of the other parts of the town. The ruins of Palenque are very richly adorned, and the city was remarkable for its many temples and churches. The ruins of the palace were long supposed to be the work of the Aztecs, but recent discoveries prove that they were the work of the Toltecs, who, it is stated, the Toltecs had attained a higher degree of civilization than the Aztecs, and the ruins of their buildings appear to confirm this opinion. It is however problematical if the ruins found east of the isthmus of Chiquimula belong to the same people, as they are distinguished from all other American antiquities by very marked characteristics. The most extensive of these ruins, and certainly the most remarkable, are those of the city of Copan, which are on the north-western side of the river Motagua from the south. This city was in existence at the time of the arrival of the Spanish, and was destroyed by them on account of an insurrection, which happened among the natives some years after they had submitted to the conquerors. At some distance from the ruins of the town, and opposite to them, is the ruins, and the whole site of the town is overgrown with large trees and underwood. The ruins are dispersed over a space about a thousand feet in length and five hundred in width, and consist of the remains of strong and high walls constructed of massive hewn stones, and of several pyramidal buildings, but there are some square altars, of which one is sculptured on the four sides and the top, and of a considerable number of stone idols, most of them still standing, though a large number have been broken or destroyed by the Spaniards. These sculptures, on the best preserved of these altars is in bas-relief, and this is the only specimen of that kind of sculpture found at Copan, all the rest being in bold alto-rilievo. It is six feet square and 10 feet high, and the top is covered with hieroglyphics. The sides of this altar are covered with sculptures representing each four human figures in sitting attitudes. There are perhaps no ruins which show greater art and ingenuity and more labour than the ruins of Copan, and they may in these respects be compared with the temples
of Elephants and Elefants in Hindustan. It appears that other ruins of a similar description occur in this part of Central America. We know at least that some idols of stone are found at a place called Quirigua, which is situated on the banks of the river Motagua, several miles east of Encuentros, which runs along the western side of the great road leading from the port of Yatoco to the town of Guatema. The idols are exactly in the same style as those of Calapa, but they are two or three times as high. At this place is also found an obelisk, or rather a curved stone, twenty-six feet high, and probably twenty-eight feet in circumference. These sides represent figures of men, and are finely sculptured.

It is probable that other ruins will be found in the states of Honduras and Nicaragua, as these countries too, at the time of the conquest, were inhabited by the ancient Spaniards by tribes which had scarcely emerged from the lowest state of civilization. No ancient monuments are met with in the republics of Venezuela and New Granada, though it is probable that these nations inhabiting the table-land of Cundinamarca, or of Bogotó, have made considerable progress in civilization. There are however a few ancient edifices in Ecuador, on the table-land of Quito. Not far from the volcano of Cotopaxi are the ruins of a large building called the Temple of the Sun. It consists of three stories, each side about thirty yards, and it has four doors. The interior is divided into eight apartments, three of which are still in tolerable preservation. Not far from the mountain-pass of Ayacucho is what is called the Fortress of Caziar, a building consisting of three walls, of stones, about five or six yards high. It has an oval form, of which the greatest axis is nearly forty feet long. A modern traveller mentions an ancient fortress called Huilcay, situated not far from the town of Ayacucho, which evidently belonged to some ancient and important state, but which is rapidly going to decay. The ancient Peruvian monuments are not, like those of Central America, distinguished by sculpture and rich ornaments, but by solidity and simplicity, as is proved by the great road of the Incas, running from Quito to Cuzco and farther southward, and by the massive stone buildings which are dispersed over the mountains of the Andes. There are however the ruins of some destroyed towns in the coast of Peru, and the Pacific is a state that no traveller has thought it worth his while to give us a description of them. Neither in Brazil nor in Paraguay and the states of the Plata have ancient monuments been discovered.

This short and rapid survey of American Antiquities is incomplete. Such as it is, it shows the immense extent of country over which they are dispersed, and gives a slight indication of the great difference in character which they exhibit. This difference must be an additional stimulus to investigate their origin and use, to all those who take an interest in the history of the human race; but the study of American Antiquities presents much greater difficulties than that of the antiquities of other parts of the world. There is no history of the nations who erected them; there are no facts on record with which we can connect them. We do not know by whom and under what circumstances these remarkable monuments were erected; nor do we know what purpose they were intended for. In the great majority of cases, the antiquities of Europe we find in most cases that these circumstances can be ascertained. Either the erection of these buildings is recorded in history, or some inscription or other indicates the time in which they were erected and by whom. There are a few antiquities, such as the Celtic remains, as to which some discrepancy of opinion exists, but even here we can approach to probable conclusions. The monuments of Egypt are covered with the names of kings who erected them, and the Greek historians have not recorded such traditions as were current in Egypt when they visited that country. We cannot say so much of the rock-cut temples and other great monuments of Hindustan. Few inscriptions are found on them, and the nations who erected them are remarkable for their neglect in recording historical facts. But the sculptures which adorn these monuments are so closely connected with the present state of society in that country and with the religion of the people, that it may be asserted that they mutually explain one another, and that a person who is thoroughly acquainted with the people and their religious institutions is enabled to understand the sculptures on the monuments. In this way nearly all the ancient monuments of the Old World may be explained by the aid of historical records or inscriptions, or by their evident connection with the present state of the inhabitants. But the monuments of America are not in the Old World. They are not mentioned in historical records, nor do they contain inscriptions. It is true that many of them contain hieroglyphic characters, which were probably sufficient to explain them to the ancients who erected them and knew their significance. But to us they are dead letters. We do not know the state of society of the people who erected them, and we are unacquainted with the meaning of the hieroglyphic characters. Further, we cannot derive from the present condition of the nations of America anything which can explain their antiquities. Their condition has been abruptly and greatly changed, much more so than that of the nations of Europe when their countries were inhabited by the ancient Greeks and Romans. The people of the fourth and fifth centuries issued from the central parts of Asia and the north of Europe. The Spaniards, who conquered the most civilized portions of America, had urgent political motives which distorted the records of their conquest. We are thus enabled to judge of the degree of authority with which they conquered and to reduce the whole population to a state of degradation; and what they began from political motives, they finished from religious zeal. It is quite impossible to connect the present condition of the native population of America with any of the monuments now remaining, whether they were built by the Maya, or the Aztec, or Chichen, or to draw from it any facts which can elucidate the monuments, though it is probable that these monuments were erected by the ancestors of the present native inhabitants.


AMIGONI, JACOPO, one of those painters who, by some chance not quite apparent, obtained a popularity in his life time immensely beyond his deserts according to more modern critics. He was born at Venice in 1675. After he had acquired some reputation in Venice, he added considerably to it in the service of the elector of Bavaria, by some works he executed for the Schleissheim; and when he returned to Munich, another elector caused some fresco ceilings to be executed at Schleissheim. He had with equal success in London, where he came in 1729, and painted a few staircases in fresco, and many portraits in oil. He painted also Shakspere and the Muses over the orchestra of the new theatre at Covent Garden. He died at Venice in 1739, having saved 5000l. during his ten years' stay in London. In 1747 he went to Madrid with the appointment of painter to the king, Ferdinand VI. He died at Madrid in 1752, where two of his daughters were still living in 1778, both married to some of them, Signor Castellani, practised as a portrait-painter in crayons.

Amigoni's frescoes are purely ornamental, mere variegated decorations; the following is Wallpole's critique upon his picture of the Thames, several years afterwards.

'His manner was a still fainter imitation of that nervous master Sebastien Ricci, and as void of the glow of life as the Nespoli Solimena; so little attention do the modern Venetian painters pay to Titian, Tintoret, and Paul Veronese, even in Venice. As Leonis' women are mere chalk, as if he
and only painted from ladies who paint themselves. Nor was this his worst defect; his figures are so entirely without expression, that his historical compositions seem to represent a set of actors in a tragedy, ranged in attitudes against the curtain, as in the productions of Mr. plot himself. Yet, notwithstanding this, his pictures are so free and easy in design as to please his contemporaries. Yet novelty was propitious to Amiconi, and for a few years he had great business.

He painted some small conversation pieces in the style of Sandrart, and later, in the very highest manner, as to his larger works. Of the latter one of the best is a Visitatio, at the Padri di San Filippo at Venice. He engraved a few prints for his masterpiece, and instructed Joseph Wagner in engraving; so many works of Amiconi, the principal of which is Melchior, Heine engraving 127, include of the portraits of several crowned heads, among them Peter the Great, and one pope, Benedict XIV.

(Lanetti, Della Pittura Veneziana, &c.; Bernoudes, Dictionnaire Historico, &c.; Wallach, Annoedetes of Painting in England, &c.; Lanzi, Storia Pittorica, &c.; Heinecken, Dictionnaire des Artistes, &c.)

AMMANI, JOST, a celebrated Swiss engraver and designer of the sixteenth century, born at Zurich in 1528. Though a Swiss by birth, he was a German by adoption, for he established himself in Nürnberg in 1560, and gave up his right of burghership in Zurich in 1577. He is the case with most of the old German masters, little or nothing is known about him, save what is contained in his colosal study, and the few engravings that yet are not a single painting of his known. Sandrart and Doppelmayr speak of him as a painter on glass only. Amman's designs are extremely numerous; a painter of Frankfurt, of the name of Keller, who lived with Amman four years, tells his principal to do with his designs; but while the size of his work would fill a large wagggon. Though he did not live long, he surpassed every artist that preceded him in the number of his designs. There are about a thousand wood-cuts attributed to him, but whether he cut all or even any of them himself is not known. Bartic also doubts whether all the etchings attributed to Amman are etched by him; he supposes some to have been etched by Stephen Hermann. His designs generally appeared as the illustrations of books; few books were printed with them, except the two large folios, one published in 1541, and the other in 1547; the former was published by the most of Amman's works; many of them were published after his death. He died at Nürnberg in 1591.

His works comprise nearly every subject—History, sacred and profane, general costume, military costume, field-sports, natural history, heraldry, and other subjects. His drawing is generally good, and in the costume very accurate and evidently drawn from nature; his animals also are executed with much spirit. Sandrart describes him as a very assiduous man, of a quiet and decided character; but if his strokes are more regular than usual with the engravers on wood of his time, it is to be feared as much as he gained by the pains he took with this labour, he lost in the execution of the same.

One of his most remarkable works is Fluvia, published first at Frankfurt in 1564; again in 1574, and again in 1588. This book is very scarce; it is a description of all the principal towns and occupation of Amman's time, containing 116 illustrations on wood of various mechanical and tradesmen, &c. in appropriate costume; he has represented himself as the engraver. Hans Sachs used Amman's plates for his work entitled 'Einige liebliche Beschreibung aller Stände auf Erden' (Particular Description of the Society of Men upon the Earth), printed at Frankfurt in 1568 and 1574.

Another remarkable work is 'Icones Livianae,' &c., published also at Frankfurt, in 1572 and 1573, containing 103 illustrations of the Roman History. They were published also with some additions and a German translation of Livy in 1573, in the same place; and again at Strasburg in 1613. The first cut is a portrait of Feyerabend, the publisher.

Feyerabend published also, in 1564, 103 illustrations of the decoral and monastic costumes of the Church of Rome, with Latin descriptions; but three German editions have since been published. And also a book of female costumes with 120 cuts, entitled Costume, as Theatre of the World, &c. published at Frankfurt, 1586. Also the same place, the book of Plays the elder, 1584; a folio set of 12 illustrous women, beginning with Eve, on copper; and in 1587 a Dance of Death, 'Der Toten Tantz,' in 49 cuts; besides many other works.

Amman was also an author: he wrote a book on poetry, panting, and sculpture, which was published at Frankfurt, first in 1578, and later as a Manual of Painting, 'Arta Pincere.' Enshehrird.'

(Sandrart, Deutsche Academie, &c.; Doppelmayr, Historische Nachricht, &c.; Stutt, Dictionary of Engravers; Heinecken, Dictionary of Woodcutters, Fussli, & Nagler; & Le Peintre-Graveur of Bartusch.)

AMMANATI, BARTOLOMEO, this distinguished sculptor and architect was born at Florence in 1511, and died at Rome on the 22nd of February 1574. Thus it was, that the former part of the wall of the church of the Jesuits in Rome, was completed by his own hands, and the latter part by his own pupils. He was educated in such a nursery, with Basnio Bandinelli and Sansovino for his tutors, he could not easily fail to produce works worthy of his opportunities and his education. His father, Antonio da Sebignano, died when Bartolomeo was young, but he left Bartolomeo under the care of a neighbor, to be in a condition to choose his own profession and to follow it.

When Ammanati returned from Venice to Florence, Michelangelo was at the height of his reputation as a sculptor, and Ammanati became one of his most devoted admirers and imitators, and, like many other painters and sculptors, catching chiefly the defects of Michel-Angelo's style, fell into the error of treating the limbs as the most essential part of man. In this spirit Ammanati executed several works in various cities in Italy. He made three great figures at Naples for the monument of the poet Sannazzaro; a colossal Neptune for the Plaza di San Marco at Venice; a colossal Hercules at Padua; the Neptune of the Piazza del Gran Duca at Florence; and the figure of Ammanati's Ancestors at the Piazza di San Miniato, at Prato, near Florence. The Neptune of the Piazza Gran Duca was ostensibly designed in competition with Benvenuto Cellini, the Fleming John of Bologna, and Vineceo Danti; but according to Cigognara, the competition had been rescinded, and the commission awarded to Ammanati's design, the duke, says Cigognara, did not even see the designs of two of the competitors.

Ammanati was also much employed in Rome by several popes, curts by Paul III., Julius III., and afterwards by Gregory XIII.

During the interval between the two periods that he was employed by these pontiffs, he attained great fame at Florence as an engineer and an architect. He constructed the celebrated Ponte della Trinita, in which a turned arch was light and elegant elliptical arches, calculated to allow the sudden floods of that river to pass without the slightest risk, it still exists, and has withstood lately (1844) the most important flood that has visited the Arno for centuries, in which even the newly constructed iron suspension-bridge was swept away. The old Ponte della Trinita, which was replaced by the bridge of Ammanati, was destroyed by the floods of 1567. Ammanati made also some additions to the Palazzo Farnese, the new court of the Farnese. He was commissioned to design and to superintend the construction of the cornice of the church of the Jesuits, and has been finished only within the last ten years. At Rome he built the Palazzo Rucellai, afterwards Ruspoli; the court and facade of the Collegio Romano, built for the Jesuits; the temple of Venus and Rome in the Propolet; and the church of the Suor in Via, dedicated to the Corneli family. His principal works of sculpture in Rome are the figures of Justice and Religion and the other sculptures of the tomb of the Cardinal del Monte in the church of San Pietro in Montorio. Many of the works of Ammanati are naked, which, as he grew old, he seems to have deeply regretted; and he wrote a letter as an apology to the Academy of Florence, which was published in 1562, and in which he exhorts the rising artists to drave their figures, the representation of the naked being, as he then thought, offensive and injurious. Baldinucci has reprinted the letter. His wife, to whom he was married in 1560, was the celebrated Laura Battiferri of Urbino. He distinguished himself as a member of the Society of the Internati of Siena. Her poems were published twice, at Florence in 1560, and at Naples in 1569. She died at Florence in 1589, aged sixty-five. Ammanati survived her three years, and died, according to Baldinucci's account, on the 16th of December 1592, at the age of sixty-six. His body was laid near his wife's, in the chapel of San Bartolomeo, which he had prepared for the purpose, in the church of the Jesuits, San Giovanniino, at Florence. He bequeathed the greater part of his property to the Jesuits and the Society of the Internati of Siena.

There is in the library of the Florentine Gallery a manuscript by Ammanati, entitled 'La Citta,' in which he has treated of all the buildings necessary for a city.

(Baldinucci, Notizie dei Professori del Disegno, &c.; Cigognara, Storia dell'Arte, &c.)

AMMODYTE, a genus of fishes belonging to the division of Apodot Malacopterygii and family Angiitoidei. The
body is very long and the head lanceolate. On the back is a dorsal fin extending nearly its whole length. The anal fin is also long; and the caudal, which is forked, is separated from both the dorsal and anal. Two species occur on the coasts of the British Islands, the Ammonia lancea and the Ammonia dubia. The former is the larger, and is distinguished by the greater size of the head, and by the dorsal fin, which commences in a line with the extremities of the pectorals, whilst in the A. lancea it commences in a line with the middle of the first ray of the Sand-Eel, and this species is popularly known, attains a length of between 12 and 15 inches. When alive the back is of a dark bluish-green, and the sides and bellies bright silver-white. It frequently sand-aborbs a great number of fish, and is thus a most dangerous in approaching the shoals. At the ebbing of the tide it buries itself with great dexterity and rapidity in the wet sands to the depth of from 4 to 6 inches, whence it is extracted by means of various instruments, such as peculiarly formed grippers and sickles with blunt edges, made for the purpose. It is much esteemed by fishermen as a bait, and is also sought after on many parts of the coast as an article of food, being very delicate eating when fresh, and excellent when dried in the sun and grilled.

The sand-lance, Ammodytes lancea, is a smaller species, and usually of a more brownish hue, with a tinge of red about the head. It is more abundant than the Sand-Eel, and has always been distinguished from it by the fishermen, though for a long time associated with it in scientific works. The distinctions between the two species were first pointed out by M. Leasug of Caen. Both appear to be generally distributed through Northern and Western Europe. In Scotland the Sand-Eel is the same name as the Horner, and in the Isle of Man the two species are distinguished from each other as the Grey Gibbon and Red Gibbon.

(Yarrell, British Fishes, vol. ii.; Parnell, Fishes of the Frith of Forth.)

AMMOCHEMI—Medical Properties of. This alkali is distinguished from the others by the application of Volatile, because at the ordinary temperature and pressure of the atmosphere it never exists in a fixed state, but either in a gaseous form, in which it is immediately combined with any carbonic acid which it encounters in the air, or is absorbed by water or spirit, from both of which it is easily liberated, particularly if heat be applied. Having been formerly obtained by distillation of shavings of hawthorn or other animal matters, it is familiarly known under the name of Spirit of H纳税ton. The combinations with carbonic acid have the same properties as the pure alkali, in respect to volatility, and only a diminished degree of causticity.

The gas in an ascertained state is highly pungent, with a suffocating odour, is irreparable, and irritates and inflames the animal tissues. (Christison.) Diluted by passing through the air, from which it absorbs moisture and carbonic acid, which serves further to lessen its acrimony, it is occasioned to be of service to the alchemist and confectioner, and to keep up vigilance in cases of somnolence from narcotic poisons.

This last mode of using it is scarcely to be recommended, as dangerous inflammation of the eyes may subsequently follow. Indeed all employment of even the less caustic forms of administration, when much insalubrity exists, such as in fumigations, epileptic fits, or from narcotic poisons, likewise in experiments on persons in the state termed manieeric coma, requires great care. Fatal inflammation of the eye and stomach has been occasioned by merely holding carbonate of ammonia (smelling salts) or a handkerchief dipped in strong aqua ammoniae under the nostrils. (Nysten.) When it is to be introduced into the stomach, this should be done by means of the stomach-pump, to avoid any of it passing into the windpipe. Besides its local action, exciting inflammation and its effects, ammonia is itself poisonous, its secondary effect on the nervous system, particularly the spinal column, being sufficient to cause tetanic convulsions. Though Eau de Collod is used to adv. cold weather is unsafe for children.

(See Lancet for April, 1844.)

Amoniacal gas absorbed by water constitutes the aqua or liquor ammoniae. This is formed of two different degrees of strength: the one of a density of 962 at 26° F. called fortior, much used in chemical experiments, by no means the most suitable for some chemical processes; the other of the density of 960, which also generally requires to be diluted further with water when intended for internal use, or with oils when for external use, as it is very frequently to form refrigerating liniments.

The solution of the carbonate likewise frequently employed in combination with oils. These, if long, if frequently repeated, cause inflammation which terminates in suppuration and ulceration.

Ammonia, when suitably diluted to be taken into the stomach, is used in doses between the 20th and 30th drops of the nervous power. Hence it acts as a prompt and valuable counter-poison to Prussic Acid, the bites of serpents, and the poison of many diseases, such as Cholera Asiatica, and typhoid fevers, at the commencement of which great depression of the nervous system is often observed; in such cases of depressio, such as the languor of hysterical females, or in atomic goit, ammonia or its carbonates are daily resorted to. It is likewise employed to counteract acidity in the stomach.

The use of ammonia should be kept warm, especially in the fasting state. The use of ammonia produces the same ill effects as the other alkalies when taken in excess. (Aylie, P. S.)

The salts of ammonia require a brief notice. The properties of the different combinations of ammonia with carbonic acid are too similar to those of the pure alkali to be noted separately, except to state that carbonate of ammonia furnishes a good emetic in the earliest stage of fever with great depression, and is in smaller doses given freely throughout all adynamia fevers, sometimes in the effervescing form, especially when action of the skin is desired. Citric acid is employed to cause it to effervescence.

Hydrochlorate of ammonia is little employed in this country internally, but it may be beneficially used in combination with astringents. (I. H. P., vol. vi., p. 699.)

It is obtainable chiefly employed to form disinfecting and evaporating lotions in conjunction with vinegar and spirit. For these it is most valuable.

The latter of these sometimes are given in doses of two grains, and in this state, the causticity of the pure alkali or the carbonates, neither is it volatile. It is so delusive that it cannot be kept in the solid form, and is always administered in weak acetic acid. This forms a most grateful refrigerant at the commencement of slight inflammatory complaints, and if the patient be kept warm, generally relieves the perspiration. For this purpose it requires to be freely given. It is also a diuretic, but not much employed. Properly diluted with rose-water it forms a cooling eyewash, most grateful after instances of inflammation, to relieve the turgescence which remains, or for a removal of turgescence which may have been preceded by inflammation. Scarpia thought it useful against commencing amanuaris.

AMMONIA—Medical Properties of. This gum-resin is fully described in P. C., vol. i., p. 498, where it is ascribed, on the authority of the former edition of the London Pharmacopoeia, which was missed by Willdenow, to the Heracleum gumifcrum, Willd., an error corrected in the subsequent one, where it is correctly referred to the Doresa ammoniacum (Don, in linn.) which was discovered by Lieut.-Col. Wright, growing near Yezd Khést, a town of Irāk Ajem, the antient Perses, about 42 miles south of Isphahan. Its Persian names are Coosh and Math, and it is said to be a native of the countries now called Persia, and used in the herbs of Persia. It is a resin, very abundant near Herst, likewise abundantly in Sygah, near Buncanec, on the north-west slope of the Hindu-Cooch range of mountains. (Christison.)

Ammoniacum was not known to the antients: but it is supposed that what they used came from Afgis as well as Asia, and was procured from a species of Ferula, either the F. orientalis (Linn.) or the F. t Ignaria (Linn.).

The Persian plant yields the juice chiefly from the stalk, especially at the points of division of the umbel, owing to the punctures of numerous coleopterous insects. 'The gum is so abundant, that upon the slightest puncture being made, it instantly oozes forth, even at the ends of the leaves.' (Capt. Hart, Trans. of Medical Society of Couchiwt, vol. i., p. 509.)

The juice quickly dries, and is either picked off or allowed to accumulate till it falls on the ground. This collection takes place about the middle of June. A tenth part is remitted as tribute to the government; the rest is sent to Bushire, on the Persian Gulf, and thence through the Cape of Good Hope to Bombay. The juice of the Sygah plant is obtained by making successive slices of the root, as in the case of asafoetida. The samples vary much in quality. The directions given to purify the inferior sorts, by softening them in boiling water, and then blotting dry, and thus purgative in effect, and causing moving mechanical impurities, impair the power of the gum-resin, by driving off the volatile oil, which even in good specimens is not very abundant, 32 ounces yielding by distillation only one drachm.

The official form for administering ammoniacum is the
The group of Arietes, including Amm. Bucklandi, A. Co-nybeerii, &c., belongs almost wholly to the lias formation.

Paeliferi.—The back is narrow, and acuminated to a sharp keel (no furrow on its sides); the ribs are elegantly and sigmoidally bent. The sutures differ from those of the Arietes, the dorsal sinus D being much less deep, with diverging and not parallel sides; the sinus L is very much deeper, and there are three or four smaller ones, a, b, e, near the inner edge of the whorls. The latter whorls usually embrace the preceding ones.

The Ammonites are numerous in the upper lias and lower oolitic formations. A. Sturkei of Cowbery is an example. (Ammonites Walcottii does not belong to this division.)

Amaltheii.—The back is generally acute and keeled, the keel generally crested; the ribs generally a little sigmoidal; the latter whorls embracing the preceding ones. The sutures are in general form much like those of the last division, but more richly lacerated and foliolaceous.

This group belongs to the upper lias and oolitic formations. Ammonites amathaei of Schlotheim (A. Sturkei, Sowerby) is an example from the lias.

Capricorni.—The back broad, without a keel. The ribs simple, straight, strong, and crossing the back. Inner whorls exposed. The sutures often approach to those of the Arietes in character. Perieira has their usual range on the same line, and the undulations are all lower and less foliolaceous than in the Paeliferi and Amalthei. Ammonites planicostatus (Sowerby) is an example. The species are common in the lias.

Planulatti.—The back and sides rounded; no keel; the inner volutions exposed. The ribs are often divided over the dorsal region. The sutures are remarkably lacerated and complicated; the sinus (L) extremely deep, and generally trifurcating.

The species occur commonly in the lias and oolitic formations. Ammonites communis, Sowerby, is an example from the lias; A. plicatissim, Sow., from the coralline oolite.

Dorcati.—The back is broad and not keeled; the whorls often quadrate; the ribs are simple on the sides, but divided over the back, and generally bear a tubercle at the point of division. Ammonites Davos, Sowerby, is an example from the lias.
in commerce, viz. short, short-long, and long-long, placed in the order of their merit. The first and best are about three to six lines long; the second about six; the last from seven lines to an inch. From this analysis he found the small carminatives, and obtained—essential oil, 4°/6; fixed oil, 10°/4; a salt (probably malate) of potash, combined with colouring-matter, 2°/6; fecula, 3°/0; nitrogenous muclage, with phosphate of lime, 1°/9; yellow colouring-matter, 0°/4; and woody fibre, 7°-8.

The fixed oil somewhat resembles castor oil. The excellence of the specimen depends on the volatile oil; this is small in inferior kinds; the best yield about six drachms and a half of the fruit. The experiments were run only four scruples for one pound of fruit. Like oil of terepine, lemon, &c., it consists only of carbon and hydrogen.

Ceylon cardamoms, or larger, sometimes termed long, are produced in that island; but some of the less valuable of the Mistletoe, and seconded Ceylon cardamoms, who have in their possession are liable to heavy penalties.

[ADULTERATION, P. C.S.]—The duty on grains of paradise was reduced from 2s. per lb. to 15s. per cwt. by 5 & 6 Vict. c. 47. Cardamoms are in great favour in the East as a spice, and also introduced into Europe after the fall of the Mamluk in 1258. In the last part of the 16th century, they were as highly esteemed as carminative and stomachic agents. Dr. Christison observes that they form part of eighteen official preparations, besides their own tincture.

AMONTONS, GUILLAUME, a diligent mechanician and experimentalist in natural philosophy, was born at Paris in August, 1663. He was, during all his life, afflicted with dizziness in consequence of a fever in his childhood; and, after a sickness which lasted but a few days, he died in October, 1705, being in the forty-third year of his age.

The taste of Amontons led him, at first, to the study of architecture and the processes of land surveying; and he applied himself particularly to the principles of both those branches of art. It is said that he was induced to apply himself to the study of mathematics by the desire of constructing a machine which should exhibit a perpetual motion: an opinion of the possibility of such a machine certainly lingered among the half-leaved of that age; and, if Amontons really attempted to form one, his failure had the good effect of disposing him to cultivate the legitimate branches of science.

In the countries are instruments employed for measuring the density, temperature, and humidity of the atmosphere were in an imperfect state; and several years of the life of Amontons were spent in improving them or in devising others. He invented a barometer, consisting of a slender conical tube of glass, which was filled with mercury and variegated with the variations in the upward pressure of the atmosphere on the base of the column; the open end of the tube, which was the greatest, being below, and the mercury being retained in the tube by a leaf of lead. He also invented one, consisting of a tube bent so as to form three parallel columns, of which the first and the third contained mercury, and the intermediate one air. Amontons contrived what he called a universal thermometer: it was a tube of glass, 30 inches long, containing mercury, and to which was adapted a scale of inches; and, by comparing its indications with those of a column of mercury in an ordinary barometer, he was able to determine the expansion due to temperature alone: he also invented a magnetometer, consisting of a tube of glass, filled with a fluid contained in a glass tube which terminated below in a leather bag. The contraction or expansion of this bag, in consequence of variations in the humidity of the air, produced corresponding variations in the length of the column of fluid.

But the most remarkable instruments employed by Amontons in the life of Amontons is his invention of what must be considered as a species of telegraph. His proposal was to have signal-posts established at intervals between the two extreme stations, which were to be Paris and Rome; a map at each post, being provided with a telescope, was to observe the signal (a letter of the alphabet) made at one station, and to repeat it to the next; the process being carried on thus along the whole line. Two experiments are said to have been made by him in 1715 in practice. The result of this family of experiments was not, however, with what success. Dr. Hooke had however anticipated the discovery about 18 years.

The only work which Amontons published is one entitled "Remarques et Expériences sur la Construction d'une nouvelle Clepsydra, sur les Baromètres, Thermomètres et Hygromètres," Paris, 1695. He was subsequently a member of the Académie des Sciences; and among the "Mémoires" of that body are those of Amontons on the expansion of fluids by heat, on the muscular strength of men and animals, and on the friction of materials.

AMPERE, ANDRE MARIE, was one of the many scientific men who, since the commencement of the present century, have contributed to the development of the highest branches of mathematical analysis to physical propositions, particularly to such as relate to electricity, magnetism, and light.

Of his private life little is known; and, like that of many men who have devoted their days in scientific pursuits, consists merely in statements of his birth and death, with a list of the works which he composed. He was born at Lyon, in 1775, and it appears that he resided in or near that city till about the year 1800, when he removed to Paris, where he died in 1836. Before this removal he was professor of physics in the central school of the department of Ain; and, subsequently, he held the appointment of professor of analysis in the Polytechnic School of Paris.

His anterior contributions to science are enumerated in the "Annales de Mathematique" (Lyon, 1802), in which it is satisfactorily proved that, if a person play habitually in society, he must infallibly, even though he play on equal terms, be ruined.

In 1803 Amontons published a work entitled "Recherches sur l'Application des Forces Géométriques du Calcul des Variations aux Problèmes de Méchanique," and in the "Annales de Chimie" (1814) there is published his letter to Berthollet on the subject of Definite Proportions, or the Analogy of the Laws of Glacial and of Chemical Action.

Some connection between the electric, galvanic, and magnetic powers in nature had been long suspected on account of the observed effects of lightning on the directive property of a magnetized needle; and in 1819 M. Oersted observed that the wire connecting the opposite poles of a galvanic or voltaic battery caused a magnetized needle suspended near it to deviate from that position which it assumes when beyond the influence of any disturbing power. This remarkable phenomenon being clearly exhibited to the philosophers in Paris, who conjectured an important discovery, at once corrected that same one; and a little more than five minutes, the current repeated the experiment in various ways; and almost immediately, by the discoveries to which their researches led, raised up a new branch of science. Among the earliest of these philosophers was Ampère, who, in September, 1820, published a paper before the Academy, in which it was stated that the voltaic pile, or galvanoic trough itself, produced a like effect on a needle suspended near it; when its opposite poles are connected by a wire; and soon afterwards M. Biot communicated an important discovery by which it was proved that some, at least, of the phenomena of magnetism could be represented by electricity alone. He showed that if two wires connect the opposite poles of a battery, they attract one another when so disposed that the currents pass along them in the same direction, and repel one another when the currents flow in contrary directions; and he contrived a delicate apparatus by which the phenomena were exhibited.

Ampère, having discovered that if a wire be suspended over one pole of a magnet, and the galvanic fluid be made to pass along the wire, or if the wire be fixed and the magnet suspended over it; the wire in one case, and the magnet in the other, would revolve about the fixed object; Ampère, to whom the discovery was communed immediately repeated the experiment, and subsequently contrived an apparatus in which the suspended magnet was, by the influence of the wire, made to revolve on its own axis. He also invented the well known voltaic galvanoelectric apparatus, consisting of a cylinder containing three cylinders, being supported by conical points over one end of a magnet placed in a vertical position, revolve about the magnet; or, in the right hand, and to the left; or, in the contrary direction if the south end be uppermost. M. Arago afterwards, in conjunction with or at the suggestion of Ampère, succeeded in communicating magnetism to a needle
AMV

by placing it within a helix of copper wire, the extremities of which were connected with the poles of a battery.

From the mutual attractions and repulsions existing, apparently in electrical, or, as they may be called, electro-magnetic currents, Ampère inferred that such currents revolve continually about a magnet; at first he supposed that the centres of their revolutions were in the axis of the magnet, but he was quickly dissuaded from this supposition by experiments. It was found that the electric current was produced in the wire as long as each atom in planes a little inclined to the general axis of the magnet; setting out with this principle, he satisfactorily deduced, by analytical processes, the phenomena of electro-magnetism. The phenomena of electricity, however, have been developed and elucidated by hundreds of thousands of experiments, and it is evident that much has yet to be discovered. Mr. C. F. Wheatstone has recently shown, in fact, that the magnetic action of the earth is the result of currents circulating within it, or at its surface, from east to west in planes parallel to the magnetic equator: he also imagined that these currents act on balanced suspenders, which, like magnetized needles, contain electric currents, causing them to place themselves in such positions that the currents on their under sides may flow in the same direction as those of the earth. He contrived several ingenious machines in which terrestrial magnetism was an agent: among others, he disposed a wire bent in the form of a rectangle or a spiral, so that the plane might turn on a vertical axis, and, placing it in the position of the magnetic meridian, he allowed the electric current to enter at either extremity, when it revolted from the current's direction; on the other side, when it became at right angles to that meridian. He also exhibited to the Royal Academy of Sciences a copper wire bent in the form of a helix which possessed the properties of a magnet: he subsequently placed the helix, each way, to the middle, from whence they passed out in opposite directions and served as pivots on which the spiral might turn. When the pivots were connected with the poles of a battery, each end of the helix, on a pole of a common magnet, was attracted to the poles of the battery.

Ampère published at Paris, in 1822, a work entitled "Recueil d'Observations Electro-Dynamiques"; in 1824, one which was designated "Précis de la Théorie des Phénomènes Electro-Dynamiques" (both of these are 8vo.); and in 1826, in 4to, "Théorie des Phénomènes Electro-Dynamiques." Two years afterwards he published a "Mémoire sur la Determination de la Surface courbe des Ondes lumineuses, &c., &c." and six years subsequently an "Essai sur la Philosophie des Sciences, &c." Besides these works there were published separately several memoirs relating to his experiments in electro-dynamics; also, in the "Mémoires de l'Institut," in the "Journal de l'École Polytechnique," and in other works, many papers relating to Mechanics, Optics, and Natural History.

(Addressee H. R. H. the Duke of Sussex to the Royal Society of London, 1836; Barlow's Essay on Magnetic Attractions, Turner's Elements of Chemistry.)

AMPHETHIUM, a genus of fish, from the Isle of Shetepy, (King's, Icon. Fossil.)

AMPHIDURETUS, a genus of Echinida, found in the coast of Suffolk.

AMPHIORIUS (Pander), a genus of fossil Crustacea (TriLOBITAE), four species of which have been described, from Tyrone and Waterford, by Captain Portlock.

AMPHIOXUS. [Branchiostoma, P. C. S.]

AMPHITRITE (Blainville). This fossil mammal, from Stonesfield, is now termed Sphenothalamus by Owen.

AMPLEXUS (Sowerby), a fossil genus of MADREPOLOides, P. C., remarkable for the simplicity of its structure and the variability of its general figure. "Occurs in the mountain limestone." (Barlow's Elements of Chemistry.)

AMPYX (Dalman), a genus of fossil Crustacea (Trilobite), four species of which have been described by Captain Portlock, from Tyrone.

AMYGDALUS.—Medical Properties of. Amygdalus communis, a tree native of Asia and Africa, cultivated in the southern parts of Europe, of which there are two varieties, sweet and bitter. Of the sweet almonds the parts which are official are the seeds or kernels. When covered with the skin, or protected by the outer covering of moderate weight and traversing the skin, and forming a raphe. Dissected of the skin, the egg-shaped seed, formed of two cotyledons, is seen of a white colour. They have a sweet and mucilaginous, rancid, only taste, and scarcely any odour when fresh, but when pressed to the press, and when ripe, they are strongly aromatic, and acquire a rancid, oily odour.

Analysed by Boullay, they yielded emulsion, and a fat oil of a very bland kind. Ten pounds of seeds yield four pounds of oil. Upon being subjected to pressure, or treated by means of either, the oil is separated, and there remains the cake, or farina amygdalae. The commercial varieties are numerous, but the most esteemed are the Jordan almonds.

Triturated with water, sweet almonds form a grateful, sweetish emulsion, which possesses considerable nutritious as well as demulcent properties. This emulsion should never be prepared long before it is required for use; as, besides the uncertainty of species, it is the risk, when bitter almonds are employed, of some of the poisonous products being developed. Almond paste forms a good emollient application to chapped hands in winter.

Almonds, as both a food and a medicine, are nutritive, but rather indigestible. In some persons they occasion, more particularly bitter almonds, an eruption similar to nettle-rash, and other troublesome symptoms.

Oil of Almonds. The almonds having been freed from the skins must be bruised, and pressed in cold, or, if warmed, they must be pressed in iron presses. The oil when first obtained is turbid, but becomes pure by time or by filtration. It is yellowish or nearly white, if the almonds have been completely freed from the skins before being pressed, translucent, and when cold-drawn is without odour. The taste is purely oily. Specific gravity, 0.911 to 0.920. Consists of, chief, stearin 25. It is tolerably fluid at the ordinary temperature of the air, but a reduction of temperature becomes turbid and white, and by a still further reduction of temperature and as an oil it takes up 1-25th part. Sulphuric acid and the volatile oils combine with it in every proportion. Caustic potash forms with it a very solid soap. When it has been carefully expressed, it dries when in contact with the air so as to be almost impervious.

It may be obtained freely from either variety; but is yielded in greatest abundance by the bitter almond. Ten lbs. of sweet, when cold-drawn, yield from 4 to 4½ lbs.; 16 lbs. of bitter almonds yield 7 lbs.

Almonds which have become rancid yet yield by expression good oil; if a little calcined magnessia be added to the bruised almonds before being subjected to pressure.

Almond oil is often adulterated with poppy oil. It is employed more as an external application, especially to the ears, than internally.

Amygdal, Amaran, bitter almonds, are smaller and flatter than the sweet. Those most esteemed come from Prussia, those least esteemed from Barbary. They have a bitter taste, and scarcely any odour, but if rubbed between the fingers with a little water, they emit a peculiarly agreeable odour. Triturated with water they form an emulsion, which by distillation yields a volatile oil, containing hydrocyanic acid. This oil is procured in very variable quantity; one pound of almonds yielding in some instances one drachm, in others only fifty grains, in others ten grains.

A fat or fixed oil is also contained, which may be procured by expression. Hence in the Pharmacopoeia, Oleum Amygdalinum is described, to be expressed from the kernels of either variety. For the sake of economy this fixed oil is first procured, and the cake which remains is employed either to yield the volatile oil containing hydrocyanic acid, or to furnish Amygdalin.

Amygdalin is a peculiar product, containing nitrogen. It does not possess the poisonous properties of hydrocyanic acid; yet it is one basis of that powerful agent, and some account of it is necessary to understand the manner in which other almonds occasionally possess this property. It is prepared as follows—the cake remaining after the fixed oil has been expressed is to be treated with boiling highly rectified spirit, containing not less than 80 per cent, of alcohol, so long as anything is drawn up by the spirit. The spirit is continually renewed, when the cake is freed from the spirit, and the residue dissolved in water, then filtered and crystallized. The crystals are to be purified by repeated crystallization. They are either in the form of small colourless shining prisms, or mucicaceous plates, devoid of odour, having at first a sweetish taste, but afterwards extremely bitter. They are not volatile, but are easily soluble in water, without undergoing the slightest alteration; less soluble in alcohol, and not soluble in ether. Geiger thinks this principle worthy the name of Amygdalin.

It is this substance which, when acted on by the emulsion, and water, forms both the hydrocyanic acid and the volatile oil of bitter almonds. The former will be amply treated of in P. C. S. [Hydrocyanic Acid]. The latter requires to be connected with the subject of the inferior in power to prussic acid. Its specific gravity is greater than that of water. It is soluble in alcohol and ether. It is a compound of a very complex kind, containing hydrosol.
cyanic acid, hydroure of benzal, benzoic acid, benzoin, benzamide, etc. (Pereira.)

It is sold in different degrees of dilution to cooks, confectioners, and others, to flavour cakes and liqueurs, under the name of essence of nataha, peach-essence, &c. (S. L. O., 1854, published similar but Pereira.)

From its inindescribable use, as well as variable strength, many fatal cases result from it. It is also used as a criminal means of destroying life.

ANABAS (from αναβαίνω), to ascend), the name given by Cuvier to a genus of Acanthopterygious Oseous fishes, remarkable for the power possessed by the species of living for some time out of water and making their way on land. This power depends on a structure characteristic of the family of which it is the type, part of the pharyngeal being laryn-thiform, that is to say, divided into a number of irregular lamellae, more or less numerous, forming cavities and little cells capable of retaining a certain quantity of water. This apparatus is so protected, that when the animals are out of their native element the evaporation of the contained water takes place very slowly, and the gills are kept moist, by means of which remarkable provision the fishes of this family are enabled to leave the rivers and marshes where they usually reside, and to travel over land for considerable distances, creeping among the herbage or along the ground. Although this fact has been hitherto known to modern naturalists, the antiquits appear to have been well acquainted with it, and Theophrastus has recorded the existence in India of certain little fishes which leave the rivers for a time and again return to them: he doubtless alludes to the Anabas and its allies.

The genus Anabas, of which there is but one species, the Anabas scandens (Verca scandens of Daldorf, Anthias testudinse of Bloch), is distinguished by a well-marked character, the borders of its opercle, subopercle, and interopercle being dentiliculated, whilst the preopercle is not so, nor even distinctly margined. The head is round and broad; the muzzle is very short and obtuse, the eye placed very near its extremity. The mouth is small, and large scales cover the head. The body is oblong, compressed centrally and behind. The lateral line is interrupted at its posterior third, recommending a little lower. The tail is somewhat rounded. The whole body is covered with large scales. There is a single dorsal and an anal fin, nearly equal in height, and in both the spines rays prevail. The formula of the fin-rays in the Anabas scandens is as follows:—

D. 17 or 16-9: A. 10 or 11-10: C. 16: P. 15: V. 1-5.

In colour it appears to vary, being brown or bluish-black or dark green, paler beneath and having violet fins. In form the individuals are constant, and reach the length of six inches.

In 1879 a Danish gentleman, M. Daldorf, communicated an account of its habits to the Linnæan Society of London, in which he stated that he had observed it in the act of ascending palm-trees near marshes, and had taken it at a height of no less than five feet above the surface of the water, effecting its movements of ascent by means of its fins and tail and the use, when of necessity, of its pectoral fins. The latter is in a similar manner that by which it progressed along the ground. Another Danish observer, M. John, published a similar statement, adding that it is called in Tranquebar panneri-et, a name which signifies: their means of ascending, who have equally observed it in its native countries, such as Reinwardt, Leschenault, and Hamilton Buchanan, whilst they record its habit of creeping on the ground and living a long time out of water, decency or omit all mention of its power to ascend trees.

The fish—but not all the species of the family—belong to the genera Helotoma, Polyacanthus, Colisa, Macropodus, Ophromenes, Trichopus, and Synbranchus, of which the habits are as yet very imperfectly known, though the peculiarities of their anatomy warrant us in supposing that they have a similar power of living out of water.

(Trans. Linn. Soc. 1850. vol. iii.; and Cuvier and Valenciennes, Hist. Nat. des Poissons, tom. vii.)

ANABATHRA, a fossil bee, from Allenbeck, Berwickshire. Described and figured by Mr. Witham, and figured in Foss. Veg. t. 8 and t. 10.

ANABLEPS, (from αναβαίνω, to look up), a genus of Malacopterygious Oseous fishes, remarkable for the curious double, or, to be more correct, quadruple eyes, which, in a few genera, are so placed, that of the irides and cornea by transverse ligaments, have two pupils, and appear as if double, whilst there is only one crystalline humour, one vitreous humour, and one retina. There is no other example known of such a modification of structure among the fishes. This peculiarity of the Anables has given rise to several stories of four-eyed fish, with exaggerated accounts of their habits. The Anabipes tetraphthalmus inhabits the rivers of Guiana and Surinam. Its body is cylindrical, and covered with strong scales; its head is flattened, and mottl. The upper jaw projects; its eyes are large, and give the fish the appearance of having two eyes, instead of one. Its anotomv has been made the subject of a memoir by Lescé-péde, which is published in the second volume of the Mémoires de l'Institut.

A NAMIBÉRTHENEIS (αναμβρέθηνεις, a remodelling or change of form) is such a representation of an object that, except when viewed from a part of point directly, or in a cylindrical mirror, or through a polyhedral lens, it will appear to be distorted, or disconnected, or to be a view of something very different from the original. Such representations are only made for the amusement of young persons, and therefore a very brief explanation of them may suffice; but the art of forming them has been treated at length in the "Thaumat-urgen Optics" of Nicerno, and in the "Perspective Horaria" of Maigram.

Distorted figures which are to appear, when viewed directly from a given point, in the joints proportions which they have in an original drawing or print, may be easily traced in the following manner:—The original being covered with a net-work of squares within a square drawn about the whole; upon any convenient part of a sheet of paper a line is to be drawn equal in length to the base of the circumscribing square, and divided into a like number of equal parts; then, from a point taken at pleasure vertically under the assumed place of the eye, lines are to be drawn of indefinite length through the points of division, to represent those which, on the original, have been drawn perpendicularly to the base or ground-line. Let next a line be drawn from the assumed spot of the eye on the paper, parallel to that which was made equal to the ground-line, and let it be made equal in length to the given height of the eye above the paper: then, if a line be drawn from the extremity of this line through one end of the divided line it meets the line drawn from the foot of the eye up to the opposite end of the same line, its intersections with all the lines which represent the perpendiculars will be points through which lines being drawn parallel to the divided line, those lines will represent the correspodence on the original parallel to the base of the circumscribing square. If, within the trapezoidal areas thus formed, the parts of the original figure which fall in the corresponding squares be drawn by another line, thus traced with the distorted figure required; and, when viewed from the assumed place of the eye, it will evidently appear exactly as, to an eye in the same point, the original would appear if it were placed in a vertical position with the base of the square on the line which
draw to represent it; that is, it will appear to be an exact copy of the original.

A distorted representation of some object, which is to appear correct on being viewed from a given point, and by reflection from a plane figure, as also given, may also be drawn on a plane by means of a perspective representation, as already described, of the squares drawn within a square circumscribing the original print or drawing. This plane must be transformed, in two different ways: in the first, by the cylindrical mirror; and from the centre of the mirror's curvature, on paper, lines must be drawn through the points of division in the chord to meet the circular arc representing the base of the cylinder; then from the points of meeting lines, squares are to be drawn equal to those which are made with them by lines drawn to the points in the arc from the seat of the eye; and on them to be set, from the points in the arc, distances equal to those of the same points from the several lines which in the projected trapezoid before described, represent the horizontal lines drawn over the original figure. Lastly, curve lines, which are nearly arcs of concentric circles, being drawn through the points thus found, there will be formed a network of mixed-lined trapezoids, within which the parts of the original figure are to be traced so as to correspond to those within the squares first drawn. This distorted tracing being laid horizontally on a table, and the mirror being set up vertically on the arc which keeps, in this instance, the same image will, to the eye, appear exactly similar to the original figure.

Distorted figures, which are to be so corrected when viewed through a polyhedral lens or multiplying glass, a lens of the same order, one of the nodal points of which is given, by a number of planes having for example the figures of triangles, may be traced mechanically thus:—Let the multiplying glass be placed in a tube, like the eye-piece of a telescope, at a distance from the end to which it is to be applied rather greater than the focal length of the glass, and let a very small aperture be formed in the cover at that end; then, on placing a lamp or candle before the aperture, the rays of light passing through the faces of the lens will project, or rather bend, so as to correspond to the faces of the images; this image will, to the eye, appear exactly similar to the original figure.

The portions thus drawn, when viewed in any manner encompassed by the object represented; and the intervals may be filled up with any objects at pleasure, so that the whole may appear confused, or may represent something different from the original landscape or figure: then, on covering the same with a sheet of paper and making small cuts, or indentures before mentioned, and the objects drawn on them, will be visible; and there will appear only the representation of the object formed by the junction of the parts within the outlines from which it is a correct copy of the original object.

ANAMORPHOSIS. (Botany.) (Metamorphous, P.C.)

ANANCHYTES (Lamarck), a fossil genus of Echinoderms, found in the chalk formations abundantly.

ANARRHICHAS, a genus of Acanthorhynchous Osseous fishes, established by Lesson, which is retained by subsequent ichthyologists. They are very nearly allied to the Bliennies; so that Cuvier remarked they might be regarded as Bliennies without ventral fins. They have round, smooth, blunt heads; elongated bodies, covered by minute scales; a single long dorsal, and an extended anal fin, both separated from the caudal; no ventrals; the mouth armed with formidable teeth of two kinds, conical incisors and flat grinders. One species, the wolffish, sea-cat, or cat-fish, Anarrhichas lupus of Linnaeus, is common off the coast of New Brunswick, Nova Scotia, and on the east coast of Scotland and the Orkneys, though rare on the English shores. Its range extends to Greenland. It grows to the length of six feet, and is a ferocious and formidable destroyer of the nuts of fishermen; when caught it defends itself with the most fearful, hissing, and snarling sounds, by means of its powerful teeth and jaws. It lives chiefly on crustaceans and tenebrous molluscs, and, like most fish which subsist on such food, its flesh is excellent eating; though, from the very great size, and narrow definition of their range, they would not be likely to be seen by any one, should he chance to visit the Edinburgh market, where, by naturalists especially, whose knowledge of its good qualities enables them to vanquish their prejudices against its aspect, it is much esteemed.

The cat-fish is of a light grey colour marked with seven or eight broad vertical bands of bluish grey. When old it becomes darker; its skin is covered with thorns. The formula of its fin-rays is—D. 22; A. 20; P. 20; C. 16. It is a very fine fish, and is one of the principal objects of this sea seen Yarrell's British Fishes, vol. i.; Pennant; and Bloch.

ANATOLIA. Since the publication of the first volume of P. C., the interior of this country has been explored by nearly all the directions, by travellers who were protected and aided by firms of the sultan. The present article proposes to give a succinct account of the geographical results of their researches. A complete map of the country, united the results of their researches and corrected and corrected: the map drawn by Arrowsmith for Hamilton's 'Researches' is the best we have, though it is only fragmentary.

The charts of the Russian Survey of the coast of the Black Sea, published in 1840 and following years, are not surpassed by any other. The survey of the western coast has been completed under the superintendence of Captain Graves, but the charts are yet unpublished; this survey, with that of Captain Beaufort of the southern coast, complete the survey of the Mediterranean coast of Asia Minor. The part of Captain Graves' survey comprehending the Gulf of Smyrna and the adjacent coast was first published in Arrowsmith's map, which accompanies the 'Researches' of Hamilton. The part of this recent survey which is erroneous. The coast of Lycia has been known since the survey of Captain Beaufort, but the interior was first visited and described by Fellows.

The principal objects of the present article are to give a correct account of the interior of Anatolia; to separate the several languages spoken in this country; and to limit as much as possible the number of terms.
as the southernmost part of a series of long narrow passes between the sea and the steep rocks of Mount Amanus; it begins, therefore, to lose the characteristic features of a mountain defile, and thence runs up to Beilâ, where it re-assumes its original character. North of Bâya the defile ceases where the plain of last begins; but farther north the narrower river bed, and after running round the innermost corner of the Gulf of Iskâderûn, enters another defile in the chain of Dûrdûn-Dagh, the northern part of Mount Amanus. The whole of these passes were called by the ancients the Syrian gates (Fylae Syriacae), because on the historian of the Persian war from Alexander and Darius down to the present time. The narrowest part of the pass across the Dûrdûn-Dagh is shut up by an ancient stone-built wall of polygonal masses of basalt, without capping, and is traversed by the road which has the Turkish name of Demir-Kûpur, or the iron-gate. Ainsworth, who has written a memoir on the subject, identifies this old fortification with the Amanian gates (Fylae Amânaides) of the ancients. The river Jîthûn, the ancient Pyramus, runs along the northern and western slopes of the range of Dûrdûn-Dagh.

The principal chain of the Taurus stretches from the environs of Merîshâ in a western direction across the whole length of the peninsula, and is generally parallel with the coast. We add a few particulars to its description in the P. C. In about 35° E. long. the chain is called Bûlgûh-Dagh, a very lofty range, through which the Jîthûn, the ancient Sirûs, passes in a bed overhanging on both sides a depth of 8000 feet height; it branches out of Gökebûlgûh-Dagh, known to the Romans as the Porta Ciliciae. During the time that Syria and the pashalîk of A'dâna belonged to Mehemedd 'Ali, pasha of Egypt, the Gökebûlgûh was partly in possession of the Turks, and partly of the Egyptians, both of whom had erected strong fortifications for the defence of their respective portions. The narrow tract between the Bûlgûh-Dagh and the coast has an alpine character, and under the meridian of Mesculli, the principal chain of the mountains approaches the coast so closely as to become visible from the sea in all its outlines. The whole country round the Gulf of Iskâderûn is thus surrounded on one side by the sea, and on the others by lofty mountains, which, from the few long and narrow defiles, may be successfully defended by a handful of men against the most numerous armies. The tract abounds in fruit, wine, corn, timber, and other productions, and is watered by two navigable rivers, the Jîthûn and the Şîhûn, and many streams of less importance, among which the Teraswâ Châfî (river of Tarsus), the ancient Cydnus, is the chief. This part of Cilicia was once a most flourishing province, and there are few countries of its extent to which so many ancient and modern collectors have resorted: the town of Taurus and Mopsuestia, the cold waters of the Cydnus which endangered the life of Alexander and killed the Emperor Frederick I., and the Plain of Iasus, where Alexander defeated Darius. If any power that is master of the sea should hereafter have the power of giving a firm foundation on the continent of Asia Minor, with the view of either preventing its conquest by an enemy of Turkey, or having its share in the dismemberment of the Ottoman empire, that power would most certainly plant its standard on the Plain of Iasus.

On following the Taurus in its western direction, we find the Karû-Dagh and the Allah-Dagh, two lofty peaks which are situated only a little distance from each other, and north of the great chain, in the southern corner of the ancient Lycia, the part of the Taurus over which the Mr. Hamilton states. The Karû-Dagh, an insulated trachytic cone, rises above a sandy plain, and is of barren and dreary appearance; a low ridge stretches from it north-east in the direction of Mount Artesius and Mount Arpasîs, with which it appears to be connected, forming part of the sand system of elevation, and standing consequently on the edge of the great table-land of which we shall speak hereafter. The Allah-Dagh stands on a base of thin-bedded semi-crystalline limestone; it is of more of the same character as the history of the Taurus, which here chiefly consists of Juras limestone. The Allah-Dagh is the summit of a lower range which runs west, and is parallel to the Taurus. The whole of the Taurus, from the Allah-Dagh west as far as Mount Arpasîs (Mount Cudamus) in 29° E. long. has not yet been explored, but parts of its snowy chain have been traversed by a few travellers, or seen from the sea in the Gulf of Adâla. The Balûch-Dagh, or most western part of the Taurus, contains its original western direction under several names, and forms the watershed between the Mendere, the ancient Ma- ther, in the north, and the Dilûmûn-Dagh, or smaller rivers which flow into the sea of Rhodes, the Gulf of Cos, and the Gulf of Mâdelîe. The whole tract which lies between the range of the Taurus and the coast of Asia Minor, or within the width of which the plains more on the curves of the coast than on those of the mountain range, has an alpine character, though the mountains are not so high as the Alps of Tyrol or Switzerland. It resembles the parts of Hâdjan, Yemen, and Hadhramût, which lie between the coast and the Red Sea, covered with the most barren tracts and deserts. Lycia is an independent part of the tract, though distinguished by the same general outlines. In its northern limits are formed by the principal range of the Taurus, and its western portion is connected with each other by transverse chains as to form a separate mountain system. The eastern part of it is a table-land, but the western part is traversed in its whole length from north to south by the Xanûth, now Erechen-Châfî, of the course of which we knew nothing till we became acquainted with it through the discoveries of Fellows.
chose that the height of Mount Arjish is 13,000 feet, a side more or less, above the sea. Ainsworth calculates it about 1000 feet lower. Strabo observes (p. 538 Cas.) that Mount Argaeus was covered with eternal snows, but his statement that both the Euxine and the Mediterranean, including the sea of Arinach and Mount Arjish, and Mount Allah-Dagh, which lies about 30 miles south of it, are the two westernmost promontories of the Anti-Taurus properly speaking, the principal chain of which is the Allah-Dagh, according to its north-east, and its summit of Mount Arjish becomes gradually higher, forms the peaks of Hasan-Dagh and Karajah-Dagh, and is connected with the Taurus by the Karaj-Dagh and the southern Allah-Dagh mentioned above. The Anti-Taurus has three chains in the north-west, the Anti-Taurus and its southern branches in the north and east, and the Taurus in the south around the easternmost portion of the great table-land, and form an extensive basin, part of which is called the plain of Karaj-Dagh. The eastern part of this basin is known to us; in the middle part are the sources of the Shihan, which flows south and traverses the Taurus as stated above; and the western part is a depression of the table-land which has no visible outlet for its waters, the greater portion of which is absorbed by the Askul, a lake of considerable extent. A small stream, which after the melting of the snow increases to a great body of water, flows out of the southern corner of this lake into a deep circular pool, 30 or 60 feet lower, and subsequently dries up. To this lake the additional water of this pool is about one-eighth of a mile in circumference, and has no outlet, nor does any stream emerge out of the southern shore of the sides, of which Hamilton concludes that the water, which he saw passes through the limestone, and reappears on the southern side of the Taurus, traversing Cicilia and flowing into the sea.

From the ridge between Arjish-Dagh and Allah-Dagh in the Taurus several chains stretch out in a western direction. The first, as we proceed from north to south, is a continuation of Arjish-Dagh, and runs under the names of Chessile-Dagh, Kesh-Dagh, Pascha-Dagh, Kari-Dagh, Ursh-Dagh, and Emish-Dagh, at first west, and afterwards north-west, till it joins the Anti-Taurus near the summit of Koj-Hisar, from which the western sides flow into the Irakirmak. The second stretches out from the range between the Hassan-Dagh and the Karaj-Dagh, perhaps from the latter mountain, north-west as far as Mount Emir-Dagh in 38° 46' N. lat., 31° 20' E. long., and thence west to the Moud-Dagh (the ancient Mount Dyomedes), where it divides into different branches which enclose valleys through which the water flows into the Arpagela. The great rivers Menderse (Masander) and Koj-Hisar, which belong to the sum of the north-western mountain. The first and second chains surround another much larger basin, forming likewise a depression of the high table-land, of which the greater portion seems to have no outlet; its eastern part has certainly none, its waters being received into the sea; and the western part is almost surrounded by mountains, and the elevated ridge of the table-land west in the east, there is another basin, the largest of all, which seems to be subdivided into several smaller basins by transverse ridges. This basin contains most of the great mountain. It is a still unknown basin.

The group of lakes in this basin forms one of the most salting features of the table-land; they may be divided into two classes, the salt lakes in the east, and the fresh-water (pamuk-kul) lakes in the west. The former are the runs of the Tuz-Gol is the largest, and of great extent; the others, such as the lakes of Tamsy, Kupack-Gol, Murud-ist-Gol, most of which lie in its immediate neighbourhood, cannot be compared to it. The Tuz-Gol was visited by Hamilton and Ainsworth. A point situated in 38° 42' N. lat. and 33° 25' E. long., lies about in its centre; its direction is south-east to north-west and north; it is about 45 English miles in length; its extreme width is about 18 miles, but its northern extremity is much narrower, and connected with the main lake by a channel five or six miles broad. A ruined causeway connects the opposite banks; it is covered with a thick coat of salt lying from the bottom to the water’s surface. The water has an overflow, which, when low it is quite dry. The banks are flat, the environs barren and covered with saline plants; along its eastern side extensive salt marshes stretch from north-west to south-east, and south-east to north-west, inclosed by impenetrable marshes partly covered with saline incarnations. The lake yields much salt, which is easily obtained, although the state of saturation of the water, which, at a very high in the spring, diminishes in the wet season, owing to several little rivers and streams which overspill themselves into the lake. When Hamilton examined the water, in July, it was completely saturated, but it was less salt when Ainsworth saw it in April. Hamilton brought some of it to this country, where it was examined by Mr. Phillips of the Museum of Economic Geology, who gives the following account of the analysis:—"Its specific gravity is nearly 1.2396, but as a few crystals of common salt had separated, either by cold or evaporation, its specific gravity may be considered as equal to 1.24. It contains 32° 2' c. of saline matter, consisting chiefly of common salt, but mixed with a considerable quantity of sulphate of magnesia and chloride of magnesium, with a little sulphate of lime and a trace of bromine, but no chlorides. The water is therefore comparable to that of the Dead Sea. The amount of saline matter contained in the water of the Dead Sea, hitherto considered the heaviest, has been calculated by Dr. Macartney to amount to 37° 1' c. The amount of saline matter contained in the water of the Dead Sea, is, according to the same authority, only 24° 5'. Traces of volcanic action abound in the environs. Another circumstance of great interest is the apparent connection between the lakes and the red sandstone and the red desert, near the hamlet of Koj-Hisar, a small town on the eastern side of the lake near the causeway, with the same formation in Pontus, from which one might conclude that the red sandstone formation between the lakes, the sandstone and rock-salt by Yez-Gatt and Aangors, which themselves belong to the system of Pontus. A mass of grey granite protrudes through the red and brown sandstone near Koj-Hisar, sending forth numerous small vies into the adjacent rock, thus proving that the formation of the great mass is posterior to that of the sandstone. Beds of white saccharine gypsum, or alabaster, are seen in the brown sandstone underlying the horizontal limestone. The lakes begins with the Askul in the south-east, which has been mentioned in the descriptions of the first basin of the table-land. It is about seven miles long by three wide. West of it, in the third and largest basin, we first met with the Soghla, the ancient Troglia, in 35° 45' N. lat. and 31° 45' E. long., another extensive lake, 20 miles long and six wide, and the lake of Bei-Sheher, the Caralita Pusgusa of the Byzantines, in 37° 40' N. lat. and 31° 50' E. long., a magnificent sheet of water which extends above 20 miles from south-west to north-west, and is from four to seven miles wide. On its western side the rocks rise abruptly from the water’s edge. The two lakes are separated by a lofty ridge of limestone mountains, through which the Bei-Sheher, the outlet of the Askul, and the Bei-Sheher lake, has a narrow channel. This river empties itself into the Soghla lake, which has no outlet, and is consequently the deepest part of this basin. North-west of the lake of Bei-Sheher are the lakes of Egerdir and Hizizar, one lake, which in the map it is called Hizizar, and the southern Egerdir. The narrow channel by which they are united lies in 28° 8' N. lat. and 31° 30' E. long. Their combined length is about 30 miles, and width of them is about 6 miles. Their waters are full of fish, and surrounded by steep and wooded hills, intersected by picturesque valleys and well-cultivated plains. Hamilton compares their appearance with that of the lakes in Italy. North of them are the lakes of Ask-Sheher and Chai-Kul, already mentioned. The lake of Ask-Sheher has a southern outlet, a deep, clear, and rapid river, the further course of which is not known. The question as to the course of its waters is of high geographical importance. It only flows south the river, which, after passing through the country, will be barred by the great chain of the Turan; and although it is possible, but not probable, that it forces itself an open passage through that range, and reaches the Gulf of
Adala, it is as likely that it escapes through the limestone of the Taurus, and, after a subterranean course of considerable length, reappears on its southern foot as a new river. If not, the case is similar to the three lakes of the Bel-Sheher, which empties itself into the lake Sohla, we see a small lake with no visible outlet, although it is fed by the waters of two very large lakes, and perhaps those of the whole southern coast of Asia Minor. It is not likely that the volume of water thus evaporated from a comparatively small surface, we should in this case also be led to believe that the water of the lake Sohla escapes through some cataract, and makes a subterranean passage through the Taurus, which Hamilton supposes to be the lake Ak-Gol, which is certainly close to it.

If we consider the most prominent features of the great table-land of Asia Minor, the great number of extinct volcanos, the masses of basalt and other volcanic productions, the immeasurable basaltic conic which are spread in all directions on that plateau, the granite which protrudes through the overlying beds of limestone, and finally the salt lakes, and an extensive tract covered with salt marshes, we are inclined to believe that the whole was once an inland sea, like the Caspian and the Aral, filled with brackish water, and that the bottom of that sea was raised by volcanic action, whereupon the waters poured forth in all directions; and on their descent to the surrounding seas digged those deep valleys which now form the foundation of the peninsulas and western head in straight lines from the ridge, or exterior parts of the table-land, down to the Mediterranean, the Archipelago, and the Sea of Marmora. The diminished volume of the remaining waters might then have been absorbed, or, to give a more subterranean notion, the whole tract may have been raised to that state in which it is now. The great quantity of fresh-water shells found on the hills of the plateau is an objection to supposing it to have once been a perfect salt sea. It was either all brackish, or divided into several large lakes, some fresh water and some brackish. It would be important to know, if among the fresh-water shells there are many belonging to such shells as live indifferently in fresh and brackish water. It will not be very difficult to explain the plateau, the rivers flowing into the Black Sea are not in straight lines. If the origin of the table-land should ever be satisfactorily shown to be what it is here conjectured to be, the peninsula of Asia Minor would no longer be considered a continuation of Armenia and Kurdistan, for the connexion between the mountain systems of those countries and the Taurus, the Anti-Taurus, and the Pontic mountains, is no obstacle to this conjecture; and as the great ranges which stretch through the country from east to west would in that case, with the exception of the Anti-Taurus, be divided into three parallel ranges, the eastern mountain-knot, and the outskirts along the three seas. But as long as these matters are merely hypothetical we must be faithful to the common notion, and suppose that the great ranges which stretch across the country from east to west, and of which we now proceed to describe the third.

3. The Euxine range.—The country between the Anti-Taurus and the Black Sea is the land of mountains, and up with mountains, the centre of which seems to be in the southern part between the Gdtr-Dagh, the Almali-Dagh, and the Gjijk-Dagh, whence several chains stretch to the west and north; others stretching eastward connect these mountains with those of Armenia. We shall call this group, which has no general name, the Lazian group, from the Lazes, a warlike nation of Caucasian origin, known in history from early times down to the present day, and whose original home must be considered the eastern slope of these chains. The Lazian group, the third landmark of Asia Minor towards the east, is the watershed between the Euphrates, which flows into the Persian Gulf, and such of the rivers emptying themselves into the Black Sea as are situated east of the mouth of the lower Aras river. On the northern side of the Black Sea the Lazian group are the sources of the Chourk-Sid, a river about 150 miles long, which flows east and north till it reaches the Black Sea near Batum: its whole course is beyond the limits of this work. The second group is the mountainous coast of the Razim-Irmak, and may be considered the natural boundary of Asia Minor on this side. The eastern limits of Asia Minor are generally identified with an imaginary line stretching from the corner of the Gulf of Isskenderun, due north-east, as far as a point situated some distance east of Trebizond. A good map will show that this line corresponds exactly with the line of the Anti-Taurus, the Taurus, and the Lazian mountains. Among the different ranges which detach themselves from the Lazian group, we shall first mention that long chain, or, more correctly, series of sub-parallel chains, which stretches in a generally easterly direction parallel with the coast of the Black Sea. These chains are known under several names. Between Trebizond and the mouth of the Yessil-Irmak we find the Mason-Dagh; and between that river and the Kisir-Irmak the Neimah-Irmak valley, the Anti-Taurus, and the Lazian mountains. They are surmounted by lofty peaks, which are however not lower than those of the Taurus and Anti-Taurus. The whole tract is a plateau, being the first terrace on coming from the Black Sea, and generally of a level surface, although it is above 1500 feet above the level of the plateau. Towards the west the plateau is broken into numerous ridges and deep valleys, the beauty of which is highly praised by travellers, and the picturesque character of the scenery is most striking in the neighbourhood of the town of Trebizond.

We come now to the district west of the Kisir-Irmak, from the point where it breaks through the chain of the Adda-Dagh. The Ilkik-Dagh, with a mean elevation of 4000 feet over the sea, abounds with forests and ranges of mountains. South of the Ilkik Dagh is a plateau of the same description surmounted by ridges of about 3200 feet elevation. South of these plateaus lies the Alkii-Dagh, the summit of which was found covered with snow, and in front of which there is a range, and north of them are others mentioned under the name of the Anti-Taurus, and others which were not named. In 41° 26' N. lat. 38° E. long. is the plateau of Ifinli, which begins in the south near the town of Zafarin-Boli, with several projectors which terminate abruptly with steep ascents, on which high rock-terraces tower one above another. On the east the plateau there are many ranges, partly bare and partly wooded, and large tracts are covered with fragments of rock. West of this plateau, and divided from it by the river Ori, is Mount Durnah-Yal-Si, the ancient Mont Doinam, which has a route of about 9 miles, and a bare crest at least 3000 feet high. Limestone and basaltic rocks abound in both of these mountains. Mount Durnah-Yal-Si is connected with the Boli-Dagh and the Karin-Ali by the Sarki-Yal-Si and the Yalik-Dagh (Mons Hyginus) in the north, and the Karin-Dagh, the Owal-Dagh, and the Kemptik-Dagh, in the north. West of the Karin-Ali-Dagh is the Gok-Dagh, or Bithynian Olympus, and between them lies the Zakaryeb or Sangerina. The Gok-Dagh is only a northern continuation of the Anti-Taurus; the eastern mountains of Mount Olympos, its western projections stretch through Mytilene and terminate in the promontories of the sea of Marmora, de Heilapont, and the Archipelago.

Hence we come to the next series of the northern chains which begin in the east with the Lazian group, we proceed to give a sketch of the mountain tract between these chains in the north and the great table-land in the south. From the junction of the western chains of the Lazian mountain with the Karin-Bel, which have already described as a northern continuation of the Anti-Taurus, some ranges stretch west, which the natives call Gemin-Beli-Dagh, and Kojeg-Dagh. They are generally parallel with the 40th degree of E. lat., and their western continuation is the Almali-Dagh. They rise above a high table-land, which is generally a level plain, and form the watershed between the Yessil-Irmak in the north, and the Kisir-Irmak in the south. A large mountainous tract lies to the west and is encompassed on the west by the Ilkik-Dagh, on the east by the Kojeg-Dagh, of which we know very little. It is a table-land, the edges of which, towards the Kisir-Irmak, are intersected by deep valleys and ravines, and form a long sharply indented wall of rocks of the grandest beauty. Across the crest of the Kojeg-Irmak, from the 38th degree of E. long., we first see the Ak-Dagh right opposite the snowy peak of the Arpaj-Dagh, stretching west. Where the Kojeg-Irmak again comes to the coast, the edge of the table-land is called Alikjik-Dagh; farther east, in the same direction is the Hasan-Irmak, a bare sharp two-headed peak, and still farther on the Boli-Dagh, a lofty chain rising high above a table-land more than 5000 feet high, and covered with snow and ice. Above Alar-Suban it forms a long promontory of the sea, rising together a sierra-like aspect. North of the Hasan-Irmak is the fine plain of Sogher, and north of it lies the Begvi-Dagh, an extensive granitic district, composed of low,
rounded, whitish, and bare hills, broken up by deep ravines, and covered with a scanty vegetation. The northern edge of the table-land, surrounded by the Kizil-Irmak River at Tokat in 40° 17' N. lat. and 36° 50' E. long., with a chain of high limestone hills surmounted by steep and craggy pinnacle, which laves the table-land near its source, and which, however, is at a considerable distance from the left bank of the Tokat-St. At Tokharl the chain is again high, and presents several steep cones. Thence to Zilleh, west and south-west, and thence north to Amasia is a high table-land, partly fertile, partly a barren place, composed of limestone, and without a trace of water. The craggy edges of this plateau towards the Tokat-St. rise to a great height above the valley and are broken by deep ravines. The rocks near Amasia are highly picturesque, and the whole southern edge of this flat place has been verified by modern travellers. From Amasia to the east range, consisting chiefly of volcanic sand or peperite, occasionally studded, runs west, partly bordering the plain west of Amasia; 18 miles west of this town theul rises into huge masses of rocks. From Chörum the table-land has the same character, being partly a level plain and partly a hilly tract, which to the north of that town is bordered by the Kirk-Delim mountains, which may be considered as the most remarkable of the barrier, and is interrupted by steep crags. Chörum south-west as far as the Bogrek-Dagh described above, is little known; its edge towards the Kizil-Irmak is more craggy and deeply cut than the side of the table-land towards the Tokat-St., except the immediate environs of Tokharl, where it has been estimated that at no great distance from the Kizil-Irmak, are the rock-salt mines of Châyán-Kö, situated in a rugged ridge of hills of red sandstone conglomerate. The surrounding country consists of the Süm a great table-land, consisting of red marls and gravel of a grey or bluish colour, the very counterpart of the suffrutescent districts of England. South of Chörum, towards the interior of the table-land, there is a succession of winding valleys sunk below the level of the plateau, and lying between white rock, varying much in colour and consistency. The high plain has a barren aspect. Towards Yüz-gatt, south of Chörum, there are deep ravines, and many broken rocks, which amidst protruding masses of clay, and other loose formations, leave large plains of some considerable extent, which have cultivated the country. The waters flow north-westward amongst the Tokat-St., a fact which proves that the slope of the table-land is towards the north. A little north of Yüz-gatt is the Halak-Tepe, a lofty hill, and the central culminating point of the tract whence rises radite in all directions: some of them consist of coarse sandstone, passing into a loose conglomerate containing pebbles of blue crystalline limestone, secondary limestone, jasper, sandstone, and sand. At a considerable distance from Yüz-gatt, and at a considerable distance, there is a range of mountains called Chichek-Dagh, which seems to be the edge of the second terrace of the table-land, on ascending it from the west, the first being formed by the Bogrek-Dagh and the Kizil-Irmak, and between these hills and fragments of chains beyond Alpgöra is another elevated table-land, but broken by deep valleys and ravines, through which the Kizil-Irmak and the Zâkîryeh with its tributaries have forced their way, and has in many places an alpine character. Many plateaus consist of trap-pan and granitic rocks, upon which the red sandstone appears to have been deposited as in a basin. Limestone occurs everywhere with masses of travertine formation overlying it. On the plateaus there are some lofty peaks and meridional ridges, and high cones of volcanic origin bear evidence that this part of the country has been reduced to its present state by the action of fire, and that the work was completed by the Kizil-Irmak in its present stage of great rapidity and magnitude, but the valleys are fertile, and yield corn, wine, and fruit of every description. Among the chains that stretch in all directions are the Ardîj-Dagh, south of A'ngora, about 3600 feet high; the Karab-Dagh, south-east of the Tokat; the Mârûn-Dagh, north-east of the Tokat-Köy-Dagh and Ishak-Dagh, which form one or perhaps more parallel ranges interrupted by table-lands which begin about 20 miles west of A'ngora and stretch in a north-eastern direc- tion for, with 100 miles, at least of the hills is formed in an immense number of basaltic prisms of great regularity of form, some vertically disposed, others horizontally. Above these, masses of a similar character tower up in rocky pinnacles of fantastic shape, in which the colossal prisms are vertically disposed. This moody distribution of basaltic prisms, says Ainsworth, supersedes anything at the Giants' Causeway, Fairford, or the Cave of Frag, and most remark- able sketches that have been published of the volcanic scenery of the islands of St. Helena and Ascension. In the northernmost corner of these mountains, in the valley of the Kerimis- köy-Dagh, there are great thickness of black basaltic lava, near its sources, and at a considerable distance from the left bank of the Tokat-St. At Tokharl the chain is again high, and presents several steep cones. Thence to Zilleh, west and south-west, and thence north to Amasia is a high table-land, partly fertile, partly a barren place, composed of limestone, and without a trace of water. The craggy edges of this plateau towards the Tokat-St. rise to a great height above the valley and are broken by deep ravines. The rocks near Amasia are highly picturesque, and the whole southern edge of this flat place has been verified by modern travellers. From Amasia to the east range, consisting chiefly of volcanic sand or peperite, occasionally studded, runs west, partly bordering the plain west of Amasia; 18 miles west of this town theul rises into huge masses of rocks. From Chörum the table-land has the same character, being partly a level plain and partly a hilly tract, which to the north of that town is bordered by the Kirk-Delim mountains, which may be considered as the most remarkable of the barrier, and is interrupted by steep crags. Chörum south-west as far as the Bogrek-Dagh described above, is little known; its edge towards the Kizil-Irmak is more craggy and deeply cut than the side of the table-land towards the Tokat-St., except the immediate environs of Tokharl, where it has been estimated that at no great distance from the Kizil-Irmak, are the rock-salt mines of Châyán-Kö, situated in a rugged ridge of hills of red sandstone conglomerate. The surrounding country consists of the Süm a great table-land, consisting of red marls and gravel of a grey or bluish colour, the very counterpart of the suffrutescent districts of England. South of Chörum, towards the interior of the table-land, there is a succession of winding valleys sunk below the level of the plateau, and lying between white rock, varying much in colour and consistency. The high plain has a barren aspect. Towards Yüz-gatt, south of Chörum, there are deep ravines, and many broken rocks, which amidst protruding masses of clay, and other loose formations, leave large plains of some considerable extent, which have cultivated the country. The waters flow north-westward amongst the Tokat-St., a fact which proves that the slope of the table-land is towards the north. A little north of Yüz-gatt is the Halak-Tepe, a lofty hill, and the central culminating point of the tract whence rises radite in all directions: some of them consist of coarse sandstone, passing into a loose conglomerate containing pebbles of blue crystalline limestone, secondary limestone, jasper, sandstone, and sand. At a considerable distance from Yüz-gatt, and at a considerable distance, there is a range of mountains called Chichek-Dagh, which seems to be the edge of the second terrace of the table-land, on ascending it from the west, the first being formed by the Bogrek-Dagh and the Kizil-Irmak, and between these hills and fragments of chains beyond Alpgöra is another elevated table-land, but broken by deep valleys and ravines, through which the Kizil-Irmak and the Zâkîryeh with its tributaries have forced their way, and has in many places an alpine character. Many plateaus consist of trap-pan and granitic rocks, upon which the red sandstone appears to have been deposited as in a basin. Limestone occurs everywhere with masses of travertine formation overlying it. On the plateaus there are some lofty peaks and meridional ridges, and high cones of volcanic origin bear evidence that this part of the country has been reduced to its present state by the action of fire, and that the work was completed by the Kizil-Irmak in its present stage of great rapidity and magnitude, but the valleys are fertile, and yield corn, wine, and fruit of every description. Among the chains that stretch in all directions are the Ardîj-Dagh, south of A'ngora, about 3600 feet high; the Karab-Dagh, south-east of the Tokat; the Mârûn-Dagh, north-east of the Tokat-Köy-Dagh and Ishak-Dagh, which form one or perhaps more parallel ranges interrupted by table-lands which begin about 20 miles west of A'ngora and stretch in a north-eastern direc- tion for, with 100 miles, at least of the hills is formed in an immense number of basaltic prisms of great regularity of form, some vertically disposed, others horizontally. Above these, masses of a similar character tower up in rocky pinnacles of fantastic shape, in which the colossal prisms are vertically disposed. This moody distribution of basaltic
ment of volcanic products; basaltic cones rise everywhere, marble is abundant, limestone occurs generally, and in many places the table-land is undulating. This circumstance gives additional strength to the hypothesis that the central table-land was once a lake. The Mərdə-Dagh with its eastern chains, the Sultan-Dagh and the Emir-Dagh, and its western continuations the Ak-Dagh and Demili-Dagh, and their valleys and plateaus, show that the volcanic rock and metamorphic limestone, which form the table-land, are underlaid by basaltic rocks. The basin formed in this manner must have been surrounded by a high rim of basaltic cone, and the general level of the whole range was covered with snow in the month of April. The chains by which the Mərdə-Dagh is connected with the Olympus, and between which the river Eroden flows, begin in the central table-land, and its height must be considerable, as the whole range was covered with snow in the month of April. The chains by which the Mərdə-Dagh is connected with the Olympus, and between which the river Eroden flows, begin in the central table-land, and its height must be considerable, as the whole range was covered with snow in the month of April. The chains by which the Mərdə-Dagh is connected with the Olympus, and between which the river Eroden flows, begin in the central table-land, and its height must be considerable, as the whole range was covered with snow in the month of April.

The general character of the geology of the peninsula, says Hamilton, is simple. The eastern extremities consist of trachytic rocks, which towards the west are succeeded and partly replaced by black volcanic basaltic rocks containing angular fragments of trap or trachyte. The western part of the peninsula consists of calcareous rocks which seem to belong to the scaglia or cretaceous formation. All these are horizontal, and the lower portion is a hard compact scaglia like that of Greece and the Ionian islands. This (the lower, hard portion) contains no fossils, but is overlaid by beds thirty or forty feet thick containing a great variety of shells, amongst which are Caribula and Modiolus. The beds vary considerably in hardness and some are rather soft and others more compact. Near the summit of the hill are the ancient quarries, in which lie large blocks hewn and ready to be removed. The same writer says that he could not find the line of junction between the limestone and the trachyte, so as to form any conjecture of their relative ages.

Hydrography—1. Rivers. Our knowledge of the rivers and lakes of the peninsula has been greatly extended by the discoveries of recent travellers. In enumerating them we proceed from the gulf of Dündar-dın east along the coast of the Mediterranean, &c. The Jhun (Pyramus) has its sources near Mərsəh in the eastern beginning of the Taurus, in 57° 35' N. lat., 36° 59' E. long., flows south-west for about fifty geographical miles, and is then superseded by the Dündar-dın, which flows west from the Dündar-dın, turns south and south-west, pursuing that course for about 35 miles, and taking a sudden turn towards east, falls into the small bay of Ayı. Its annual floods rise from the point where it turns east to south-west, and are caused by a great scale, of which it is the principal part, and extends along the coast from near Cape Kard-Tash at the entrance of the gulf. Its whole length is about 100 miles; it receives on its right the Sədirun, which descends from the Taurus. Its upper part is confined between steep rocks; it reaches the plain of Alexander in 52° 30' N. lat., but the hills of the Dündar-dın accompany it in the east as far down as Mount Misia. The lower part of the Jhun is navigable. The sources of the Səhun, the ancient Saurun, are in the central table-land, in 56° 12' N. lat., 34° 23' E. long.; its course is about 50 geographical miles, and is then superseded by the Cilician defiles of the Taurus, and 40 geographical miles south-west till it reaches the gulf of Lycia in 36° 44' N. lat., 34° 59' E. long. It enters the plain of Caria, and is much changed in its lower course. Its whole length is about 50 geographical miles. The whole course of the Səhun and the Jhun is not known.

The Tercit-Chañ, the ancient Cydnus, a small river, originates near the entrance of the Tercit-Chañ, and is a plateau of 3800 feet elevation, and after a south-south-east and south-west course of 40 geographical miles, which is only partly known, empties itself in the sea a little west of the mouth of the Jhun. The Gık-Şu (Calycodnus) has its sources in the Taurus, in 37° N. lat., 33° 36' E. long.; it drains the western part of Chicia, and after a south-eastern course of about 50 miles has joined the mountainous tract, joins one sea a little above Selwék, the ancient Seleucia. Among the rivers mentioned by the ancients in Pamphylia are the Eurymedon, the Cestrus, and the Cataractes. The maps do not give the present name of the Eurymedon, but the river that passes through the country of the Lycian is the noble river; the Cestrus is the present Akaï, and the Cata-

The description of this river will be appropriately accompanied with a few remarks on Lycia, one of the most interesting parts of the peninsula, and unknown to Europeans till Felziers published his account of that country. The Xanthas has its sources in the snowy ranges of the Taurus, and flows due south as far as Hörən, where it receives, on the left, a tributary of about 26 miles length, and much longer than the portion of the main stream above that point. From Hörən the river runs through a border of limestone hills and picturesque rocks in a south direction with a slight western inclination; and a little below the ruins of the ancient city of Xanthus it turns abruptly west and falls into the sea, after a course of about 50 miles. Below Hörən it is crossed by a series of cascades, the highest of which is over 150 feet, and between this bridge and the bay of Makri (Glaucus) in the west, the river Xanthus and the sea, is filled up by sand-bars known by the ancient names of Cragus and Anti-Cra-

The length and breadth of the whole country of the Lycians is about 1200, 5000, 5400, 5100, and 5000 feet respectively. The eastward continuation of the table-land is 25° west, which must be the eastern limit of the Lycian peninsula, lies between the river Xanthus, and the bay of Makri, and is a part of the ancient district of Lycia, which has been known as the best sailors among the Greeks, especially for ships of war. On this table-land there is a river that falls into a cavern and disappears. A few miles south of the cavern there is the lake of Axewel, which has no outlet, is three or four miles wide and ten long, and lies in the middle of a highly cultivated plain which is about 3000 feet high. Between the table-land and the eastern coast of Lycia is the Taktula-Dagh, the ancient Mount Solyama, with a very abrupt inclination, and towards the sea, and large table-land beyond it forms a terrace which is lower than the Taurus, but higher than the elevated tract along the southern shore. The tract along the shore is traversed from west to east by the little river Dernem, it is a smaller river than the ancient rivers of the eastern coast of the peninsula, and rises near the sea and discharges itself into it. The exterior of Lycia resembles on a small scale the northern part of the peninsula between the Black Sea and the central table-land; and the Dembre and the Xanthas are on a small scale in the south what the Yeapul and Kizil-Irmak are on a large scale in the north. In the same relation in which Lycia stands to the whole peninsula, the peninsula with its central table-land, barren rocky plains, and other and other without outlets, and longer in breadth than in length, is to the midst of the midlands, stands to all Asia, and this circumstance might not have escaped the keen eye of the later ancients, and suggested to them the name of Asia Minor or Little Asia.

The next river to the Xanthus is the Dolummon-Chañ (Cullah). Its sources are supposed to be about 57° 15' N. lat., 36° 0' E. long., in the high table-land north of the Dolum-mon-Chañ, and south of the western table-land of the Cilician part. It passes through a defile in a series of cascades, and flows in a deep ravine through a plateau 6000 feet high. Its course, which at first is east to west, soon becomes south-west, but nearly the whole of it is unknown, except the part near its mouth, a little north-west of Cape Ghina, where it turns into the sea. The Dolummon-Chañ is about 100 miles. No large river occurs between the Dolum-

* In Arrowmuth's map belonging to the Journal of Hamilton, this part of its course is north west to south east.
Maestad, has its source in 38° N. lat., 30° 20' E. long., in a chain of antient rivers—first to the east toward the Bâhâ-Dîgh, and bordering the elevated plains of Dîsdr. Hamilton states that it issues from a small lake fed by subaqueous springs, and surrounded by steep and lofty mountains. This corresponds with the account of Pîny. The source of this river, from this spot, in 38° 24' N. lat., 30° 20' E., is the scene, and in its environs is the spot in the plain where Maryas paid so dearly for his presumptuous rivalry of Apollo (Xenophon, Anabasis, 1: 2); but the cavern where Apollo hung up the head of the Thracian Cub, according to Homer's 'Iliad,' is in 2° 10', and 37° 36' 10". above the course of this river is 24 geographical miles north-west, through the high plain of Dîsdr; 16 geographical miles south-west, and 20 geographical miles north and north-west, partly through high plains, partly through a deep rocky valley; 110 geographical miles south-east, through an rugged mountains, to a beautiful valley that becomes wider and more fertile as it approaches the coast. Its whole course is above 170 geographical miles. Its tributaries are, on the right, the Sanudiki-Châf, which comes from the south-west continuation of the Mûrûd-Dîgh, and the Hânâs-Châf, 50 geographical miles long, which rises at the foot of the Mûrûd-Dîgh, and joins the Maestad where this river begins its regular west-south-west course.

The Kôpî-Sû, a smaller river, rises in the Bûn-Dîgh immediately above the Maestad. From this spot down to the coast only small streams join the Maestad on the right. On the left it is joined by the Chôrû-Sû, the antient Lycus, a small river flowing east from west; the Kârû-Sû, which flows into the Bûn-Dîgh; the Kôhû-Sû, which flows from Mount Bâhâ-Dîgh; and the Chânî-Châf, the antient Maryas, the sources of which are about 35 geographical miles south-south-east from its junction with the Maestad.

The part of the river running down between the Little Mêndere, the antient Casyter, has its source in the angle formed by the Kestânâ-Dîgh (Mosseig) in the south, and the Kâhîl-Mûsâ-Dîgh (Tmolos) in the north. It falls into the Gulf of Scula Nâsūr, after a western course of 60 geographical miles. The Kudûs or Châmû-Dîgh, another antient Hrus, has its sources in the Mûrûd-Dîgh, south-east of the town of Ghidîz; its course is 20 geographical miles west, 36 south-west, nearly 100 geographical miles in a straight line, and 130 geographical miles south-south-west, till it falls into the bay of Smyrna, which leads with its clayey and sandy deposits. In its upper part, the only river of consequence that joins it on the left is the antient Cogamus, now Allah-Sheher-Sû (2), the sources of which are only a few miles from the middle part of the Maestad, in 35° 24' E. long. It joins the Hrus after a north-west course of 50 miles, through a beautiful and highly cultivated valley.

On the right, the Hrus receives in its upper part the well-known river of the antient Greeks, the Kifwa, which comes from the Ak-Dîgh and the Demirji-Dîgh, and in its lower part it receives the Ak-Sû (Hyllus 7). The middle part of the Hrus, between the mouth of the Cogamus, and the sudden turn which it makes near its mouth to the north-west, is called the Bîkîr-Dîgh (Cahos), the Tûsîl, and the Mendere (the famous Scamander), flowing west, and the Bûkîâ-Châf (Aspesus 7), which flows north into the sea of Marmara. The only important tributary of the Hrus is the Edrenos, the antient Rhymbacus, which is formed by the junction of two rivers. One of them, the Rhymbacus or Edrenos Proper, originates in the lofty chain which connects the peaks of the Ak-Dîgh and Ak-Dîgh (Monte Vento), which after a north-west course through a beautiful valley falls into the large lake of Abulliont (Apollonias); it issues from the northern corner of this lake, and empties itself into the gulf of Miadâzâh, after a course of about 120 geographical miles. The other, the antient Marcestos, which comes from Simâlîl, at the foot of the Ak-Dîgh, where it is called Sîmâdîl-Sû; it flows west for 60 geographical miles, and north for 80, and joins the Bûkîr-Dîgh, 300 feet below. It is called the Bûkîâ-Châf (Aspesus), and the Marcestos is one of the largest branches of Abulliont. The Rhymbacus also receives the Kârû-Dîgh, the outlet of the great lake Manîfà. Until Hamilton made these rivers the subject of very careful examination we knew very little about them. Between the Rhymbacus and the Zakkaryeb there are only small rivers, the Nifûdeh or Loîf-Sû, near Brûsur, and the outlet of the lake of Inizik or Nûres 7. The Zakkaryeb, the antient Sangarius, is the second in magnitude of the rivers of the peninsula. Its sources are rivers on the high table-land between Kûthîshây and Scerînâsh, so that the river passing by Chânîd in 39° 16' N. lat., 31° 24' E. long., is the main branch; or a river which comes down from the Ermeni-Dîgh, in a northern direction, and passes by Hergân Kûleb, is the principal branch. Those two streams unite about six miles east of Chânîd, whence the river flows east and north till it is joined by the Ermeni or A'ngora-Sû, by which the mountainous tract of A'ngora is drained. The mouth of this river, on the north-east, only a few miles south of the city of A'ngora, the river has been seen by European travelers only at a few places. Its general course however is known, and in tracing it we follow a map of Bithynia, in the first volume of Le Flem's 'Atlas Historique.' The course of the Zakkaryeb will be found defective as to geographical correctness in many parts, but we may rely upon its general correctness, and with regard to its details and the names of localities; as there is perhaps no man in Europe who knows Bithynia, the original abode of Orontes of the Greek and Phrygian races, better than the celebrated Mr. Hammer.

The direction of the Zakkaryeb, from its junction with the A'ngora-Sû, as far as 33° 1' E. long., is west; thence it flows west and north-west till it reaches the north-eastern provinces of the Ermeni-Dîgh, a lofty and wooded range connected with the Olympus of Brûsâ by the Tûmânî-Dîgh. At the foot of the Ermeni-Dîgh, near Sîgûtî, a few miles west of the Zakkaryeb, stands the tomb of Óxâghrul, the father of Osman 7.

From the Ermeni-Dîgh, which is close to the stream, the river runs north, north-west, and north to the town of Sârîkàf, a village about 10 minutes south of the latitude of Nîces, the river is fordable at a place called Sûrîkûn, that is 1 ford. The most western part of the river, according to the map, is in 30° 1', but it is seen only in the above-mentioned map, as to the fact; and the curve of the river in this part varies much in different maps. In the latitude of Nîces there is a stone bridge over the river near Kiw (Kimîrî Gaîwa), and on entering the great road joining the towns of A'ngora and A'ngora unite. From that spot the direction of the Zakkaryeb is north-east, and in the latitude of Nîcema it turns suddenly east, but it soon flows north, north-west, and north, and it enters the sea in 41° 17' N. lat., 30° 42' E. long. From this point it suddenly turns east, the river runs north, and the old bed is still visible. A fine bridge of antient construction, 1087 feet in length, leads across the bed, through which a small arm of the Zakkaryeb flows north. Near this place it is joined by a bridge from the Nîces, and Kiw the Zakkaryeb flows for 13 miles through a gloomy intricate defile, with high and rugged precipices rising perpendicularly on both sides. The summits of the mountains are covered with excellent timber, oak, beech, sycamore, and ash. The Sangarius, says Kimîrî, is in general about 100 yards wide (near Kiw), contains an immense body of water, and flows with surprising rapidity. The stone bridge over it, according to an inscription, built by Sultan Bâkûr-Gûl, in 1510 (L.), was renovated in 1719, and was renewed by the current. Ainsworth crossed the river on a wooden bridge near the ancient bridge, which is over the dry bed. The width of the river was 327 feet, with an average depth of two feet, and a rate of about three miles an hour. He adds that the same river was liable to overflow in 1804 and in September, the driest month of the year. The tributaries of the Zakkaryeb, besides those mentioned above, are on its left, the Fûrâk-Sû, the antient Thymbrius, which comes from the Mûrûd-Dîgh, and after a northern and north-eastern course of about 50 geographical miles, and passing by Kûtâ-jiây and Sîkê-Sheher (Doryalemon), joins the Zakkaryeb about 10 geographical miles below this town. The Yeîlî-Sû (Yeîlî-Sû), which joins the main river near Kiw, after a north-eastern course of 50 geographical miles; it comes from the Olympus of Brûsî. A river which flows from the east falls into the Zakkaryeb on its right, below Sûrîkûn, after a westerly course of 40 miles. It has no name in the map, and its mouth is 80 feet wide. The river of the Kerims-Sû, and the Zakkaryeb may be estimated at 220 geographical miles. The distance in latitude between its mouth and the sources of the Thymbrius, which has often been taken for the main river, is about 30°; but between the mouth of the Kerims-Sû and the Zakkaryeb is about 80 miles; and consequently belongs to the upper system of the river, there is only a difference in latitude of 40'; and there are only 30° difference between it and the sources of the Kerims-Sû. The defile near Kiw is the place where traces of former canals may be seen. The Zakkaryeb descends into the Exunie plateau. The mouth of the Filîsî, the antient Biliaus, is in 41° 35' N. lat., 32° 6' E. long. Its lower part has been visited by Ainsworth, who describes it as a 'noble river' flowing through a most beautiful valley from south to north. We know nothing of its upper part.
except a portion of it near Zafaran-Buli, where there is a wooden bridge over it. This is mentioned in the first volume of Travels (p. 60), and it was also noted in the 19th-century map which accompanies Hamilton's 'Travels,' also leaves a blank for the country thus traversed by Ainsworth, and neither indicates the towns of CHERKESH and CHOMONIM visited by the traveller, nor the water-courses which are closely pressed in the north by the Durnah-Yaill-i (Mons Orminius), it turns west by Fillya, but being stopped by the Karab-Dagh it flows north along the eastern foot of this chain. The Fillya thus effects the drainage of the tract which begins between the mouths of the Zakarye and the sources of the Milian-Irmak in the west, and is bordered in the south by the range between the Bدل-Dagh and the Ishk-Dagh, and in the east by the chains between the Ishk-Dagh and the Black Sea. The waters flowing south of this border flow into the Zakarye, and east of it they are tributaries of the Kizil-Irmak.

The Kizil-Irmak (Halya) is the largest river of the peninsula. Its sources are now known: they are in the Gemin-Belli-Dagh, in 40° N. lat., 37° 40' E. long., in the northernmost part of the second of Phrygo-Cappadocian terraces. The river at first flows south, but it soon takes a south-west direction, which it pursues for about 150 geographical miles, through a picturesque valley, along the northern border of the seven east-west tablelands.

This part of its course is partly confluence. In 38° 40' N. lat., 34° 4' E. long., it turns north-west, with some western bends, and flows in that direction as far as a point in 40° N. lat., 39° 20' 30" E. long., for about 150 geographical miles. This part is likewise imperfectly known. Thence it flows north-east, east, and again north-east as far as Omsmflik, for 100 geographical miles; this part is much better known. This part of the course is shortened, and has partly been observed, to be west for about 20 and thence north-east for about 30 geographical miles, as far as the defile of Karal-Tepé, a narrow pass overhung by huge precipices. A portion of this pass is formed by an angle of the main river, and another portion by the valley of the Gok-Irmak, called here Costambuli-Chai, or Karal-Siid. From this spot the river flows south-east for 15 geographical miles, and thence north-east for about 40 miles. It empties itself into the sea by two navigable channels, in 41° 48' N. lat., 36° E. long. The sea flows north-west along the coast, and flows through a flat alluvial tract. The whole length is above 430 geographical miles: the distance in latitude between its mouth and its sources is only 1° 50'. We know of no considerable tributaries to this river except the Gok-Irmak, mentioned above, which rises in the mountains of Urmûn-Bûrûm, west of Kastamuni, which lies on its eastern bank: the Gök-Irmak has an eastern course of about 70 geographical miles, and flows along a valley bordered by high rocks, and generally fertile fields. It appears to be adapted for regular navigation by large craft; the waters are low in the dry season; but they greatly increase in winter and spring, when the snow melts on the high northern mountains, and flows in a strong stream along the valley. The Yeshil-Irmak, the last considerable river in the eastern part of the peninsula: we know little of it. Its sources are at the north-western foot of the Lætan group, in 40° N. lat., 39° 5 E. long., and it enters the Black Sea below the fortress of Chârnehâmeh, after a north-western and south-western course of about 50 miles. It receives on the left the Tökêt-Siid, the antient Thaïs, of which the sources lie between Niksar, on the Yeshil-Irmak, in the north, and the large town of Tökät in the south. Its course is west, with occasional bends to the north as far as Amasia, a distance of about 90 geographical miles, and then south to Amasia west and north-west for 30 miles. The Tökät-Siid receives on its left the Choterlek-Irmak: its sources are in the Kirk-Delnin Mountains, north of Chârnehâmeh, and enters the Yeshil-Irmak near the town of Kizil-Irmak, in 41° 2' N. lat., 38° 48' E. long.; its direction is south-east to north-west.

Lakes.—Besides those mentioned in the description of the great lakes, the lake of Aballione (Apol lonia) lies on the south-western border of Bithynia, between Mount Olympus and the Gulf of Medînisch: it stretches from east to west 20 miles, and 12 1/2 north to south. On the south it is bordered by the beautiful wooded mountains of Olympus, on the north-east by thievichy hills, and towards the north-west by marshes. The north-eastern portion is studded with many islands: one of them, which is connected with the mainland by a wooden bridge, stands near the antiens Apollonia, the antient Apollonia ad Rhynion. The town some of the islands, and the whole surrounding countries, are full of ancient ruins. The lake abounds with fish, and supplies the markets of Brissa and Constantinople. The river Ebrous is a 280 feet broad a little below the spot where it issues from the lake, and it is crossed by a wooden bridge. The lake of Nilûni, the antiens lake of Melitopolis, is west of that of Aballone, on the eastern borders of Myasia: it is 14 miles long from east to west, and 8 miles wide from north to south. The geographical and historical notices of it are not abundant; it is well cultivated, and produces much wine, which is highly esteemed by the Greeks. At Kazakli, at the western extremity of the lake, there is a Christian population, and is said to be the scene of a great battle with the Turks. The lake of Buldir (37° 45' N. lat., 30° 25' E. long.) is so called from the town of Buldir, which stands near the southern part of it: it contains five thousand acres, and has a numerous population, of which a considerable portion are Greek. The length of the lake from north-east to south-west is about 17 miles, and its width about four. The southern shore is flat, and the banks are very muddy. The neighbourhood produces much gum-tree sap, which comes from a plant (gum) resembling a species of furze. It is obtained by making an incision in the stem near the root, and cutting through the pith, when the sap exudes in a day or two, and hardens in the opening, after which it is collected by the peasants. Its price is about 10 kreutzers per inch. A lake of the same name is said to be under the Turkish name of ‘kether.' The water of the lake is blackish, with a strong taste and smell of sulphurated hydrogen gas: it is very shallow, and it is covered with thick, soft fowl. The lake contains a considerable part of the Lake Ascania by Pilny (Hist. Nat., xxxi, 10), but it cannot be the Palus Ascania of which Arrian says that its water was so salt that it crystallized naturally, and that the inhabitants felt no want of the sea, as they got salt from the lake: Arrian (Anab., ii. 1-22.) says that another lake in the neighbourhood which corresponds with the account of Arrian. This is the lake of Chârnehâmeh, about 14 miles north-west of the lake of Buldir; it is about 20 miles long from east to west, and 10 miles broad, and is surrounded by high hills, with precipitous and lofty cliffs. In summer the lake is very shallow, at least near the banks, which are muddy, but in winter the water rises. In the
by reason the water is perfectly saturated with salt, which crystallises on the surface, and is scraped off the mud with large wooden spades. The broad muddy beam along its banks is likewise covered with salt coats, and great quantities of salt are annually produced here. A species of salicornia grows near the sea, and a species of mignonette, called the Aquatic Aralia; but it is also identified with the lake mentioned by Herodotus (vii. 30) as being situated near the town of Aphanis in Phrygia, and from which salt was exported to Ashar, where it was obtained and sent to Hamilton. We omit the lake of Nicassia, though large, and the most picturesque sheet of water in the peninsula, and many others, as they have either been described under other heads, or are not important enough in a general description of the country.

Mineral Productions.—Both Hamilton and Ainsworth, who have contributed so much to our knowledge of the peninsula, had a firmain to inspect the mines, and they visited many which were hitherto unknown except to natives. Mining skill is in a very low state in this country. There are copper-mines near Bükir-Kurechâf, not far from the Black Sea, in the plateau of Åfên; near Châlswor, on the Black Sea, near Tintak, and many other places. Iron-mines near Üniçli, near Uniction, on the Black Sea; silver with copper, in the mines of Têbrezil; and silver and lead at Denek, in the Begrekk-Dagh, east of the Kizli-Urmâ. Nitre is got at Karâ-Bûnik, in the south-eastern part of the plateâls; Salt-lakes abound in all parts, especially in the north-eastern part of Asia Minor and in the tract round Ängora.

Hot springs occur in all the provinces: those of Brûcâ are celebrated, and are even visited by European patients. The hot springs near Ereğli, in the southern part of the peninsula, are much frequented, and there is one particularly which is hotter than any other in the peninsula. It issues out of narrow crevices on the summit of a ridge of low hills near that town, and forms a succession of small pools and conical hills, which have been created by the gradual deposit of the earthy matter with which the water is charged, and which forms at first small pools round each orifice, which, by the rapid evaporation of the water, are soon raised into cones. The confined water and gases are heard bubbling under ground. Some of these springs deposit potash, and others deposit sodium sulphate of lime or gypsum, which is the most frequent.

(Hamilton, li. p. 307, &c.)

Population.—A closer examination of the accounts of recent travellers leads to interesting results on this point. The opinion that a line drawn from the corner of the Gulf of Ädâla to the mouth of the Zâkârâyik would divide the country into two parts, so that in the western portion the Greeks would form the majority, and in the eastern the Turks, is not accurate. As to the towns, the proportion of the Turks to the Greeks is not more than eight to ten, and the tenth part of the population, and in Bithynia the Turks are the three times as numerous as the Greeks. The Turks are more numerous in the western part than in the east, and the towns are more numerous in the towns, and several districts in the western part are exclusively inhabited by them. All those who call themselves Turks are not of Turkish origin, and there are several hundred thousand so-called Turks who are descended from Greek ancestors. There are also Mohammedan Arminians in the east. Those among the Turks who style themselves Osmânlis are settled in the country, and lead an agricultural life, though many of them live during the summer time, when the rice and tobacco fields are in full growth, and visit the towns and market places, and some of them in the towns, and some of them in the interior of the country, and lead a life of idleness. Both are exclusively for agricultural or pastoral purposes, leaving their houses empty in the villages. The Turkomsans are most numerous in the east; but such among them as are shepherds, and lead a real nomadic life, wander as far as the table-lands of the western provinces. The Yûrûks are nomadic Turks, probably of the same origin as the Osmânlis, and are numerous in the northern, middle, and eastern parts. In the same district there is a considerable number of Kûrds, who are either pretended or real, who are the secretaries of the chief of the villages, and who are at the head of the landladies, and sometimes, though seldom, as far as Brûcâ. The Turkish peasants are a brave and honest set of men, full of confidence, faithful, trustful, ready to assist, liberal, generous, by no means so grave as the Turks are generally represented, for a people of the same nation, religion, and sentiment; they are very ignorant and credulous. Follies, perhaps, gives too favourable a description of them; but he was in the Arcadia of Asia Minor. Religious prejudices are less strong in the peninsula than in European Turkey, and generally the population of Anastasia may be considered as the best part of the whole population of the Turkish empire.

We add some of the routes of Hamilton, and some of the points of latitude computed by him:—

1. Road from Mûdîniâ to Smyrna, in distance hours:—

Mûdîniâ—Bâsh-Arûs, 6; Têbrezî, 6; Asaadî, 6; Aphanis, 6; Smyrna;—

2. From Kârakûsh to Smyrna, in distance hours:—

Kârakûsh—Buûchâ, 1; Çorhîm, 2; Chorûm, 3; Arka, 4; Heki, 5; Smyrna, 6; Aphanis, 9; 8 miles. 1

3. Smyrna to Ainsworth, in distance hours:—

Smyrna—To Tirebdli, 1; Akhsâm, 6; Smyrna;—

4. From Smyrna to Ainsworth," Travels and Researches in Asia Minor, &c.; Ainsworth, &c.; Ainsworth, 115
at least before the first receipt or possession of a body. The secretary of state appoints inspectors of places where anatomical examinations are carried on, and they make a quarterly return of every deceased person's body removed to each place in their district where anatomy is practised, distinguishing the sex, and the name and age. Executors and others (not being undertakers, &c.) may permit the body of a deceased person, legally in their possession, to undergo anatomical examination, unless, to the knowledge of such executors or others, such person shall have expressed his desire, either in writing or verbally, during the illness whereof he died, that his body might not undergo such examination; and unless the survivor, husband or wife, or any known relative of the deceased person, shall require the body to be interred without. Although a person may have directed his body after death to be examined anatomically, yet if any surviving relative objects, the body is to be interred without undergoing such examination.

(§ 6.) When a body may be lawfully removed for anatomical examination, such removal is not to take place until forty-eight hours after death, nor until twenty-four hours' notice after death to the anatomical inspector of the district of the intended removal, such notice to be accompanied by a certificate of the cause of death, signed by the physician, surgeon, or apothecary who attended during the illness whereof the deceased person died; or if not so attended, the body is to be viewed by some physician, surgeon, or apothecary after death, and who shall not be concerned in examining the body after removal. Their certificate is to be delivered with the body to the party receiving the same for examination, who within twenty-four hours must transmit the certificate to the inspector of anatomy for the same district, accompanied by a return stating at what day and hour, and from whom, the body was received, the date and place of death, the sex, and (as far as known) the name, age, and last abode of such person; and the particular, with a copy of the certificate, are also to be entered in a book, which is to be produced whenever the inspector requires. The body on being removed is to be placed in a decent coffin or shell, and be removed therein, and the party receiving it is to provide for its interim after examination in consecrated ground, or in some public burial-ground of that religious persuasion to which the person whose body was removed belonged; and a certificate of the interment is to be transmitted to the inspector of anatomy for the district within six weeks after the body was received for examination. Offences against the act may be punished with imprisonment for not less than three months, or a fine of not more than 50l.

The supply under this act, of the bodies of persons who die in places of public lodging, and elsewhere is said to be sufficient for the present wants of the teachers of anatomy; and the enormities which were formerly practised by 'resurrection-men' and 'harkurs' have ceased. The number of bodies annually supplied in London for the purposes of dissection amounts to 600.

ANCHOR. Among the changes proposed within the last ten years in the construction of anchors, the most remarkable perhaps is that brought forward by Mr. Porter, for which a patent was obtained about five years ago.

The objects designed to be attained by this new construction are said to be mainly the two following:—the avoidance of the consequences of what is termed 'fouling,' by the cable passing over the exposed fluke of the anchor when the vessel is swinging in a tide-way; and the avoidance of injury to the vessel itself, in the event of falling upon her anchor. The peculiarity of the plan consists in giving to the arms and flukes a freedom of motion, and to a pivot or pin on the lower end of the anchor, the departing at once from the rigidity usually observed in the construction of anchors. The arms and flukes are forged wholly independent of the shank, and have a hole drilled transversely through the centre, for the reception of the pivot bolt which joins them with the shank. To give a familiar illustration, the joint may be described as of that kind which connects the wires of an umbrella with the ribs, so as to give a freedom of motion round the pin or bolt as an axis. To the shank is attached one fluke, and to the ground, the other necessarily falls down upon the shank, thereby avoiding the danger incident to the upward projection of a sharp point.

A paper appeared in the 'United Service Journal' for 1840, in which the effect of this swivel action was rather minutely traced. When the anchor is dropped from the vessel, it descends swiftly and strikes against the bottom of the sea with great momentum (estimated, with an anchor of ten hundredweight and a depth of twenty-four fathoms, at 45 tons). When the anchor rests fairly on the ground, its first position a

with the lower peak, or tip, in contact with the lower surface of the shank, the upper peak being as far as possible from the shank, as shown in position A in the above figure. Then the slightest movement of the cable suffices to disturb this position, and to bring the lower peak into a direction fitted to penetrate the ground, as at B. This illustration continues until the upper peak touches the upper surface of the shank, and the lower peak is directed almost perpendicularly: a position very favourable for penetration, which then takes place. The shank and stock then lie flat on the ground, as in C; and the anchor, if pulled in the direction of the shank, has a tendency to fix itself more firmly in the ground, by keeping the lower fluke almost perpendicularly in the ground.

It is evident that the free movement of the arms on the end of the shank must produce great modifications in the position which the anchor assumes under varying circumstances; but the efficiency of the change must be determined by the daily task of practical navigation. Captain Denham, of the Marine Surveyor's Department at Fleetwood, gave a report of some experiments which he had tried in 1840 on the new swivel anchor, and states the following as the results to which he had arrived:—It is almost impossible to foul it; it glides quickly into the most stubborn ground; it holds on to the shallowest peak; it cannot lodge on its stock end; it presents no upper fluke to injure the vessel herself, or others, in shallower water; it cannot injure vessels' bows when hanging close to hill, as merchant-vehicles find a common practice which is not so likely to break off an arm, or part in the shank, as anchors with fixed flukes do, because the construction of these arms can be of continuous rod-iron, and the fulcrum of leverage is so much nearer the ring, owing to the particular of the upper fluke being placed at the shank; it is a most convenient anchor for stowing inboard on a voyage, as the flukes can be easily separated and passed into the hold; it can as easily be transported by two boats when one would be damaged by the whole weight; it produces the desired effect of ground-stable at one twentieth less weight." (Unit. Serv. Journ. March, 1840.)

In 1836 Mr. Meggett patented an anchor in which the wide flukes, or palms, are dispensed with, the flukes being very little broader than the arms; while at the same time there is an increased width given to the crown by the addition of a triangular piece of iron. The objects of these modifications in the customary form are stated to be three in number:—
ANCHOVY PEAR. [GRIAS, P. C. S.]

ANCHUSA, a genus of plants belonging to the natural order Boraginaceae, and to the sub-tribe Anchusae of that group. The calyx is 5-fld.; the corolla funnel-shaped, with a straight tube, the throat being closed by prominent oblong nutlets, or scales, or petals, subtended by scales, and the limb of the corolla, when expanded, is 5-fld., and blue or white, or more rarely purple, or pink, or red, or yellow; the personages are numerous, and the fruits are capsules, or follicles, or nutlets. The name is derived from a corruption of anchor, because the same was formerly used to anchor ships. It is an inhabitant of Great Britain, and is a rare plant.

A. officinalis, common Alkanet or Bugloss, has lanceolate, hispid leaves, unilateral crowded spikes, ovate-lanceolate bracts, the segments of the calyx bluntish, hairy on both sides, the scales of the corolla hairy. The flowers are a deep purple.

A. sempervirens, Evergreen Bugloss, has ovate leaves with lower leaves on long stalks, the peduncles axillary, each bearing two dense spikes with an intermediate flower, the segments of the calyx hairy on the outside only, the bracts minute lanceolate, scales of the corolla downy, flowers blue, salver-shaped. This plant is found on waste ground, near ruins, in Great Britain, but is rare.

A. tectoria. Dyers’ Bugloss or Alkanet, has different stems, oblong hispid leaves, bracts longer than the calyx, the segments of the corolla shorter than the stamens. The corolla has a deep blood-coloured tube, with the limb deep blue. The root is woody, descending, and of a dark red colour. This plant is a native of Peloponnesus, the island of Cyprus, and the deserts about Alexandria. It is cultivated in the south of France for the sake of the root, which yields a fine red colour to oils, wax, all unctuous substances, as well as to spirit of wine. Its chief use is in colouring lip salves, ointments, and sometimes pastes, &c. It is also used in dyeing wood and dyeing cotton. It is also used for colouring many of the beverages sold under the name of port wine, likewise the corks used for the bottles in which this fluid is sold. The colouring-matter has been separated, and has been called by the chemists Paeoniae. There is a great abundance in the external parts of the root, the inner being nearly destitute of it. An extract of this root was formerly used in medicine in hemorrhages, but is now seldom employed.

A. aquatica. Narrow-leaved Bugloss, has linear lanceolate hispid leaves, ovate-lanceolate bracts, 5-fld calyx, with blunt teeth. The tube of the corolla is pale purple, the limb deep blue. In gardens it attains a height of 1 foot; but when wild it is not a foot high. It grows in Italy, Germany, and Switzerland, by road sides, amongst rubbish, and on the borders of ploughed fields. It was used by Boerhaave as a medicine; but, like the order to which it belongs, its properties are too insipid to give it a standing-place in the Materia Medica of the present day.

In the cultivation of the species of this genus but little care is required, as they will grow in almost any soil, and are easily increased by seeds. The A. Cyprium, or Personae, which is an annual, is a great plant of a beautiful green. Many of them are pretty annuals for the garden, as A. procumbens, A. Barraillei, &c.

ANCIENT DEMESNE. [MANOR, P. C.; SOCCAR, P. C.]

ANCIENT LIGHTS. [LIGHTS, P. C. S.]

ANCYLOCERAS (D’Orb.). This fossil genus of M. D’Orbigny includes several species of Hamites (Philips), from the Speeton clay and lower greensand.

ANDERSON, JOHN, the founder of the Andersonian Institution of Glasgow, and one of the earliest promoters of...
that popular instruction in science which has so greatly ele-

vated the character of British artisans, was born in the parish of
Renaseth, Dunbartonshire, in 1726. He was grandson of the
Rev. John Anderson, an eminent Scotch Presbyterian minis-
ter, and interoloped as the first minister of the Royal's Horn Church, Glen.
He was left an orphan at an early age, and was educated at Stirling by an aunt; and while there he became an officer in a burgher corps raised in
February, 1746, to defend the town against the forces of the

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A right angle is half the opening of a straight line and its continuation; an acute angle is that which is less than a right angle; an obtuse angle is that which lies between one and two right angles. Complementary angles are two which make a right angle; supplemental angles are two which together make two right angles. Two lines which meet and make a pair of angles, one less than two right angles, are called ex-exterior, or re-entering; the other greater than two right angles, are called en-enior, or re-entering. A line, but never a point, is mentioned by Euclid. For salient and re-entering (which are borrowed from fortification) direct and retroflected have sometimes been used.

The angles which two lines make with the same part of a third, on opposite sides of it, are called alternate. Two lines which cross one another make two pairs of vertically opposite angles. The angles made by adjacent sides of a figure are called internal; those made by any sides with adjacent sides produced are external. When the angular point is the center or on the circumference of a circle, the angle is said to be at the center, or at the circumference. Beginners often confound the angle with the angular point.

The angle of contiguity or of contact is an old notion of the opening made by two curves, or a curve and a line, which touch. In modern mathematics, when a curve is supposed to be composed of infinitely small rectilinear elements, the infinitely small acute angle made by one element with the curve, and the production of the next does duty for this old angle of contiguity.

A spherical angle is made by two circles (usually great circles) of a sphere. When the circles meet at the pole of the sphere, the angle is called a horary or hour-angle; and when neither is the meridian, the angle is frequently called horary. The angle of position of a star is that made by the circles drawn to it from the poles of the equator and ecliptic. The angle of elevation is the angle made by a line drawn from the eye to any object, with the horizontal line which is in the same vertical plane as the first line; but when the object is below the horizon, the term is angle of depression. When lines are drawn from two points to a third, those two points, and also the line joining them, are said to subend the angle which is made at the third point. The angle which two objects subend at the eye is their angle of elongation. The angle of the vertical is a name given to the angle which a line drawn to the spectator's zenith makes with his radius of the earth produced. It is taken as nothing when the earth is supposed to be a perfect sphere. Angular terms, such as right ascension, longitude, etc., with which the word angle is not usually coupled, are not considered here. The parasitic angle is simply the Para-

A dihedral angle is the opening made by two planes: it is measured by a rectilinear angle, namely, that made by two lines drawn in the two planes perpendicular to their common intersection. But the rectilinear measure is not the same thing as the dihedral angle, though the two are often confused: we might just as well say that the pressure of the air is the same thing as the number of inches in the barometrical column of mercury. A solid angle is said to exist when three or more straight lines, not in the same plane, meet at a point. It is a complex idea, and the best notion of it as a magnitude is derived from considering it as measured by the area of the spherical tangle which subtends it.

To what we have said under the article Angle, P. C., we may add the following:—If we were to define an angle as the infinite plane space included between two straight lines which meet at, and point, and are produced ad infinitum one way from that point, we should have a sufficient definition, subject only to the question of the propriety of making infinites a part of the elements of geometry. But when the great mathematicians arrived at the conclusion that this definition is the true and proper one: the author of 'Geometry Without Axions,' an acute writer, declares it to be the definition 'whether geo-

ANGE'LICO. [PIERCE, FRA GIOVANNI DA, P. C. S.]

ANGELO BUONARROTI. [BUONARROTTI, P. C. S.]

ANGE. As the explanation of the various ways in which this word is used lies scattered in many parts of the work, the following summary may be found convenient.

An angle is the opening of two lines; rectilinear, of two straight lines; cartesian, of two curves; mixtilinear, of a rectilinear angle, and when a curve enters, its tangent is the straight line which is used in determining the angle.
a triangle are equal to two right angles. Without going so far as to say that this is the definition of an angle, we should recommend it to be admitted and examined as what might be called a distinct proposition of an angle otherwise formed, by means of finite lines, we find much advantage in the knowledge of the following truth—The infinite spaces contained between lines have among themselves all the relations which exist among the angles formed by the lines themselves. The angle best understood is that between as the infinite solid space contained between three planes, that is, between such parts of them as lie between three infinitely produced straight lines which meet at a point.

ANGULO, P. C.

ANGOULEME, DUC DE. [CHARLES X., P. C. S.]

ANGUI/SOICLA, SOFONISBA, greatly distinguished as the 'Cremonese' for her ability in portrait-painting. She was born in Cremona, of a noble family, about 1533, and learnt painting first of Bernardino Campi at Cremona, and afterwards of Bernardino Gatti at Milan. Vasari describes some of her portraits as wonderful, they possessed so much life. Her reputation having reached the ears of Philip II. of Spain, he sent two gentlemen and two ladies of the court in 1569 to invite and to escort her to Madrid, to enter into the service of the Queen of Spain. She painted a portrait of the queen, with which Philip was so much pleased that he sat for her own, and ordered Don Carlos likewise to sit for her. She settled upon her two hundred dollars, and presented her, according to Ceán Bermúdez, with a diamond of the value of fifteen hundred ducats. By these portraits and many others Sofonisba obtained a reputation for portrait-painting which was equalled by none of her contemporaries. Pope Pius VI. requested her to come to Rome to improve his cabinet, and in 1581 at Madrid he procured a portrait of her by the Queen of Spain, in the hand of the Cremonese. Sofonisba sent the portrait with a letter to the pope in the month of September, 1561, and his holiness paid the fair painter the extreme compliment of an autograph answer in the following month, complimenting her highly on her performance. The letter and the pope's answer are both given by Vasari.

Sofonisba was married in Madrid to a Spanish nobleman, Don Francisco de Gonzalez, upon which occasion Philip raised her pension to a thousand ducats, and presented her at her marriage with twelve thousand crowns as a dowry. Her pension was to be drawn from the customs of Palermo, where, after her marriage, she resided with her husband. In a few years however she became a widow, but she found a second husband in the person of Orazio Lomellino, the captain of the Genoese galleys in which she returned to her own country from Palermo. They were married shortly after her return from Spain, in the year 1585. In 1591 Philip raised her pension to fourteen hundred ducats. She painted many pictures at Genoa, by which she added to her reputation, but as she grew old she became blind. She however did not lose her fame, but became the centre of an intellectual society, her house being the resort of the principal artists and men of letters and virtù in Genoa. Vandyck, who frequently visited her, is reported to have said that he had learnt more from the conversation of a blind old woman than from the works of all the great masters of Italy, a report which may not be true.Walpole says that Vandyck painted her portrait at Palermo when she was in her ninety-second year, which would be about 1625, but this statement must be corrected by the circumstance, that she is not known to have returned to Palermo, and she is generally supposed to have died in 1620. If Vandyck painted her portrait when she was in her ninety-second year, it must have been in Genoa, and she probably did not live more than a few years after her marriage. She has never been very certain both of her birth and death. Vandyck was in Genoa in 1619 and in 1623, and perhaps between those dates.

The works of Sofonisba betray none of that fineness of design and modelling which is frequently apparent in the pictures of the French school. They are particularly in the works of Angelica Kauffmann. There are several portraits of Sofonisba by her own hand: there is one at Althorp in Northamptonshire, in which she is represented playing upon a harp; another she painted before 1533: the dates however are very uncertain.

The works of Sofonisba are also to be found in handbooks, such as that of Petteri, and in Ceán Bermúdez, Dictionario Historico, &c.

ANIMAL CHARCOAL. [CHARCOAL, ANIMAL, P. C.; JARROW, P. C.]

ANIMAL FLOWERS. [ACTINIA, P. C.]

ANIMAL MAGNETISM. In the articles Animal Magnetism and Somsambulism, P. C., reference has been made to the fact that several persons, including members of the Society of Mesmerists, have excited much public interest. It will be found from those articles that although this subject had excited much attention on the continent of Europe, in Great Britain it had obtained comparatively a small share of interest. Recently however animal magnetism has had directed considerable attention. By a great amount of attention, it has been investigated by physiologists of eminence, and used as a curative agent by many medical men. In the present article we shall not attempt to summarize all the facts presented by specialists with a view to the rejection or adoption of any theory, but endeavour to give a fair view of its position and claims from the writings of those who have investigated its phenomena.

One of the first publications on the subject was by Mr. Richard Chesewicz, a fellow of the Royal Society, who published a series of papers in the 'London Medical and Physical Journal' for 1829, entitled 'On Mesmerism, improperly denominated Animal Magnetism.' He performed numerous experiments, which were witnessed by medical men, and amongst others by Dr. Elliotson. In 1836 Mr. Colquhoun published a work on animal magnetism, entitled 'Isa Revelata,' which attracted considerable attention to the subject. In 1841 a translation appeared as an appendix to a report of a second French commission appointed to investigate this subject in 1831. This was followed by the arrival of Baron Dupotet in London, who performed many experiments, some of which were witnessed by Dr. Elliotson, who immediately published an account of the further results obtained.

The result of the experiments of Dr. Elliotson, which were published in the 'Lancet,' produced a great sensation, and phenomena which had hitherto been regarded as impossible were constantly produced. Communications were at this time to various medical journals of remarkable cases, and among others were some from Mr. Herbert Mayo, then professor of physiology at King's College, London. In 1840 a work was published by the Rev. Chauncey Hare Townshend, entitled 'Tracts on Mesmerism and the Nervous System.' This work contained many cases and facts with regard to the phenomena of animal magnetism. In 1841 Mr. La Fontaine, a Frenchman, visited England, and commenced giving public lectures on mesmerism and exhibitions of its phenomena. Whilst in Manchester he attracted the attention of Mr. Braid, a surgeon residing there, who, having repeated and modified variously the original experiments of the mesmerists, published a work on the subject in 1844, entitled 'Neuropsychological Researches or the Nervous Sleep.' Since this time various public lecturers have appeared, and have created a general interest on the subject. One of the most recent productions on this subject is a small volume in the 'Animal Phenomena,' which attributes the cure from a long-standing ailment to the influence of animal magnetism.

The phenomena presented by persons under the influence of animal magnetism are various, and are produced by which the phenomena are produced. Mesmer and his followers on the Continent, and most of those who have practised mesmerism in this country, have produced its effects by placing themselves near to the individual to be mesmerised, and making downward passes with their hands by their bodies without touching them, but looking at them at the same time intensely in the face. This is found to affect the individual in a space of time varying from two to three minutes to half an hour. We have however not here to consider the influence, and if an effect is not produced in the course of half an hour, the effort is abandoned. Mr. Braid however, in the course of his inquiries, found that a second individual was not necessary to the successful development of mesmeristic phenomena in those persons. By his person and his causing a partial but not complete corporeal contact directing his attention, by means of the eyesight, to some particular object, as a lancet-case or a cork, all the effects of the passes and intense looking of the operator could be produced. He has caused him to give the same name, Hypnotism, to the state in which persons are thus placed.

The effects of the passes or fixed attention on persons of nervous susceptibility are various. Writers on animal magnetism in many countries are as follows: Classification is by Kluge, a German writer on this subject, a tolerably correct estimate of the effects which have been observed in mesmerised individuals:

First degree—Called waking, presents no very remark-
the phenomena. The intellect and the senses still retain their usual powers and susceptibility.

Second degree:—Half-sleep, or imperfect crisis. Most of the senses still remain in a state of activity, that of vision only being impaired, the eye withdrawing itself from the person, and generally looking downward.

Third degree:—The magnetic or mesmeric sleep. The organs of the senses refuse to perform their respective functions, and the patient is in an unconscious state.

Fourth degree:—The perfect crisis, or simple somnambulism. In this degree it is said to "waken within himself," and his consciousness returns. He is in a state which can neither be called sleeping nor waking, but which appears to be something between the two.

Mesmeric cases have been supposed to be cases of amnestic, or lucid vision. This is called in France, and mostly in this country, Clairvoyance; in Germany, Hellschen. In this state the patient is said to obtain a clear knowledge of his own internal mental and bodily state, is enabled to calculate with accuracy the phenomena of disease which will naturally and inevitably occur, and to determine what are their most appropriate and effectual remedies. He is also said to possess the same faculty of internal inspection with regard to other persons who have been placed in mesmeric or somnambuistic states.

Sixth degree:—Universal lucidity; in German, Allgemeine Klarheit. In this state the lucid vision becomes greatly increased, and extends to objects whether near or at a distance.

Such are the states of the system recognised by mesmerists, and from which dependence is made in each of these six degrees. However, there are many who practise mesmerism who are sceptical with regard to the real existence of the two last degrees, although such cases are recorded by the best authorities on animal magnetism.

One of the most singular statements with regard to mesmerism is its application to phrenology. It is asserted that persons in the sleep-waking state, when that region of the head is touched or pointed at by the mesmeriser which is over the seat of the supposed sense or organ in the brain, will exhibit the mental and states and which are peculiar to the exercise of those organs. Thus when the organ of language is touched, the patient talks; when, it he laughs; when, in allusion, he is kind, and so forth. Such cases the first stated by Dr. Elliotson, Mr. Brain, Mr. James Simpson, and others.

The mesmeric state has been applied mostly to the cure of disease, for which purpose it was used by Mesmer when it first attracted public attention. It has also been used for the purpose of producing sleep during surgical operations, as well as a means of diversion for the purpose of ascertaining past and future events, as related in the case of Miss Martineau's affection. The class of diseases which have been cured by its means include the different known to medical men as functional nervous diseases. Various nervous diseases, such as paralysis, epilepsv, &c., come on from changes in the structure of the nervous organs, but these are not susceptible of benefit from the influence of the mesmeric state, since, as already stated, no structural lesion can be supposed to exist, and which often yield to sudden changes of the mind from various causes of excitement, and which frequently cease without obvious cause, that has hitherto yielded to this remedy. To this class of diseases belong those of Miss Martineau, to which we have before alluded, who has been relieved of her nervous symptoms by mesmerism, whilst an organic disease still exists. (Report of the Case of Miss H. M., by Mr. Greenhow.) In the article by Dr. Souter, in the second edition of the Encyclopaedia Britannica, it is said: "No operation was performed during sleep artificially induced, and many cases of a similar kind have recently been recorded.

Many theories have been proposed in order to embrace the effects of animal magnetism. Mesmer and his immediate followers attributed to them the action of a subtle fluid in the bodies of animals, which enabled them to exercise an influence on each other at a distance, just as a magnet affects iron; hence he called it animal magnetism. This hypothesis of a universal animal magnetism has received great support from the discovery of the connection of the cerebral centres and of the circulatory and respiratory and muscular systems, induced by a fixed state, absolute repose of body, fixed attention, and suppressed sensation concomitant with that fixity of attention. He further adds, that in all cases he believes that the patient depended on the physical and psychical condition of the animal, arising from the causes referred to, and not at all on the volition or passion of the operator throwing out a magnetic fluid or exciting into activity some mystical universal fluid or magnetic will.

While there can be little doubt with regard to many of the facts recorded on this subject, they have been so remarkably misrepresented through the influence of those who have observed and narrated them, that men of science, disgusted with the imposture of some and the credulity of others, generally shunned its investigation and turned a deaf ear to what they consider the pretensions of its professors. There have been however recently recorded instances in which much has been attributed to suggested observers, and which have led to the conclusion that in these particular cases either imposition was practised or a false conclusion had been drawn from the facts. In the case of two girls put to the test by Mr. Wakley, editor of the Lancet, and recorded in that periodical for September 1, 1838, there was strong reason to believe that many of the phenomena attributed to animal magnetism were assumed at the will of the patient. A more recent instance is recorded by Dr. John Forbes, in the Medical Journal, April 3, 1844, in which he states the powers of Clairvoyance of a French youth named Alexis. Some of these experiments, which were conducted before many observers, the youth entirely failed to give evidence of any extraordinary mental powers during the mesmeric state. Dr. Forbes remarks: "I have repeated a large number of the experiments, 'It is necessary to repeat here what I have stated in the notes, that mesmerism may be true, while its professors are false; that negative results must of course give way to positive ones; and that I for one am still unconvinced that Clairvoyance has not existed, and does not exist, mere because Alexis on these occasions failed to show it. Independent of the motive of gain which actuates some, it is admitted by mesmerists that the class of persons who are most susceptible of the influence of mesmerism are those who have a disposition to deceive, that is, are exceedingly difficult to say when, or upon what occasion, their statements are to be relied on.'"

In this article we have avoided expressing an opinion, and have given only an outline of the present position of animal magnetism in this country.

(For further inquiry refer to the works quoted, and to Elliotson, Human Physiology, 6th edition; Lang, Mesmerism, its History, Phenomena, and Practice; the Atheneum for December, 1844; and the Zoist, a monthly journal which advocates animal magnetism.)

ANIMAL PHYSIOLOGY. [PHYSIOLOGY, P. C.] ANIMAL STRENGTH. Efforts were made to express the amount of human and animal labour in a uniform system of measurement, but the production of a unit capable of universal application, as well as free from the disadvantages of the scale proposed by D'Arçon, which was published in 1680, in the 'Memórias da Academia das Sciences' for 1699, there is a unit of animal strength, and, by M. de l'Hire, for 1703, which he calls the animal unit. It consists of the sum of all the forces necessary for the execution of a given task, that is, the work performed by a horse is equal to 512 of them. In this way, the strength of the states of force, that is to say, the power of action, may be expressed in terms of the animal unit, and that may be applied to measure the relative forces of different animals. This is what is meant by the term 'animal unit,' and is defined as the amount of work that can be done by a horse in a given time, and is the basis of all experiments in this field. The strength of a horse, for example, is said to be 100 animal units, and that of a dog is said to be 10 animal units. It is a useful and practical unit for comparing the strength of different animals, and is widely used in the study of animal physiology.
to a distance equal to one kilometre (≈9280-9 feet, or 2-6124 miles English); and his expression for strength is, therefore, the number of the kilometres by the number of distances to which the burthen is conveyed during one working day. Other mathematicians take, for the dynamical unit, the weight of a cubic metre of water conveyed one unit: neither of these units is, however, convenient for persons among whom those weights and measures are used. In the following, in the results of the remarks experiments have been made to correspond to a unit expressed by one pound (avoirdupois) conveyed one mile; every number expressing strength is, therefore, the product of the number of pounds by the number of miles or which it is conveyed in a day.

With respect to men, Coulomb found that when a man travels unloaded on level ground, he can walk 31 miles daily. Now, assuming the weight of a man to be 100 pounds, we have 160 x 31, or 4960, for the number of burdens, which should be the quantity of action; which is consequently equivalent to that of a machine capable of carrying 4960 lbs. to a distance of one mile, or one pound to a distance of 4960 miles in one day.

He found also, from a mean of the work done by the porters of Paris, that with a burthen equal to 128 lbs. a man can walk 9-72 miles in a day; from which it follows (the weight of a man being 160 lbs.) that the quantity of action is (160 ÷ 128) x 9-72, or 11-5 lbs. to the mile. This number is not included, the quantity of action is 128 x 9-72, or 1244; and this is to be considered as the useful effect. Subtracting 2790 from 4960, we have 2161 for the measure of the action lost in consequence of the burthen; but the useful effect, which in the first case was 1155 lbs., in this second expression is 2044.

Now, if $f$ represent the burthen which would prevent a man, or animal, from moving, and $v$ the velocity with which he would move if unloaded; also, if $F$ be the burthen due to a velocity expressed by $v'$; we should have, according to Euler,

$$f = f' + (v' - v)v$$

or

$$F = F' + (v' - v)v$$

making therefore $f' = 128$, $v = 9-72$, as in the example above, we have 272 nearly for the value of $F'$; or the greatest burthen, in pounds, which a man supposed to be of average strength can carry, and under which he could not move.

From the equation above we have

$$v' = \frac{F}{F'}$$

therefore, in order to find the maximum value of $v'$, we may make the differential of the second member equal to zero, $f$ being the variable), which will give $f' = F'$. So, or 121 lbs. This is the weight which should be placed on a man's shoulders, when it is required to produce from his labour the greatest possible effect. Making $f' = 124$, and $v = 9-72$, and $v' = 31$, in the above equation, we obtain $F' = 272$, or $v' = 10$; nearly, for the distance to which the burthen $F'$ could be carried in one day; and $f'v'$, the quantity of action, is 3450 lbs.

Coulomb further determined that when a man ascends a convenient flight of steps unloaded, the vertical heights of all the ascents during one day being added together, were equal to 1.92 miles; the quantity of action may therefore be expressed by 160 x 1.92, or 307 lbs. and the action was equivalent to that of a machine which could raise 990 lbs. to the height of one mile vertically, or one pound to the height of 991 miles during a day. When loaded with 150 lbs., the vertical height ascended was 0-494 miles: the whole quantity of action is, therefore, given by 160 x 0.494, or 79, while the useful effect is 150 x 0.494, or 74; that is, 74 pounds raised one mile vertically.

It is remarkable that, from the result of Coulomb's experiments on the power of man and beast, the gross weight which a man can carry without moving, and the weight which he should bear to render his useful effect a maximum, are nearly the same in this case as they were found to be from experiments made with burthens carried on level ground.

Coulomb has also made experiments to determine the quantity of action in the case which most generally occurs when heavy goods are carried in towns, viz. that in which a porter, having delivered his burthen, returns unloaded for another; and he has, in order to produce the most useful effect in this case, the greatest burthen which a man should carry on level ground is 156 lbs.; and with this he should walk 7 miles. The quantity of useful action is therefore 135 x 7, or 945.

It is said that a London porter can carry 200 lbs. on his shoulders at the rate of three miles per hour; but this action can only be continued during a short time.

The following statements of the strength of men are taken from Hachette's 'Tract des Machines,' and from other sources; the numerical values being reduced so as to express the number of pounds carried by a man one mile per day of eight hours:

- **Drawing a vessel on a canal:** 7584.59 lbs.
- **Conveying a load (110 lbs.) in a wheel-barrow:** 291 lbs.
- **Drawing a heavy wagon on four wheels over rather unequal ground:** 857 lbs.
- **Pulling horizontally, the weight being raised by a rope passing over a pulley:** 378 lbs.
- **Rowing in a boat:** 291 lbs.
- **Travelling, as at a captain:** 368 lbs.
- **Turning a winch and axle:** 745 lbs.
- **Digging with a spade:** 85-3 lbs.
- **A soldier marching (12-48 miles) with his arms, &c. (50 lbs.) daily:** 745 lbs.

With respect to horses, the most useful way of employing his strength is to make him draw loads in a cart or wagon; but, even for such work, the estimates which have been made of the quantity of action performed daily are various.

M. Hachette expresses the whole quantity of the action of a horse of medium size as equivalent to 309 lbs. drawn nearly 25 miles in a day; and consequently such action should be represented by 309 x 25, or 7725. But, according to Tredgold, a horse can only draw 125 lbs. at the rate of 24 miles per hour; which, for one day, would give 125 x 24 x 8, or 2500 lbs.

The useful action of a horse with a load, as in some mills, is considered as equivalent to 800 lbs.

A horse carrying a soldier with arms, &c. (≈300 lbs.) can go 25 miles in a day, which gives 15000 lbs.

An Arab, by prolonged carryings, with his rider (160 lbs.), can go between 7 and 8 miles per hour during 9 or 10 hours; which gives 160 x 7-94, or 11500 lbs.

An Asiatic camel will carry burdens weighing from 350 to 450 lbs. (suppose 600) at the rate of 4-6 miles per hour. This, for a day of 8 hours, gives 600 x 24 x 8, or 12000 lbs.

The velocity of a horse in walking is estimated at 34 feet per second, or 39 miles per hour. In trotting, 12 feet per second, or 14 miles per hour; and in galloping, 18 feet per second, or 43 miles per hour.

For drawing on a road, the traces of a horse should be perpendicular to the collar on his breast and shoulders, so that when he leans forward, in pulling, the traces may be nearly parallel to the ground. The rate of the wheels should be determined accordingly. When, in drawing a two-wheeled carriage, a horse has to overcome an obstacle on the ground, he lifts up his fore-feet, and allows his weight to act upon his hinder feet as fulcra, till the wheels have passed over the impediment. It follows, that a certain portion of the loading of a cart should be thrown on the back of the horse, in order to increase the power which the animal employs in overcoming an obstacle; and, in ordinary circumstances, it renders a considerable inclination forward unnecessary.

When a horse is employed to turn a mill, the circle which he describes should be the greatest possible, 25 or 30 feet in diameter, both to diminish the centrifugal force, and the necessity which the animal is under of reeling from a vertical position.

ANIMAL TISSUES. [Tissues, P. C. S.]

ANKBAR. [Asteinia, P. C. S.]

ANTOLO. [Antotto, P. C.]

ANIMIES AND ANICEANCES. We add some of the most recent information on the subject to what we have said in REVERSINES, P. C.

The completion of Mr. Jones's work on Annuities, in the Library of Useful Knowledge, has given computers an immense mass of tables, involving all that can be necessary as far as two lives are concerned. Barrett's method, in particular, is applied to two lives, for various rates of interest.

The 'Life Assurance and Annuity Tables,' by Edward Snow, Edinburgh, 1841, fourth edition, will, through several years, the Carolina Table, and 3 per cent, in every point of view a remarkable work. It contains the present values and pre-
The subject has been well given, and reference to authorities facilitated, by Mr. Edwin J. Farren, in an 'Historical Essay on the Rise and Early Progress of the Doctrine of Life Contingencies in England,' London, 1844.

The actuarial table (as it ought to be called) contains the experience of the Amicable and Equitable societies, which had been previously printed, and which afforded conjointly a large majority of the policies employed. We give a summary of these, namely, the duration of life among 100 persons at quinquennial periods of age.

In the following table, columns C. and E. contain the Carlisle and Equitable tables [*Mortality, P.C.]: A. is the Amicable table above noticed. All on the right of the double line comes from the actuarial tables; in which the data are divided, as far as was practicable, into policies effected in town (London), in the country (other parts of Britain), and in Ireland. The first table, M. T. C. I., is that of males only, town, country, and Irish; F. T. C. I. the same for females; the remaining tables contain both male and female lives, T. town, C. country, I. Irish, C. T. combined town (which is explained to be the total experience of the Equitable and Amicable combined with the town experience from other quarters, the reason of which we do not see); G. I. the result of all the materials, including the Irish; G. the same not including the Irish.

Thus 100 individuals at 35 years of age have among them 3100 years of life according to the Carlisle table, and 3055 according to the general result of the actuaries.

These tables present that general agreement with the Carlisle table which the Equitable experience first showed. It appears that the town-insured have a very little more life than the country, not more perhaps than can be very well explained by the greater difficulty of making good selection through an agent. The result of the Irish lives is startling; it is not credible that the middle age of an Irish life at forty years old should have five years less life in him than an Englishman of the same age; the necessary inference is, that the offices have done Irish business without sufficient precautions.

The vitality of the Carlisle table seems a little too high; but, though if the difference were serious, the offices should of course adopt their own experience, yet it does not follow that such experience better represents the state of life among the insured class. Probably those who sell or surrender their policies, as not being best test of who are the people of the best health, for it is not known that ill health is close at hand prefer to remain.

It appears that male insured life is slightly better than female, on the whole; which is contrary to all else that is known about the relative values of the two. Perhaps female lives are, more frequently than male ones, insured from fear of permanent symptoms or hereditary tendencies. A man insures his life either for his family or to obtain an advance of money, and apprehensive of speedy death nothing to do with the disposition to insure in either case; a woman has, generally, not so many reasons, independently of forebodings, to insure. There is then probably a large proportion among women (of the friends who insure their lives) of the undesirable cases in which parties insuring have reason to know more about the state of the life insured than their medical attendants, as to causes of death which are not likely to act soon. We do not much like being forced upon an explanation which presumes something like consentment in so large a number of respectable persons; but some reason must be for

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<th>M. F. T.</th>
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It thus appears that the effect of selection is most decided
m young lives, and that if apparently healthy lives were substituted, in a mass of persons in all conditions of health, in the place of those who would be refused by an insurance office, the policy would add more than two years of life to each case, at any age from 35 upwards.

ANNULARIA (Sterenberg), a genus of fossil plants with leaves in whorls, from the coal formations of Europe and America. ANOMALINA (D'Orb.), one of the many genera of FORAMINIFERA [Fossil, P.C.S.] which occur in tertiary strata.

ANTHOCYTIES (Bromghiart), a fossil genus of Ferra, found in the basalt sandstone of Salzburg.

ANSWER. [Pladino, P. C.]

ANTHEMIUS NOBILIS (COMMON OR ROMAN CHAMOMILE)—Medical Properties of. This is an indigenous plant, frequent on our commons; but the flowers used in medicine are generally obtained from cultivated plants. Of these there are two kinds, the single or semi-double, and the perfectly double. The doubling of the flowers is attended with a lessening of their virtues, as the single are more aromatic, and contain more volatile oil, which resides in the yellow tubular florets of the disk. Their excellence may be determined by the beautiful whiteness of the radiant florets, the yellowness of those of the disk, and the strength of the aromatic smell.

Those which are brown, mousy, and faintly smelling, should be rejected. They contain a volatile oil of a beautiful blue colour, camphor? a gum resinous principle, and a small quantity of tannin.

The difference of both of taste and smell, the diversity of the oil, and the absence of the camphor-like principle, allow the impurity of substituting for the Anthemis the flowers of the Matricaria Chamomilla (or Feverfew). In this genus the receptacle is naked. The Anthemis it is palaceous, besides, the flowers are similar, and of an unpleasant smell. The flowers should be gathered before they fully expand. The forms of exhibition are, powder, infusion, extract, and oil.

Chamomile is an excellent bitter and tonic agent. Given in powder, or pill, or extract, with addition of a few drops of the oil, it is of great service in dyspepsia, atonic gout, and in intermittent fevers. The infusion may be made the vehicle for alkalies or acids.

The infusion when tepid is emetic, and may be given beneficially in diabetes, and at the commencement of catarrh, (particularly influenza,) and hooping-cough.

The decoction is an objectionable form, as it dissipates the oil. Even the infusion should be made with cold water. A most grateful aperient for weak dyspeptic patients is made by steeping serveridae leaves, chamomile flowers, and a very few caradions for ten hours in cold water, straining, and adding to the infusion any saline medicine required. The extract possesses medicinal virtues, but in preparing it the volatile oil is dissipated, which deprives it of its therapeutic value. This may be restored to it by adding a few drops of the volatile oil. Extract of chamomile, with sulphate of quinine, and the volatile oil, furnishes a combination of immense power in improving the appetite and aiding the digestion in convalescences from acute diseases, or after an attack of gout.

Infusion of chamomile, either warm or cold, furnishes an excellent application to weak eyes, or after exposure to the wind in travelling, especially by railroads. This used early will often ward off inflammation.

ANTHEMIS (OR ANACCYLUS) PYRETHRUM—Medical Properties of. Pellitory of Spain grows in the south of Europe, north of Africa, and in Syria, but the root of a species called Pellitory of a deeper red, native of Germany, is also met with. The first is called the Roman or true Pellitory, the latter the German: this is necessary to be known, as the chemical analysis varies considerably. Gauthier seems to have analysed the Roman, and found it to contain—

| An acrid fixed oil (resin) | 5 |
| Volatile oil (a trace) | 14 |
| Gum | 11 |
| Inulin | 33 |
| Muriate of lime (a trace) | 35 |
| Woody matter | 5 |
| Loss | 100 |

It is devoid of smell, and though it does not at first excite any sensation in the mouth, it is followed by a pungent taste, and flow of saliva.

Its use is confined to local affections of the mouth, where subcutaneous or paralytic. In rigidity of the muscles of the jaw, or rheumatic pains, from exposure to currents of air, showing this is often of great service. An infusion may be held in the mouth, also in toothache from cold. A mixture may be made of it, which would be a useful agent in paralysis of the stomach, added to the infusion.

ANTHEMIUS (Anthemius), a distinguished mathematician and architect of the sixth century. He is sometimes called Anthemius Traianus, from his birthplace Traul in Lydia. Alexander Trallianus the celebrated physician was his brother of Anthemius, and he had three other brothers who distinguished themselves, according to Agathias. Anthemius was the most distinguished of the architects employed by Justinian at Constantinople: he began to rebuild the church of St. Sophia, after it was destroyed by the populace in 581, and it was completed after his designs by Isidora of Miletus, after the death of Anthemius, which seems to have taken place in the year 594. The church was not finished until 537, but the dome fell in two years afterwards, through the shock of an earthquake; it was however again rebuilt by lardus, and the dome then raised was the first that was ever built upon arches and piers, and still remains; it is 105 feet in diameter, and composed of stone.

The mechanical genius of Anthemius is praised by Agathias, and he must have been distinguished also as a mathematician, as Eutocius has addressed to him his commentaries on the Conics of Apollonius Pergaeus. Halley published an edition of these commentaries, Greek translations, Greek commentaries of Eutocius, at Oxford in 1710. M. Dupuy published in 1777, at Paris, a fragment of a work by Anthemius on mechanical paradoxe: Pupil Plagabatou Meyagwurmous, with a French translation, and notes, entitled 'Fragment d'un Ob- vage Grec d'Anthemius sur des Paradoxes de Mécanique.' (Procopius, De Aedificiis Justiniani, l. i. De Templo Sanctae Sophiae; Agathias, Hist. l. v.)

ANTHIANUS, FURIUS, a Roman, from whom we get on the subject of Pontius Pilatus, much more correct accounts of the Digest. [JUSTINIAN'S LEGISLATION, P. C.] The age in which Anthianus lived is unknown.

ANTHOLITHES (Bromghiart). Some fossil plants that designated occur in the coal formations of Shropshire and Northumberland.

ANTHOPHYLLUM (Schweigger), a fossil genus of MADDREPHYLLICA, P. C.

ANTHOSPERMEE (from a, flower, and erize, seed). A genus of plants belonging Antho sperma (the rib-ber-tree), belonging to the natural order Cinchonaceae. It consists of the genera Cordosma, Phyllis, Galopina, Ambria, and Antho sperma. They possess dioecious or hermaphro- dite flowers; a rotor corolla; styles separating to the base, exuding an agreeable gum and yellowish resin; the fruit consists of 2 indehiscent 1-seeded mersiscarpus, or nuts; the flower of the seed is fleshy. The species are small herbs or shrubs, with opposite or verticillate leaves, and small 1- torched stipules, which are adnate to both sides of the peo- ticles.

None of the species are used in the arts or medicine; the tribe is however interesting as forming a link between the opposite-leaved Cinchonaceae and the verticillate Battiglias. Although most of the Anthospermaceae have opposite leaves, yet several species of Anthospermum itself, as A. Bergainianum and A. Anthophicum, have their leaves subverticillate. In Phyllis the leaves occur in whorls of three or four. This genus but a few years since became known to botany by the common name of the Ob- hare's-car. It may be cultivated, with other species of the tribe, in a mixture of loam, peat, and sand.

ANTHROCOTIUM (Cuvier), a fossil genus of Pachyderm mammals, of which many species occur in the deposits, especially in the gypseous and lignite strata of Piac and Tuscany.

ANTICLINAL, a term in geology which expresses the fact that, from a given line, the strata dip in opposite direc- tions.

ANTIDICOMARIANITES (from the two Greek words antidikos, adversary, and maris, Mary). A sect of so-called heretics, whose peculiar belief was that Mary the mother of our Lord did not continue a virgin after her marriage. The Roman Catholic Church asserts that she did this to the end of her life, but bore other children to her husband Joseph. This doctrine seems to be countenanced, not only by probably
and common sense, but by the statement of St. Matthew, that Joseph knew not his wife till she had brought forth her first-born son, and by the mention in various passages of the Gospels of the brothers and sisters of Jesus. (But see what is said as to the meaning of the expression in the New Testament.) The founders or first preachers of Antidotearianism were Hel- vius and Jovinian, two Roman theologians of the latter part of the fourth century. The principal objections to them were raised by various other heretics. The original accounts of Helvidius and Jovinian, and of their opinions, are to be found in the writings of Augustine, Jerome, and Euphronius, who were their contemporaries. There is a small island opposite the north-western part of the island of Milo, the ancient Melos, in the Archipelago; it is about five miles from the harbour of Milo, and opposite to it, a little to the north-west, so that the main sea cannot be seen from it. The hills two or three miles the island appears to be a round mountain rising out of the sea, but, on coming nearer, a peak is observed in the centre with steep acclivities forming several small capes, between which are little bays.


\textbf{ANTIPATER, LUCIUS CAELIUS. [CaECilius, P. C.]}

\textbf{ANTIPHIUS, (\textit{Antiphius}) a celebrated Greek painter, who lived in Egypt in the time of the Ptolemies, was the pupil of some distinguished artist n. c. He is praised by Quintilian for the facility with which he painted, and Pliny mentions several of his works, in various styles. He painted—Hesione; Alexander, Philip, and Minerva; Bacchus; Alexander as a boy; Venus and Mars attending to each other; two horses frightened by the sea-monster sent against him by Neptune, a comprehensive and difficult subject: these were all in Rome in Pliny's time. Pliny also mentions the following—Polemy hunting; a boy blowing a fire with reflection upon his face and the surrounding objects; a room full of women spinning and weaving; and a Satyr looking out—was standing with his hand over his eyes, and a panther’s skin hanging from his shoulder: the last was a very celebrated picture. The following description of Antiphius is taken from the work of another writer, who notices the above pictures. Antiphius was the inventor of a kind of caricatures called \textit{Griffii}. They were a species of grotesque monsters, part man and part animal or bird, of which the Greeks and Romans appear to have been fond. Antiphius therefore added variety of style to facility of execution. He was a native of Egypt, and his time is fixed by a circumstance connected with him mentioned by Lucian in his treatise against Calumny. Some writers have inferred that he lived in the times of the Ptolemies. But it is probable that we have here a confusion in the author, who says that Quintilian mentions him, and because Pliny states that he painted those pictures; but their pictures are not noticed as portraits, but simply as pictures, and which may have been painted at any subsequent period. Quintilian speaks of Antiphius as one of the two greatest ancient artists; he mentions Alexander and his successors, but he speaks vaguely; Polemy Philopator however, though the fourth of the Ptolemies, may be strictly spoken of as one of the successors of Alexander. The circumstance related by Lucian shows a black side to the character of Antiphius. Being jealous of a painter of the name of Apelles, a citizen of Ephesus, who was then on a visit at the court of Ptolemy, Antiphius accused him of being a participator in the conspiracy of Theodotus at Tyre. Theodotus was Euseus, the governor of Cae-Sara, in which his conspiracy took place, according to Polybius, in 218 n. c. Polemy at first believed the accusation, and Apelles was apparently imprisoned, but upon his innocence being established, Polemy not only presented him with 10 talents, and condemned Antiphius to be his slave, a part of the indemnification probably which the painter would not be disposed to put in force. Apelles was however not satisfied with the handsomely conduct of Polemy, and when he returned to Ephesus he sent a letter to Polycrates, the son of Eutytus, in which he charged the Egyptian king with treating him in a very ridiculous manner—and he was preceded by Envy and followed by Deceit and Artifice; in the background were Repentance and Truth. The allegory is evidently bad; the subject is inapplicable; but it presupposes a thorough knowledge of iconology, or allegorical personation, in the spectator. 

\textbf{ANTONELLO DA MESSINA, a celebrated Italian painter, distinguished as the first Italian who painted in oils, as it is termed. Neither his name nor any date connected with events of his life are exactly known. He was born at Messina about the year 1414, and was instructed in painting by his father Salvator d'Antonio; he then studied in Rome, and returned to Messina an accomplished for his time, and acquired considerable reputation by some works which he executed at Messina and at Palermo. In about the year 1442 he had occasion to visit Naples, where, in the possession of the king, Alfonso I., he saw a picture executed in a manner and with materials quite new to him: this was a picture of the Amniation by Giov- anrino da Bruggia, which immediately struck him as belonging to the new method to Domenico Veneziano, who was murdered
in Florence in 1464, by Andrea del Castagno, after he had obtained the secret of the new method from him. From Venice Antonello repaired to Milan, where he probably dwelt some years, and about the year 1468 he returned to his native city. In Venice he lived upwards of 20 years in the enjoyment of the reputation of one of the most distinguished painters of his age. He died aged 49, but from various circumstances this is evidently an error: he probably mistook 49 for 49 in his authority. Domenico was said to have been assassinated when Antonello was 49, which was, as near as can be ascertained, in 1446; if Antonello was as aged 79, when he died his birth and death, 1414 and 1495, and the last date corresponds with the year when the repairs in the palace of the Signory of Venice were completed.

Antonello appears to have made secret of his new method of painting after his second visit to Venice, for in 1578 Bartolomeo Vivarini painted a picture in the new manner for the church of the SS. Giovanni e Paolo, and Antonello himself marked his pictures 50 pixit. There is at least one so marked in the possession of a gentleman at Utrecht: it represents Christ between the two thieves, and 'Antonellus Messenscus me 50 pixit, 1475,' is inscribed upon it; it is a small picture painted upon a panel of wild chestnut. The 56 evidently signified oil, or in oil; a word which is used later in the account of the method of painting by which, simply in oil was very old, and that of Van Eyck was not merely painting in oil; it was, according to Vasari, painting in vernis. Vasari says that Van Eyck, by boiling linseed, poppy, and nut oils, with wax, obtained that medium which every other painter in the world had long desired. From this statement it is evident that painting in oil is strictly a misnomer, and it was adopted only as sufficiently descriptive in contradistinction to the then prevailing method of water-colour or tempera paint.

Antonello's works were distinguished for tone, for brilliancy of colour, and for the excellence of his impasto, but those which remain are much darkened. In design they are similar to those of the Berrini. Antonello's life was long, and he was industrious; the extreme sensibleness therefore of his works cannot be otherwise accounted for than by supposing them to be attributed to other masters, or vaguely designated as of the school of Van Eyck, a very frequent designation in the continental galleries. There is only one picture by him in Venice—the Virgin reading in the Academy. Bocchi (1733) mentions only one—A dead Christ supported by angels, in the chamber of the Council of Ten, which appears to be now in the gallery of Vienna, but how it was removed from Venice is not stated. At Messina, in 1792, there were still twelve small pictures by Antonello, around an old altar-piece. Messina, in the museum of St. Gregory. At Munich, in the gallery of the Duke of Leuchtenberg, there is a portrait by him of Caterina Cornaro, queen of Cyprus.

(Vasari, Vite de' Pittori, &c., and Sehorns Notes to his German translation; Poccini, Memorie Istorico-Critiche di Antonello degli Antoni, Pizzaro Massinesse, Florence, 1869; De Bast, Messager des Sciences et des Arts, Gand, 1824; Boisserée, Kunstblatt, 1826; Passavant, Kunstreise durch England und Belgien; Lauti, Storia Pitteria, &c., vol. ii.)

APHELION. (Theor.) A spherical, or more nearly so, surface, the centre of which is the principal focus of a paraboloid of revolution. The equation of the section of the paraboloid by a plane through the axis is

\[ y^2 = 4ax \]

where \( a \) is the parameter of the paraboloid. The equation of the section by a plane parallel to the axis is

\[ x = 2a. \]

The abscissa of the point of intersection of the plane with the axis is called the axis of the paraboloid, the ordinate is the parameter, and the line from the vertex to the point of intersection is the axis of the paraboloid. The equation of the section by a plane perpendicular to the axis is

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APHELIUM. (Arctis). [Apsidiala, P. C. S.] APICORINITES (Miller), a fossil genus of Crinoides, found in the oolitic formations and in the chalk.

PLANE LENS. (From the Greek, plana, without, and \( \varepsilon \), deviation or aberration) is one which should be capable of so refracting all the rays which, diverging from or converging to any one point in the axis, are incident upon it, that after being transmitted through it they may converge to or diverge from any other point in the same manner.

The spherical forms which are given to the surfaces of lenses, and the dispersions of the different coloured rays in each pencil of common light, are the causes that the rays of any one colour when incident on a lens in the circumstances of a given case, are scattered from their just true paths, and, therefore, rays of different colours in any one pencil however slender, do not converge in one point; and the diffusion of the various points of convergence about the geometrical focus of the lens is the aberration which it is proposed to correct as far as possible by giving appropriate forms to the surfaces, or by combining together two or more lenses.

Writers on optics show that a curve-line by whose revolution about an axis there shall be described a surface which, being that of a refracting medium, will cause all rays incident upon it, when they diverge from or converge to one point, to be refracted so as to converge to or diverge from one point is, in its most general form, of the fourth order: but when the radiant point is at the focus of the refracting surface, as when it is at a celestial body, the form of the refracting medium is such that the rays, when within the medium, converge accurately to the focus most remote from the place of incidence. If the refracting medium were less dense than that in which the rays are incident, the surface would be that of a hyperboloid. The semi-circle was the form of the sphere, the sphere was that of the hyperboloid, and the sphere of the spherical aberration, or the eccentricity, as the sine of the angle of incidence is to the sine of the angle of refraction: in the former case the refraction is from the surrounding medium into the sphere: in the latter case the refraction is from the sphere into the surrounding medium.

It follows that there is a meniscus less dense than the surrounding medium which has the anterior surface spheroidal, and its posterior surface that of a sphere whose centre is at the further focus of the spheroid; since the rays will then suffer no deviation in passing through the posterior surface, it will be aplastic. Also if the anterior surface of a medium be plane, so that the parallel rays incident perpendicularly on it may suffer no refraction in entering, and the other surface be part of an hyperboloid, the medium between them is that in which the rays, after passing through the plane lens thus formed will be aplastic; the refracted rays converging to the opposite focus of the hyperbola.

The form of the expression for aberration, when parallel rays are incident upon an hyperboloid, being of the form

\[ y^2 = 4ax \]

it is such that the aberration cannot be made to vanish with any real values of the radii of those surfaces unless the index of refraction in the medium were equal to or less than 0.25. But there is in nature no medium which has such a refractive index; therefore, in falling in making spherical lenses strictly aplastic, and it has been found impossible, hitherto, to form them with surfaces produced by the revolutions of conic sections, mathematicians have investigated expressions for the form of surfaces which, for all angles of incidence, would make the aberration of the focus to be a minimum; see the article 'Light' in the Encyclopædia Metropolitana (art. 306), where the ratio between the radii of the surfaces, in this state, is given. From that ratio it is shown that, when the index of refraction is 1.5, the lens should be of the double convex form, having the radius of the posterior surface six times as long as that of the anterior surface, or that which is nearest to the radiant point.

For an investigation of the radii of the surfaces of lenses we may turn to the General Theory of Errors, as combined together for the purpose of diminishing as much as the same time the chromatic and spherical aberrations, see TELESCOPE, P. C.; and, in the treatise on light above quoted (art. 313, 468). Sir John Herschel has given four equations involving the refractive indices of the materials of the lens, and the principal focal distances, from which the four radii may be obtained consistently with the condition that the aberration shall be zero. From the equations, and with different refractive indices, there is computed a table of the radii of the lenses for the compound object-glass of a telescope as nearly aplanat...
the hypotkecium, and the other the perithecium.

In lichens the reproductive matter appears on the surface of its frond or thallus in two forms. First, in the form of little coloured cups or lines with a hard disk surrounded by a rim, and containing tubes filled with sporules; and secondly, in the form of little heaps of pulverulent matter, which are scattered over the surface of the thallus of the fungus. These organs form the principal means of distinguishing the various forms of lichens, and consequently it has been found convenient to indicate minor points in their structure by other names. Thus the apothecium, which in English is called a shield, consists of the sporocarps containing the sporules, enveloped by a shield with an elevated rim; Pelea, a flat shield; Tuberculatum, a convex shield; Trica or Gyroma, a furrowed shield; Lirio, a linear shield; Globulus, a round deciduous shield; Polysiphon, an orbicular, smooth, cylindrical shield. The parts of the apothecium or shield have also obtained distinct names: such as perithecium is the inside of the shield, in which the sporules are immersed; hypothecium is the substance that surrounds or overlies the perithecium; nucleus is the disk of the shield, which contains the sporocarps; its cases; and ascus are the tubes in which the sporules are contained.

Apothecia is also the same name given to the cases in which the organs of reproduction of many of the Algae are contained. The reproductive granules contained in the apothecia of both Lichens and Algae are called by some writers gonothyrs.

APPARITOR, an officer employed as messenger and in other duties in ecclesiastical courts. Apparitors, says Burn, are 'so called from that principal branch in their office, which consists in summoning persons to appear.' The canons direct that letters citatory are not to be sent by those who have obtained them, nor by their messenger, but the judge shall send them by his own faithful messenger. It is the duty of the apparitor to call defendants into court, and to execute such process as may be given to him; but this duty is not to be performed by deputies. In 21 Hen. VIII. cl. 5, as well as in the canons, apparitors are also called summoners, or sumners. The above act restrains the number of summoners, but does not restrain the names assigned to their cases; and such are the tubes in which the sporules are contained.

The apparitors of the ecclesiastical courts are paid by fees, which in most cases amounts to a very small sum annually. The earnings of the apperators of the Prerogativa Court of Canterbury are however considerable, and in 1648 amounted to 300.

Apparitor is a word not used, and was used as a general term to signify any person who was in attendance on public functions. It was sometimes given to Piombino on the 30th day of September, the day on which the orders. The term accordingly includes a great variety of officers in the Roman system. Under the latter Empire most of the magistrates and functionaries had their apparitors, whose duties and privileges are enumerated in the Justinian Code, 12. cit. 69, &c.

APPAREANCE. [Pl. 12, p. 320.]

APPEAL TO THE SESSIONS. [Sections, p. 325.]

APPENDI, FRANCESCO MARIA, born near Turin in 1639, son of D'Appiano, became a Jesuit, and in the Scuolo, and was after a time sent to fill the chair of rhetoric in the college of his order at Ragusa, a town which then maintained a close connexion with Italy. He became a great proficient in the Slavonian language, and he published a grammar of the language, and a dictionary of the Latin and Slavonian dialect of the Slavonians, and several treatises on the same subject. But his principal work concerns the history of his adopted country Ragusa, and it gives a very interesting account of that now almost forgotten little state, which goes far towards itself for centuries as a republic, and cultivated the arts and retained the manners of civilized Europe.

When Napoleon took military possession of Ragusa, and subverted that ancient republic, as he had subverted the republic of Venice, he found the seat of government at Ragusa, and appointed Rosaspina to be bishop of the see, and the pope retained his dignity in his own person. The republic was then occupied by the French, and subverted. When the French were driven out, the republic was restored, but the powers in Europe were now divided, and the republic was at the mercy of the most powerful nation. The republic was at last occupied by the Turks, who remained there until 1814, when it was occupied by the Austrians.

Then Appiano, who had been ambassador at the court of the Austrians, and had been a great friend of the republic, became the minister of foreign affairs of the republic, and was appointed to the post of ambassador at the court of the Austrians, and was also appointed to the post of minister of foreign affairs of the republic. He was a great friend of the republic, and was appointed to the post of ambassador at the court of the Austrians, and was also appointed to the post of minister of foreign affairs of the republic. He was a great friend of the republic, and was appointed to the post of ambassador at the court of the Austrians, and was also appointed to the post of minister of foreign affairs of the republic. He was a great friend of the republic, and was appointed to the post of ambassador at the court of the Austrians, and was also appointed to the post of minister of foreign affairs of the republic. He was a great friend of the republic, and was appointed to the post of ambassador at the court of the Austrians, and was also appointed to the post of minister of foreign affairs of the republic. He was a great friend of the republic, and was appointed to the post of ambassador at the court of the Austrians, and was also appointed to the post of minister of foreign affairs of the republic. He was a great friend of the republic, and was appointed to the post of ambassador at the court of the Austrians, and was also appointed to the post of minister of foreign affairs of the republic. He was a great friend of the republic, and was appointed to the post of ambassador at the court of the Austrians, and was also appointed to the post of minister of foreign affairs of the republic. He was a great friend of the republic, and was appointed to the post of ambassador at the court of the Austrians, and was also appointed to the post of minister of foreign affairs of the republic.
wards passed by inheritance into the house of Buoncompagni of Rome, who kept it till the French revolutionary invasion. Bonaparte, on his assuming the imperial crown, bestowed the principality of Piombino on his brother-in-law Felix Baccocchi.

(On FRIEND, Memoria Istoriche di Pisa; Botta, Storia d' Italia.)

APPOINTMENT. [TRUST AND TRUSTEE, P. C.]

APPOINTMENT. Apportionment of rent, &c. is a term of law signifying the dividing of a rent, annuity, or other payment receivable by the land or fixed personal estate, among several persons entitled to the rent, or between the person entitled to the rent and the person or persons liable to the payment of it.

The issuing out of land may be apportioned in two ways:

one by granting the reversion of part of the land out of which the rent issues, the other by granting part of the rent to one person and part to another. When rent is reserved upon a lease, and the lessor disposes of part of the lands in reversion, either by will or deed, the rent is apportionable, provided the leasee concur. But the lessee is not bound by any apportionment made without his consent. If the lessor or a stranger recovers any part of the land, or the lessor enters for a forfeiting rent, or, on the expiration of the lease, the lessee, the rent will be apportioned in respect to the part so recovered or surrendered and the part remaining in the hands of the lessee.

When a lease blinds a part of the land comprised in his lease, the rent is liable in an action of covenant for a proportional part of the rent reserved on the lease, the covenant for payment of rent being one which runs with the land; and therefore as respects him there is an apportionment of the rent. The rent of a part of the lands does not however, any more than an assignment of the whole, discharge the original lessee from his liability upon his express personal covenant for payment of the whole rent. The right of distress for the whole rent upon every part of the land of course remains unaffected by the assignment, unless, sometimes, done in the case of building leases, the original grantor agrees to restrict his right of distress on the lands aliened to a proportionate part of the rent.

If a man having a rent-charge issuing out of lands, purchases any part of them; the rent-charge is extinct as to the whole; but if part of the land out of which the rent issues descends upon the owner of the rent-charge, the rent will be apportioned. And this will also be the case upon a partition of the lands out of which the rent issues. If a grantee of a rent-charge release all his right in part of the land charged, he extinguishes the whole rent; but if a grantee of a rent-charge release part of the rent to the grantor, the residue will remain chargeable, for the same reasons deals with the rent only, not with the land. On the principles here stated a difficulty arises on the sale of part of lands subject to a rent-charge. Where the party entitled to the rent is willing to release the land to be sold, the mode sometimes adopted is that the owner of the rent-charge assigns the rent on the land to a trustee upon trust, to receive it exclusively out of the lands intended to remain charged. Another mode is for the annuitant to join in the conveyance of the lands sold and to add a proviso that the other lands shall continue liable. This plan however is open to the objection that as the proviso operates as a new grant, the rent-charge becomes liable to the incumbrances of the owner of the land created before the conveyance. A third mode, sometimes adopted, is that of the owner of the rent-charge retaining the land sold, but it seems doubtful whether such a covenant does not operate as a release of the rent-charge. If the owner of the rent-charge will not concur, the only plan seems to be for the trustee to assign the lands not sold to the other lands shall be exclusively liable, and give an indemnity by demise or otherwise against the rent-charge. It seems that the technical rule of law which is productive of so much inconvenience ought to be altered.

By the lease of a tenant for life died within the half-year at the end of which rent was due upon a lease not made in execution of a power, and which therefore determined on the death of the tenant for life, the half-year's rent could not be apportioned, and was therefore lost to both the representatives of the lessee and to the remainder-man or reversioner, upon whom the lease was not binding.

To remedy this evil it was provided by the stat. 11 Geo. II. c. 19, § 15, that where a lessee tenant for life died before the rent-day, his executors might recover from the tenant a proportionate part of the rent then owing, making all just allowances. But as this statute was construed to apply only to persons strictly tenants for life, and had no application to the case of a lease made by a tenant in fee or by a tenant in tail under a power, if in either of these cases the lessee died in the interval between the tenant for life being due, the whole rent went, according to the rule of the common law, to the heir or remainder-man, and there could be no apportionment in favour of the execut. The law has now been altered by the stat. 4 & 5 Wm. IV. c. 94, the object of which was to apply the principle of equable apportionment to all property which consists in periods and fixed money payments.

By the first section it is declared that rents reserved a leasehold for a term of years on the death of the person so reserved (though not strictly tenant for life), or on the death of the tenant per autre vie, shall be considered as within the provisions of the above-mentioned stat. 11 Geo. II. c. 15, § 15.

By the 2d section it is enacted that from the passing of the act all rents reserved service reserved upon any lease by a tenant in fee, or for any life interest, or by any lease granted under any power (and which leases shall have been granted before the passing of this act) or by any annuities, pensions, dividends, moduses, compositions, or all other payments of every description in the United Kingdom of Great Britain and Ireland made payable or coming due at stated periods under any contract that shall be executed after the passing of this act, shall be apportioned and in such manner that on the death of any person interested in any such rent, annuities, pensions, dividends, compositions, or any other payments, as aforesaid, or in the estate, fund, office, or Messrs from or in respect of which the same shall be issuing or derived, or on the determination by any other means whatsoever of the interest of any such person, his executors, administrators, or assigns shall be entitled to a proportion of such rents, annuities, pensions, dividends, moduses, compositions, and other payments, according to the terms which shall have elapsed from the commencement or last period of payment thereof respectively (or at the death of such person, including the day of the death of such person or of the determination of his or her interest, all just allowances and deductions in respect of charges on such rents, annuities, pensions, dividends, moduses, compositions and other payments being deducted, whether the death of such person be before or after the passing of the act).

A tenant for life, as respects the year or years during which he is in life, is liable, for the part of the rent due during such period, to be recovered by any person entitled to the whole rent. The annuity, if any, or other annuities, pensions, dividends, compositions, or other payments being deducted, whether the death of such person be before or after the passing of the act, shall be apportioned and in such manner that on the death of any person interested in any such rent, annuities, pensions, dividends, compositions, or any other payments, as aforesaid, or in the estate, fund, office, or Messrs from or in respect of which the same shall be issuing or derived, or on the determination by any other means whatsoever of the interest of any such person, his executors, administrators, or assigns, shall have such and the same rights, and have and enjoy all the same privileges and be subject to all the same duties and liabilities to law and in equity for recovering such apportioned parts of the said rents, annuities, pensions, dividends, compositions, or other payments, as aforesaid, as if such rents, annuities, pensions, dividends, compositions, or other payments had been paid, and been in the hands of such person, into whose hands they would have come had there been no death or determination of his or her interest in the same, and shall be entitled to recover any rents reserved or payable reserved by any lease or demise, and the land, tenements, and hereditaments comprised therein shall not be resorted to for such apportioned parts specifically as aforesaid, but the entire rents of which such portions shall form a part shall be received and recovered by the person or persons who, if the act had not passed, would have been entitled to such entire rents; and such portions shall be recoverable from such person or persons by the parties entitled to the whole rent, in the same manner and to the same extent as any rents, annuities, pensions, dividends, compositions, or other payments. It seems doubtful whether the above enactment will apply to the case of an annuity payable at certain periods and determinable at the death of the grantor, because if the annuity cease by the death of the grantor on any day before that of payment, the 'entire portion' can never become payable. It is advisable therefore to retain the usual apportionment clause in the grants of such annuities.

The 3rd and last section provides that the act is not to apply to any case in which it shall be expressly stipulated that no apportionment shall take place, nor to annual sums made payable on policies of assurance of any description.

Rights of common are apportionable in certain cases. Common of pasture when the common is neither a common owned either where the commoner purchases a part of the land in which he has the right of common, or upon an alienation of part of the land to the right which is appurtenant. In the case of common of pasture appurtenant, there will be apportionment in the second case, but not in the first. Common of
of male flowers axillary, umbelliform; the female ones aggregate. It is a native of North America, from Canada to Virginia, in sandy wet woods, and on the borders of swamps.

The flowers are white, and the berries are of a crimson red. The bark is bitter, and has been substituted for Cinchona bark in the treatment of fevers. It is said to act as an antiseptic, and is used in America as an application to gangrenous sores, and also in infusion or decoction, as a lotion in cutaneous disorders.

In plader, has evergreen, cushion-like, ovate-shaped, shining leaves, a little toothed at the apex, and axillary 3-flowered pedicels. This is a low handsome shrub, with white flowers and a black fruit; hence it is called, in Jersey, ink-berrys. It is a native of North America, from Canada to Florida. It has been introduced into Bath, for the use of those for the Paraguay tea-plant, and are used for making tea.

There are several other species of Prinos, some of which are hardy, and well adapted for shrubbries. They will thrive in most light soils, but do best in peat. They may be propagated by laying down the shoots or by seeds. Most of the species of Aquifoliacese plants may be cultivated in the same manner.

(Don, Gardner's Dictionary; Burnett, Outlines of Botany; Lindley, Natural System.)

AQUILLA, JULIUS, a Roman jurist, whose period is uncertain. He is one of the jurists who were used for the composition of the Digest. As there is a doubt whether there be only one Digest, or whether it is a collection made from two, the Digest contains only two excerpts from him, both of which belong to his 'Book of Answers'— Liber Responsorum' (Dig. 25. tit. 7. s. 54; tit. 10. s. 12).

AQUILLARIA/C/E, a small natural order of plants belonging to Lindley's tuberosous groups of incomplete Exogen. The species are trees with smooth branches and a tough bark. The leaves are alternate, entire, seated on short stalks without stipules, and when young with a pubescent underside, with very fine veins running together into a marginal vein just within the margin. The calyx is tubulous or tubular, limb 5-cleft, segments spreading, persistent, with an imbricated aestivation, the ovary furnished with 5- or 10-bearded scales (metamorphosed stamens). The stamens are 5 or 10 in number; when 5, they are opposite the segments of the calyx; the filaments are short or absent, smooth, inserted into the orifice of the calyx a little lower down than the scales, except in cases where they are united to the tube of the calyx; the anthers are narrow, oblong, attached by their back edges to the middle, 2-celled, opening internally and lengthwise; the ovary is superior, sessile, or stipitate, downy, compressed, 1-celled, having 2 thickened sides, a line of prominent stigmata resembling a dissepiment, hence apically 2-celled, with a very narrow partition; ovules two, of which one is suspended from each placenta, tapering downwards; the style is either absent or conical and thread-like; the stigma is rounded, or large, sessile, or stipitate, 1-celled, 2-valved, the valves bearing in the middle the placenta, which almost touch each other. One seed is mostly borne on each placenta (one is sometimes abortive); the seed rises up by the aid of a funiculus, originating near the apex of the placenta, and is furnished with a tail-like aril, which descends straight from the hilum to the bottom of the capsule; the radicle is straight and superior, the albumen is absent, and the cotyledons thick, dead, and hairy. This order, which consists at present of only three genera, was constituted by Robert Brown, who regarded it as having so close an affinity with Chilaleteace as to see no objection in making it a separate order. On account of its peculiar connection with Thymelaeaceae, in which he followed Lindley, who says, 'Aquillariaceae chiefly differ from Thymelaeaceae in their dehiscent fruit, and probably also in the direction of their radicles. In both orders the ovary is superior, bilocular and 1-celled; the fruit is a small scale-like berry at the end of a stalk, the orifice of the calyx, and no petals; both suspended ovules, one single style, and single stigma.' De Candolle places the order between Chilaleteace and Terebinthaceae.

All the species of Aquillariaceae are natives of the East Indies.

The three genera of this order are thus defined:

1. Aquillaria. Perigone 5-cleft, urceolus 10-lobed, stamens 10, anthers versatile, style none, seeds covered by a spiny substance.

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2. **Perigonea**. Perigone 6-petalled, urceolus 10-lobed, stamens 10, anthers oblong, seed furnished with a wing.

3. **Gyrinopsis**. Perigones tubular, toothless; seed furnished with a spiny, awl-shaped, trigonellate tail.

Of the last two genera little is known. One species of each has been described. There are three species of **Aquilaria**.

A. **Malacca**. The **Bois d'Aigle**, or Eagle-wood, has ovate, abruptly cutinized leaves. It is a native of Malacca, and produces a whitish yellow wood. This is the A. of commerce and the native of the East Indies, where it is called *Ugoor*, or *Ugooro*, by the natives, and *Lignum-aloe*, or Aloe-wood, by the Europeans. The wood has a fine scent, and is supposed to be the *Calamumb*, or *Aguillochum*, of the Spanish.

**Aquilaria Aesculacea** is another species which also yields a scented wood, and has been known in the Medici Medicus, and used in perfumery, under the names of *Agullochum*, *Aesculaluminum*, and *Aloe-wood*, by the Europeans. In a healthy state this wood is said to be white and inodorous; but it is subject to the attacks of disease, which causes the secretion of a resinous matter, and the wood then becomes coloured, and gives out a powerful scent. This secretion resembles camphor in many of its properties, and has a bitter flavour, hence its medical value. It is recommended in the same diseases as the febrile and volatile oil, and does not seem to possess peculiar properties; so that it is not used as a medicine in Europe. The Cochinn-Chinese are said to make their paper from the bark of this tree. The scented woods of **Aquilaria** and many trees must not be confounded with the *Aloezyon Agullochum*, or Aloe-wood, which is a tree belonging to the natural order Leguminosse, and which also yields a scented wood used by the Chinese in medicine and perfumery.


**ARABA**. The war of Mehemd 'Ali, pasha of Egypt, against the Wahhabis, the occupation of Aden by the British, and their friendly connections with the Imam of Muscat, have greatly contributed to increase our knowledge of Arabia. In consequence of those events the attention of Europe has been directed more eagerly towards that country, and as the Red Sea now once more offers a passage from Europe to India, we may hope that one of the most interesting portions of the globe will soon become better known. The natives of Arabia have always shown hostile feelings towards Europeans. These feelings may have increased among a few tribes, but generally speaking they have diminished. The intercourse of the British with the Arabs will probably prepare the way for Arabic translations or abridgements of European works on scientific subjects, especially natural philosophy, chemistry, medicine, mathematics, navigation, and generally useful knowledge, so that the Arabs may learn to know Europeans, and we may become better acquainted with them. The coasts of Arabia are now accurately known, except some parts of the south-eastern shore, on the Indian Sea, and even on those we are at the positions of the principal ports. The splendid chart of the Red Sea by Commander R. Moreby and Lieutenant Carless, in two immense sheets; the chart of the south-east coast of Arabia by Commandier Haines, assisted by Lieutenants Welford, Sanders, Jardine, Shepherd, &c., and the chart of the Gulf of Persia by Commander Barnes Brucke, in two great sheets, ought to be studied by all those who wish to make themselves acquainted with the approaches to the most important country that lies between Europe and India. A person will be greatly assisted if he consult the atlas with the aid of Adjutor's 'Geographical Directory,' London, 1836, 4to. The best map of Arabia is that of Bergsma, Gotha, 1835. In some places this map is too crowded, so that in spite of the minuteness of the engraving the eye is unable to detect the features of the country. This defect is less owing to the number of places and names than to the amount of hydrographical and orographical delineation, and we find the same defects in other maps of that distinguisable geographer, as for instance in his map of Cibra. Frequently with the aid of Birds are extremely inexpressible, such an unexperienced person might be induced to believe that what he sees is as accurate as it is neat, but this is not generally the case. In making maps minuteness of execution should always be preferred.

If the map of Arabia is half turned so that the western side shall be nearest to the spectator, the eye will traverse the country from west to east, in the direction of the parallels, and not from south to north, in the direction of the meridians, in which lies the general construction of the maps leads us to examine them. On viewing Arabia from the Red Sea we perceive an immense range of mountains stretching from north-west to south-east, nearly parallel to the coast of the Red Sea, and generally not far from it. In 21° 20' N. lat., 41° 16' E. long., near the mouth of the Teyf, and at a distance of 64 miles from Mount Sinsai and the Straits of Bab-el-Mandeb, a chain detaches itself from that range, and runs north-eastwards towards the Persian Gulf, and it becomes gradually lower. This is the Jebel-'Ared, or the Jebel-Sammur, a range of mountains parallel to the great range along the shore, and is the latitude of the peninsula, which it divides into two great portions, the one north-west of it, the other south-east. The northern portion is divided into two by the Jebel-Shammur, commonly called the Agerit, and the Jebel-Sammur, the Mount of the Elamites, it stretches from west to east between 28° and 29° N. lat., and probably connected with Mount Sinsai by intermediate chains, such as the Jebel-Adam and the Jebel-Sallani, the position of which however we do not precisely know. The Jebel-Shammur is said to be as high as Mount Lebanon. The portion north of Jebel-Shammur comprehends ancient Arabia Petrae in the west, and the greater part of antient Arabia Deserbi in the east; the most elevated parts are the tracts north of Mount Sinsai, and east of the Teyf, and the 6 Pales, which form a ground slope towards the northern corner of the Persian Gulf. The tract north of Jebel-Shammur is a sandy desert, intersected by some arid wadis, or valleys, with running water, or only a few wells and moist spots where water may collect, and forms a great desert formed by the wandering of the traveller against the scorching sun. Lying between Palestine and Syria in the west, the Euphrates in the east, and the more fertile districts of Arabia in the south, it is traversed by several high roads. One of the most important leads from Haleb to the Euphrates and thence to Bagdad, by Tabeb, and the Wadi-Sulib; and from west to east it is traversed by the road from Damascu to Bagdad through the oasis of Palmyra and the Wadi-Hazrak, a valley stretched in winter by a chain of intermediate mountains towards the direction of the Euphrates. The tract which is traversed by these roads is generally considered to belong to Syria, although it has the Arabian character, and is inhabited by genuine Arab tribes. The road from Bagdad to Anhef, and thence to Mecce and other parts of central Arabia, crosses the highest portion of Jebel-Shammur. The road from Damascus to Jebel-Shammur, and thence to the interior of Arabia, goes in a south-east direction, following the sinuosity of the Wadi-Ades-al-Shirhan for about 160 miles, and traversing the fertile plain of Jof and the desert plain of Ed-Dhibah or Ta'ta before it reaches El-Shammur. Two western roads lead from Damascus and Jerusalem to the Gulf of Aekib and to Medina. In the direction from the Dead Sea to Jof is the easternmost of these, and which is called by the natives the ‘wilderness,’ or Barib-al-Abad. This road to the interior is not very elevated, mostly level, traversed by chains, and intersected by valleys, of which we have only vague notices. This observation however does not apply to the group of Mount Sinsai. The portion south of Jebel-Shammur extends east as far as the Persian Gulf, and is bordered in the south-east by the Jebel-'Ared, and on the west by the great range mentioned above, so that the tract between this range and the coast does not belong to it. The country is a high table-land inclining towards the west, and not much equal to the proportions of the Persian Gulf. In 26° N. lat., 46° E. long., a chain of mountains, the Jebel-Tidek, detaches itself from the Jebel-'Ared, stretching north-west in the direction of the Jebel-Shammur. The tract west of the Jebel-Tidek, an irregular mountain, is watered by the portion east of it, which loses the character of a table-land in proportion as the traveller approaches the Persian Gulf. The immediate neighbourhood of which the country is low and sandy. The greatest part of the inland tract south of the Jebel-'Ared is, generally speaking, unknown. It is probably a table-land as high as the tract north of that chain, and its inclination is likewise towards the Persian Gulf, the direction of the slope being north-eastwards, in the course of the higher northern range, with the range along the Red Sea by a high tract and some ridges of hills, stretches parallel to the coast of the Indian sea in a north-east direction, separating the elevated lands in the interior from the coast country. This chain also is at right
angles to the range along the Red Sea, and is consequently parallels to the Jabel-’Ard. From its most eastern part a chain branches north-west, at right angles, and its direction is parallel to that of Jabel Tulsik mentioned above. This branch chain rises above a plateau of great elevation, and several of its peaks, among which Jabel-Gassiri, or Ghasiri, as Edrfi writes it, is the highest, are said to be crowned with eternal snow. The town of Tayf stands at the western foot of Mount Gassiri; and although the immediate neighbourhood and the deeper valleys produce the choicest fruits, especially excellent raisins, the surrounding plateaus are so high that the water will freeze in the summer nights. From the highest peaks being always covered with snow in 21° N. lat., we may safely conclude that the Jabel-’Ard is the highest of Arabia. From Tayf the range continues its south-eastern direction as far as a point about 19° 31’ N. lat., where it forms two branches, one stretching south, and lowering gradually till it reaches the coast of the Red Sea in about 18° N. lat., and the other south-westwards, and forming the western boundary of the sea. Between the two chains is a deep valley running from the north, where it is highest, towards the south, where it becomes broader, till it widens into an open plain. This valley is the national boundary between the provinces of A’dr and it lies between the province of A’dr and the south (Tehmah) of Konfodah in the west. One of the most important mountain-passes of this range leads through the valley, and the road high from Konfodah to A’dr, and farther on to the interior of Arabia. The point where the two chains originate seems to be a plateau of great elevation; the road from Konfodah leads over it, and it cross here by another high road leading from the lowland of Hejaz to the northern-east part of Yemen (A’dr), through which the Egyptian army penetrated into Baghdad in 1836. The natural boundary between Hejaz and Yemen, and the limit between the range of Hejaz in the north and the range of Yemen in the south. The northern commencement of the great western range is the lofty peak of Mount Sinai. A deep inlet, the gulf of Abab, separates it from a high chain stretching along the northern coast of the Red Sea as far as Yambö. The bold and craggy summits generally press close upon the shore. It has no general name. Along the gulf are the Jebel-Ashš and the Jebel-Tihib, the latter 9000 feet high; south of them are the Jebel-Antina, Jebel-Ab, or Amr, on account of its elevation, the most remarkable, which and of the coast is a low and sandy tract; but its northern and western parts tower above the shore, and are known by the names of Jebel-Nab, Jebel-Lambam, and Jebel-Hadi. Yambö, at the foot of which lies the sea town of Mäilah, is between 5500 and 6000 feet high, and, with two other peaks in the neighbourhood, is visible from 60 to 80 miles. Mäilah lies in 27° 40’ N. lat. Six miles south-west of it is Ast-Salah, a high promontory, which on Ptolemy’s Chart of the Red Sea is nearly 40’ south of Mäilah; and this error has been copied by many navigators. The prevalent rock of the whole chain is porphyry, rising with craggy serrated summits above a base of metamorphite. Yambö, the port of Medina, lies on the northern side of a bay forming a spacious, deep, and safe harbour. It is the jumping-off point of and known in the history of geography ever since Ptolemy ascribed it to Ibn Habs, being 24° 6’. The present name is Yambö, or Yambö, or Yambö, which is Yambö, or Yambö, or Yambö, which is a corruption of Jabel-Rafid, as far as the promontory Rás-eh-hat-bah, in 23° 30’ N. lat., continues parallel to the coast, but is at some distance from it. The tract between it and the sea is however mountainous, being traversed by portions of the great range, and terminating abruptly towards the coast, from which it is separated in some places by narrow sandy tracts, while in others it forms bold promontories along the coast. Such is the Rás-eh-hat-bah, the last of a chain of isolated mountainous tracts, which form in the middle of some of the principal rivers of the Arabian desert. The names of the great range from north to south are—Jabel-Sahr, which contains lofty peaks visible from the sea; Jebel-Sab, or Sabah, 4000 feet high; Jebel-Aly, and Jebel-Rafid, in the latitude of Rás-eh-hat-bah the range takes an eastern direction, and afterwards running south, forms a bend which surrounds the high tract of Mecca, which is about 100 miles wide from west to east. This crescent-shaped bend, the Jebel-Kašr, is the highest portion of the whole range and it is watered by the river El-Haas, which rises above a plateau of great elevation, and several of its peaks, among which Jabel-Gassiri, or Ghasiri, as Edrfi writes it, is the highest, are said to be crowned with eternal snow. The town of Tayf stands at the western foot of Mount Gassiri; and although the immediate neighbourhood
of the strait of Bôo-el-Mâdheb, between the cape and the coast of Abyssinia, is about 14 miles; the island of Perûn, or Mehum, divides it into the great or western channel, which is 106 miles wide, and in the middle above 100 fathoms deep, and the little or eastern channel, which is 3 miles wide, and never less than 13 fathoms deep.

The great range stretching from Southern Yemen north-east to 'Oman is very imperfectly known. From Jebel-Yafâl a chain stretches east near the coast, rising by several terraces to 2500 feet above the sea, and is traversed by a ravine called Nakab-el-Hajar. There are many large rivers, and several smaller ones, which are also traversed by this chain. These terraces are formed under the names of Jebel-Hamari, and Jebel-Ghurâb, which are in the country of Hadhramait, parts of which have been visited by Wellsted and the author. This chain has a range of from 8 to 10 miles, and is intersected by some ridges of hills, and intersected by wadis of wide depth.

The interior of Hadhramait was entirely unknown to Europeans until it was lately visited by the Baron de Wrede, a German gentleman, whose account has been published in the fourteenth volume of the 'Journal of the Royal Geographical Society of London' (1844).

The baron having been robbed of most of his papers by order of the Sultan of Seiff, the account is very short; but his description corresponds generally with the accounts of Edward Arbery, and信息安全

The north-west is traversed by a range of mountains in the direction of Makalla, which is a chain of hills extending for about 60 miles from the coast. On the fifth day he ascended a high yellowish plateau about 8000 feet high, the eastern part of which was overflowed by the summit of the colossus Kar-Scebn.

The appearance of the sea as far as the eye could reach was from west to north-east. Iron-sandstone was observed on the whole plateau, overlaid by a yellow and hard sandstone of a fine grannular texture; and the plain was traversed by ridges of hills with conical summits, and intersected by deep and narrow ravines (wadis), through which the rain-water flows into the lower regions.

On the ninth day the traveller reached the Wâdi-Dûân, the chief object of his search, which, from its commencement about 150 miles north-west from Makalla, stretches according to all appearance (the baron does not give its direction), east, south-east, and south, till it reaches the sea near Sâhibi, a small village about 140 miles north-west from Makalla. The baron was only allowed to visit the upper part of this celebrated valley, which has different names in different places. Following the opinion of Niebuhr, our best geographers have put the Wâdi-Dûân 850 miles north-east of Makalla, in the unknown desert north of the country of Shêher, though Seetzen observed that it was on the east side of the desert of Hadhramait, which, according to the same traveller, begins five journeys from Makalla. Seetzen's further description of the valley of Hadhramait corresponds with that which Baron de Wrede gives of the Wâdi-Dûân; and as both agree that the Wâdi-Dûân, which is the most celebrated for its length, is a branch of the valley of Hadhramait of Seetzen, and the Wâdi-Dûân, in a more extensive sense, of the baron, we conclude that in this case Niebuhr and those who followed him were wrong.

The difference in the journeys from Makalla, the beginning of the Wâdi-Dûân, is no absolute difference of distance, since the baron made the way in eight and a half short journeys, each of less than six hours, while the five journeys of Seetzen might be longer journeys. From Khoreibeh, a town in the Wâdi-Dûân, Baron de Wrede travelled by the route of Wâniheb, which is the northern part of a long valley bearing the successive appellations of Wâdd-Håger, Wâdd-Giswuel, and Wâdd-Mafiah, under which name it reaches the sea near Bir-el-Hali. This is the Wâdd-Mafiah which was visited by Wellsted on his tour to Nakab-el-Hè'far. Near Hoti, a town in the Wâdd-Hâger, the valley is watered by a continually running stream that rises four journeys north-west from that town, and of course continues its course through the Wâdd-Mafiah, as the author has described it appearing from the neighbourhood of the Wâdd-Mâreh, and is perhaps the same by which this fertile valley is watered, and which supplied the famous reservoir of Sâba or Mâreï. We thus come to the country of Hadhramait, and the first great long rivers, one originating not far from Wâdd-Mâreh, and running south-east and south for a distance of about 150 or 160 miles; and the other, the river of Dûân, flowing east, south-east, and south for nearly 800 miles. But neither of them reaches the sea, which is the case with nearly all the rivers in Arabia; and it may be doubted if they flow during all seasons, though it is possible that they never dry up entirely in all places.

From Khoreibeh the baron travelled six good journeys north-west and west to Sava, in the Wâdd-Râchî (Rakki), which is the present capital of the country, in 17° 11'. He remarks about the river: no accurate computation is possible. This Wâdd runs north eight journeys. A six hours' journey north-west brought the traveller to the edge of the desert El-Ahkâf, called Bahr-el-Saffi, one of the most extraordinary tracts on the earth. It lies not far from the borders of the desert, and is 1000 feet below the level of the high land (from which the baron descended), and strewn with numberless undulating hills, without any trace of vegetation. There are many spots that indicate the limits of old vegetable mould, and the sea, the traveler, having thrown a plummet of about one pound weight attached to a cord of sixty fathoms into one of these sand-gulls, which was about two miles long and nearly as broad, saw it sinking with diminishing velocity for about five minutes, when the end of the cord disappeared in the chasm.

The baron says he made the experiment in the most northern chasm, from which we must conclude that Bahr-el-Saffi, that is, the tract containing such chasms, is more to the north from the spot where he reached the edge of El-Ahkâf, than Bahr-el-Saffi is the border of El-Ahkâf, stretching from the spot where he reached it to Kubr-el-Hûd, a distance of eight journeys; and, as, according to his statement, Kubr-el-Hûd is 17° from the equator, it is evident that Bahr-el-Saffi is traversed from south to north by the Wâdd-Râchî, and is consequently as difficult to be traversed as the desert of Saffi. From Mahrab, which is called Sâhib or Dâshir, by the Arabian geographers. Bahr-el-Saffi, or the sea of Saffi, or the former Bar-el-Saffi, or desert of Saffi, is said to be called so on account of Saffi, an Arabian king, having perished there with his army in his attempt to march through it. His fate reminds us of Aelius Gallus, who, on his retreat from the interior of Arabia towards the sea, has been visited and described by the baron. Parallel chains of mountains run along the coast, pressing in some parts upon the sea, and separated from it by narrow sandy tracts. Makalla lies in 14° 31' N., 46° 50' 30" E., long., in the corner of a fine bay, and is situated in the extreme part of the greater branch of the bold promontory, in 16° 37' 30" N., 49° 58' E. long., visible at the distance of 26 leagues from the sea. Ras-Morebâst, a low cape east of Ras-Tartik, is in 16° 56' N., 52° 31' 35" E. long., according to Capt. Owen. East of it, a high tract borders the sea, being a terrace leading to lofty and steep chains, which stretch in the same direction, and are visible from the sea at the distance of 20 leagues. Their height has been estimated at 6000 feet.

The interior has the name of Wâdd-Dûân, and is that part of the valley of the same name to which it generally is, though erroneously, called Mahrab. The language of this tribe has always been, and still is, very different from the Arabic, being probably derived from the ancient Hamitic language. The country of Shêher is described as an awful desert, but the mountainous tract along the coast is fertile, and in many places the mountains are covered with forests, a rare circumstance on this coast. At Ras-Tartik the coast turns north, keeping that direction for about 60 leagues, in which place the baron was prevented from proceeding by a great mountainous projection, which is as far as Ras-Morebâst; thence it runs north-east and north about 90 miles; and again running east about 60 miles, encompassing the Gulf of (Jûna-1-) Hashish, or Kuria-Muria, which is the name of a group of great islands, the passage of which is entirely prevented by two extraordinary reefs of coral. From this point the direction of the coast is north and north-east,
but its details are not known. Opposite it lies the long
land of Masearah, the eastern coast of which has been
surveyed. The coast terminates to the north-east with Râs-Jin\', a
high promontory, backed by a chain of lofty mountains, in
22° 30' N. lat., and 36° 10' E. long.: this is Râs-Katîf, a low point,
where Bahr-Omân begins, or the part of the Indian Sea
which lies between the coast of Omân and the coast of
Beyanistan. From Râs-Katîf the coast of Omân turns west
and south-west, and is smooth and sandy. The coast
lies between that cape and Râs-Hasrân, near Muscat;
the other, which has a chord of 240 miles, and advances to the
sea as far as 26° 21' N. lat., 56° 30' E. long. (in the map of
Evans, 1850, the Medina runs west from Râs-Katîf to Râs-Hasrân.
The Strait of Ormus, between this cape and the coast of Persia,
is about 32 miles wide at the narrowest part. The coast of
Omân is generally low, being a narrow "telaham," backed by
lofty chains of hills. Near Muscat rocks tower above the
sea. Jebel-Huthur, in the south-east, is said to be 6000 feet
high; and its north-west continuation, Jebel-Akadar, has an
equal elevation: a peak which is south-west of this chain is
still higher. Still farther west begins the sandy table-land.
Part of this tract is called El-Tehabat; it is unknown to us:
it is said to be inhabited by a tribe called Zarâk, whence
comes the word Sarascas. Omân is generally a fertile well-
cultivated tract, though containing sandy districts, as we see
from the description of Wellsted.

The coast of Omân distinctly turns south-west, and
continues in that direction for about 200 miles along the
Persian Gulf; the peninsula extremity of Arabia, between
that gulf and the Gulf of Omân, is about 170 miles broad at
its base, and nearly as long from south to north. From the western
continuation of the coast of Persia and south-west of Râs-Katîf
and then north for 140 miles, as far as Ras-Anfr, forming an immense bay, the shores of which are generally flat,
with an irregular outline, intersected by numerous creeks
and small harbours, and lined by numerous islands and coral cliffs.
Prates have always infested this dangerous coast, and they
are not yet entirely destroyed, in spite of the vigilance of
the officers of the British Navy. From Cape Anfr the coast
again runs south, which direction it keeps for about 80 miles,
reaching the coast of the Persian Gulf. Between this
bay, the Gulf of Bahrein, in the middle of which lies the
large island of Bahrain, noted for pearl fisheries. The coast
round this gulf is indented by many smaller bays and creeks,
which have good and safe anchorage, and the whole tract is
one of the most frequented of Arabia. A little south of Râs-
Tâmir, lying at the north-western extremity of the gulf, is
the town of El-Katif, in a fertile and well cultivated tract,
bordered on the west by the desert, and noted as a commercial
port and a centre of the pearlfishery. It is a well fortified and defended by a Turkish garrison, the com-
mander of which depends upon the Pasha of Barnath.
The town of A'zirj or Adnbar, once in the possession of the
Wahhabsies, is also a centre of the pearlfishery. El-Derâriyyeh, is supposed to be in the innermost corner of
the gulf, which is here called the bay of El-wah. From Râs-
Tâmir the coast runs in a curve north-west, north, and
then east, up to the Shat-al-Arab, forming a great number of
small bays, which are dangerous to approach on account of
near coasts and reefs. The tract along this coast, or the
northern part of El-Hassâ, is flat and covered with sand to a
great extent, but it also contains many fertile and well culti-
vated valleys.

The interior between El-Katif and El-Derâriyyeh, has been
made known to us by Captain Sadler, the first European who
traversed Arabia from one coast to the other; and the
tract from El-Derâriyyeh to Medina was seen by the same
traveller and the French officers who accompanied the
expedition of Ibrahim Pasha against El-Derâriyyeh, the former
capital of the Wahhabsies. But all that we know of this tract is
chiefly confined to the routes or is derived from the descrip-
tions of Jamal, who mentions, El-Derâriyyeh, and a well
cultivated district, of the Persian Gulf towards the interior.
The first terrace begins about 100 miles westward from the coast, where Sadler felt a cooler atmosphere, but the ascent is gradual. The country
is generally barren, being a rocky soil covered with pebbles or
rocks, and the only cultivated tracts are the few more fertile tracts at some distance from the common
road. The second terrace begins in the neighbourhood of
Derâriyyeh and Misrah, where the high land is cut by fertile
valleys covered with date-trees; the plains afford excellent
pasturages for horses. Derâriyyeh, though destroyed by
the Egyptians, is a place of importance and has always had a
large trade, being a central position, and connected by great
roads with all the provinces of Arabia. West and south-west
of this town are the highest portions of the central table-land
of Arabia, and approach to Mecca. The most direct route
to Anfezah, where it joins the high road from Beighâd and Damascan. The position of Anfezah is as
important as that of Derâriyyeh; it is in the province El-
Kusn, at nearly equal distances from the Persian Gulf and
the Red Sea, west of Ris-Musendom, and north-east of the province El-A'reed, in which Derâriyyeh
is situated; the tract between this province and El-Kusn
is the province of El-Wahsh. The road from Anfezah to
Medina runs by a series of chain of ranges which stretch
from north to south, thence across other barren hills called
Jebel-Tayeh and Jebel-Maqiyeh, as far as Henkâyeh
(Henfah) in the neighbourhood of Jebel-Ohod, a mountain
of red granite, yet it turns south-west south of Medina and
passes through a desert which is a stony plain traversed
by chains of barren rocks and sand-hills. Water is not
scarce, but there are few villages, and the cultivation of
the more fertile tracts is neglected, probably in consequence
of the Wahshah war. Henkâyeh is placed in Gunthorpe's
map 36 miles north-east of Medina, in 26° 22' N. lat., 38°
E. long. The account of Sadler of this part of his
route is very incomplete. In the map belonging to Burck-
hardt's Travels, Henkâyeh lies in 26° 35' N. lat., 38°
E. long. From Henkâyeh to El-Burckhardt's Travels,
20' E. long.; Berghaus computes it to be in 26° 9' N. lat.,
38° E. long., 75 miles north-north-east from Medina, and he
seems to be more correct than the others; Houghton is
apparently at fault. As far as the map of Wellsted, the
transaction of Henkâyeh is of great importance; the road from
Anfezah to that town is evidently the high road to Medina
as well as to the upper part of the Red Sea; the former
branches from that place south, the latter continues in its
western direction.

The axis of Arabia, the range of El-A'reed or Jebel
Imariyyeh, begins, as above mentioned, in the environs of
Dayef, where it is connected with Mount Korah-Karah, which
is part of the Hejaz chain, by the lofty peak of Qasdiân
the surroundings of which are termed the Derâriyyeh. We
know it only from the descriptions of the natives and
some Arabic writers, but D'Anville placed it in his map of
Arabia. Its north-western declivities are steep, white rocks
rising like a gigantic wall, along the foot of which runs the
dayef from Derâriyyeh to Mecca mentioned by Edrizi, and
which is marked with its stations on most of our maps. In
the south-east this chain borders on a sandy table-land, and it
seems that the great gap which, according to Ritter's opinion,
it is supposed to be the gap of the supposed route of
El-Derâriyyeh, runs across that table-land at some distance south-
west of the chain of El-A'reed. There is another road, first
mentioned by Baron von Hammer, who derived his know-
ledge from the maps of Berghaus, which runs from Mecca by Merak, Shik, Jenkijj, Merakb, Menahb, 'Ahlâb, Sekiyeh, and Dhat-
'Ark, where it joins the northern road: it runs south-east of, and generally parallel to, the chain
of El-A'reed. But whether those places are situated on the
table-land between the chain and the supposed gap, or in the
gap or valley, we cannot determine. The road is not
mentioned in any of our maps. The town of Derâriyyeh, which
is known to us by the descriptions of the natives as being
situated in or near the western part of the Derâriyyeh (as in
the map of Berghaus), is most probably on that road
which continues from that place south-west to Mecca, while
another road, which has a southern direction, traverses the
fertile and well cultivated district of El-Bakars, and leads to
'Asir and the other districts of Northern Yemen. The pro-
vince of 'Asir is traversed from west to east by four consider-
able streams which unite in its eastern part and form the river
Bisbes, which, according to a brief account lately published
by Mr. Jomard, contains the town of Deir-El-Bakars, a distance
of about 200 miles. Jomard thinks that the river Afân, which according to the Arabian geographers
traverses the province of El-Hassâ from west to east, and
empties itself into the Persian Gulf somewhere below El-
Afân, is the continuation of the river Wâdi, which flows in the
valley of Derâriyyeh flows into the Wâdi-Afân, and we
can trace this Wâdi still farther to the west. Niebuhr
observed that there was no perennial stream in the Wâdi-
Afân, nor has Captain Sadler, who twice crossed the line in which
the Afân was supposed to flow, observed anything like a
river in that tract. On the other hand, it is difficult to explain where the river Bisheh finally flows to. Its direction is certainly north-east, and the natives say that it enters the Persian Gulf. It is supposed by some that it flows into some lake, and such is the lake Salome, which, according to the account published by Jomard, is east of the Wâdi-Dowarâ, and into which the river Bisheh flows after having wasted that Wâdi. It flows farther down—a phenomenon observed in other rivers. The same account, which is derived from trustworthy natives, also says that the Bisheh, after having traversed the lake, continues its eastern course and empties itself into the Persian Gulf. It is probable that this road is still frequented, but leads through barren tracts inhabited by a warlike population. Another road was formerly known between 'Oman and Dâwarâ, where there is a frequent road from all parts of Arabia, and even of India. Burckhardt mentions a path to the town of Nejd, through the Wâdi-Jebrin, to Hadramaut, which is frequented in summer. This road must cross the Bahur-ul-Saff (the northern and western barrier of Hadramaut), and a considerable rise in the relief. Wrede, the English traveller, supposes that this road was used in the Wâdi-Rachie, but through the Nejd road also, though, of course we do not mean the sand-gulls. It is said that an English gentleman has lately started for Southern Arabia, with a view of traversing it in its whole width across El-Ahkaf. That road is little frequented. Wrede, the English traveller, supposes unless prevented by the natives. The whole tract seems to be inhabited by Beduins or Nomadic Arabs, and there is little chance of finding towns or many fixed settlements. The maps attached to the editions of Ptolemy have induced many to believe that he was acquainted with a number of towns in the tract which is now called El-Ahkaf; and Jomard, excited by hopes of making conquests in the desert, thinks that if we knew all Arabia, our maps of the desert would be so much the poorer. This is far from likely. Ptolemy had certainly a more extensive knowledge of Arabia than any other ancient or modern geographer, but his knowledge was not accurate, and if we should succeed in clearing any part of the desert, it is more probable that his map would be little more correct as our own must be little more. We should be like his. The writer has in his possession a vast number of extracts from Arabic geographers and historians who have never or seldom been made use of for geographical purposes, and the works of others are still in the present stage of preparation. He has also a number of extracts from Ptolemy's map, which will be of great use when the corrected and the corrected, the corrected, the corrected.

The remaining part of the interior of Arabia, between 'Oman and Nejd and Hadramaut, is a tract of which we have no knowledge. It is generally believed to be a desert overgrown with salt grass and desert shrubs, although in the Jihâd-usûm of Hâjji Khalil it is described as an interrupted wilderness, inhabited in some places, so that the traveller is always sure to sleep at night in a hut. It is called El-Bisheh, because it contains many barren tracts covered with sand-hills, but this term is frequently employed by the Arabian geographers in the description of other parts of Arabia. The unknown part of Southern Arabia begins at the Wâdi-Rachie, in the west, in about 46° 30' E. long. That meridian forms its limit as far as 30° N. lat., in the north-eastern corner of the Wâdi-Ahâj. A line drawn from that spot north-west to the eastern boundaries of El-Bakrâ was mentioned above; hence north-east along the range of El-Arkâs far as the meridian of Derâsûl; then south-east to a point in 34° N. lat., 47° E. long., and thence east to the frontiers of 'Oman, forms its northern boundaries. Its eastern boundaries are 'Oman, and its southern the range as far as the Wâdi-Dowarâ, which they follow south-east to the boundary of the Wâdi-Rachie. The territo-

\[\text{source: } \text{Decennales et Observationes sur le cours du Bahr-el-Ahâj et sur quelques sources pontos de l'Arabie.}\]
was the peninsular tract round Mount Sinai, separated from the eastern part of Arabia Petraea by the Sinus Atlantides, now Bah Arab. The name of Arabia Petraea is not very antient, and even that of the town Petra seems to have been unknown before the time of Alexander the Great; the country however is so distant from the Eastern natures as being connected with the history of the Jews. Ismael, the chief of the tribe of the Ishmaelites, and the supposed ancestor of the Arabs, had his abode in Arabia Petraea. (Geness xxvi. 18.) Other tribes mention the name of the country in the same region, as Amalekite, Amaelekite, Hagaren, and Edomites or Edomaei, who inhabited the tract bordering on Judaea, which was called Idumea. In the time of the Romans, the Nabathaean or Nabataeian were the ruling nation in Arabia Petraea, and are found on inscriptions of Nabathaei, and are consequently the same tribe as the Ishmaelites of the Scriptures. In the time of Augustus the Nabathaean possessed the northern part of Arabia Felix also. The name of Arabia Petraea is not mentioned by Strabo, who calls the country 'speciea novi Naboraria,' the Nabataean Arabia. Trajan conquered this country, and united it to Palestine; it was afterwards called Palastina Tertia, and thus Stephano Byztantius (Titre) says that the term of Petra was situated in the 3rd Palatine (Petrar. P. C.) King Baldwin I. con-
erated part of the country, and caused its principal town, Kasa, to be called Mont Royal. The antient writers mention several towns in Arabia Petraea, among which Petra is first in importance, as it is the abode of those who live between the Dead Sea and the Gulf of Akaba, and it was also called Rokem. (Arab. P. C. and P. C. S.) Colliers, Noticia Orbis Antiqui, vol. ii. pp. 357-463.

AEROMETRE (from the Greek aerus, light or thin, and diemeter, a measure) is an instrument employed for the purpose of ascertaining the specific gravities of fluids, generally such as are less dense than water, but capable of being used also to determine those of any fluids, and even of solid bodies. It differs little from an hydrometer, and in its simplest state it was merely a glass ball, hollow, and having attached to it a graduated stem also of glass, a weight was applied beneath the ball in order that the instrument might float in a vertical position when partly immersed in a liquid; and the different depths to which it sank in different fluids were indications of the relative densities of the fluids, the volume of a cylindrical portion between any two graduations on the stem being some known part of the whole volume of the instrument.

But an instrument of this kind was soon found to be very defective; for when immersed in different fluids, the elevation of the fluid depressed by the weight of the instrument, and the difference of the elevation in different fluids, were unequal, and thus the difference between two immersed volumes could not be correctly estimated. Fahrenheit improved it by forming at the top of the stem a small cup, receiving weights, by which, when the instrument was placed in the fluid, the fluid displaced by the weight would stand on the level of the fluid surface; the weight of the instrument itself, with that of the objects in the cup, were together, of course, equal to the weight of the fluid displaced by the immersed part; and the difference between the weights in the cup, when the mark was successively at the surfaces of two different fluids, allowed a nearly correct estimate to be made of the difference between the specific gravities of the fluids.

We have since been made in the construction of the instrument; and the best form is probably that which was given to it by Nicholson, and which bears his name. It consists of a hollow cylinder, or sphere, of copper, from each extremity of which proceeds a stem; that which, when the instrument is in a vertical position, is uppermost is a wire of hardened steel about 1/4-inch in diameter, and, like Fahrenheit's instrument, it carries at its top a small cup in which weights may be placed; to the lower stem, which is short, is attached a small vessel containing a solid body whose specific gravity it may be required to determine. The instrument is so adjusted that, if a weight equal to 1000 grains be placed in the upper vessel, the whole will sink to the bottom of the vessel from the weights, and of the specific gravity of Fahrenheit's thermometer, a mark made on the stem is on a level with the fluid surface. When the specific gravity of a fluid lighter than water is to be determined, the instrument is plunged into the fluid and weights are placed in the upper vessel till the mark on the stem is at the surface; then, if w in grains, be the weight of the instrument when unloaded, and w the weight placed in the cup as just said: also if s be the specific gravity of distilled water, and s' that of the fluid in which the instrument is placed, we have, by hydrostatics, 

\[ w + 1000 = w' + w' + w + w' + w'; \]

whence s' may be found.

To obtain the specific gravity of a solid which does not imbibe water: after placing the instrument in distilled water to find the weight of the body, and weights, in grains added to the mark on the stem at the level of the surface, these weights being subtracted from 1000 grains, leave the weight of the body in air: then placing the body in the upper vessel, let other weights be added in the upper vessel till the mark on the stem is at the level of the surface; these additional weights will express the loss which the body sustains by being immersed in water. Consequently if w' be the weight of the body in air, w' the loss just mentioned, s the specific gravity of the water, and s' that of the body, we have by hydrostatics,

\[ w' + s = w' + s'; \]

whence s' may be found.

If the substance whose specific gravity is required be, like wood, capable of imbiping water during the experiment, it should be left in the lower vessel, while under water, till the instrument is stationary, when the additional weights in the upper vessel will express the weight of the displaced water, and the weights in the lower vessel, placing the instrument in the dried surface, let the substance be placed in the upper vessel and weighted in air as at first: the difference between this weight and that which was found before the substance was put in the water is the weight of the water imbibe; and this must of course be subtracted from the total weight of the substance in water, previously to substituting the values of the terms in the proportion. The theory of the araeometer and hydrometer is given in Gregory's 'Mechanics,' vol. i. art. 406. 350.

For fluids of greater specific gravity than water, such as the concentrated acids, an instrument of the like kind which was invented by Guyton de Morveau, and is designated 'Gravimeter,' may be used. It is made of glass, with an upper and lower cup, in the former of which may be placed a constant weight, and in the lower a glass ball containing mercury. The weight of this body in air is made exactly equal to the constant weight together with the weight of a body of distilled water equal in volume to the ball containing the mercury. It is evident therefore that in the water this last object will be exactly equivalent to the constant weight, supposing the latter to be placed in the upper vessel; so that, in use, its weight is expressed by the number of grains in the constant part; and at the same time the position of the instrument being plunged in a fluid more dense than water, a weight to be placed in the upper vessel much greater than that which could be otherwise introduced consistently with the preservation of the vertical equilibrium.

Now the constant weight being that which, in distilled water at the standard temperature, sinks the instrument till the mark on its stem is at the level of the surface; the weight of the instrument without the ball of mercury, together with the constant weight, is the weight of a volume of the water equal to that of the immersed part including the ball; and when the instrument is introduced in a heavier fluid, its weight together with the constant weight and as many grains as will depress the mark on the stem till the surface, will be the weight of an equal volume of that fluid. Consequently, if s be the specific gravity of the water is to the required specific gravity of the fluid; which last is thus found.

ARANJAA, in F. C., is a misprint for Aramea. (Aramea, P. C.)

ARACARITRES (Prel), a genus of fossil plants found in the liles of Lyme Regis.

ARAXES. [Ars, P. C.]

ARCADE. In addition to its proper technical meaning, the term has of late years received different signification among the Parians more properly designate a passage or gallery, viz. an alley lined on each side with shops, and roofed over so as to be in fact a sort of covered street, extending from the westerly, and of uniform design throughout in its architecture. So far, an arcade answers to the idea of a bazaar, the chief distinction between the two being that the latter has not so much of street character about it, but consists either of a single spacious hall or separate rooms, fitted up with counters &c., stands,
and may therefore be likened to a single large shop occupied by a number of different dealers, whereas in an arcade the shops are quite distinct from each other, and enclosed in front with windows after the usual manner; and they have besides dwelling accommodation, kitchen, &c. beneath, and a chamber or garret above. Thus, in every way, there is but one entrance to each.

Another distinction is that an arcade serves as a public thoroughfare for foot-passengers. As to such a place being a very great public convenience there can be but one opinion,—as in dirty or wet weather, when the advantages attending such houses, and the satisfaction they give to themselves, are very evident, and no pretence of elegance or even of decency has anything in accordance with the title bestowed on it, it being neither arcaded in any way nor arched over. The Lower Arcade in the Strand (erected 1831) manifests very great improvement upon that first specimen, for it is really a very handsome and tasteful piece of architecture; the side elevations are divided by pilasters into compartments, each of which contains a shop-front, with an ornamented triple window over it, and above that a semicircular one in the arches of the Pantheon; and an arcade can, each of its divisions is covered by a pendentive dome with a circular skylight; and these numerous domes and their arches produce a singularly pleasing perspective effect. The same may be said of the Royal Arcade at Newcastle, erected a few years later, in which, as to the side entrances, the same device of alterations—and those not for the better in the side compartments—yet where, while so little has been done, there is such ample scope for variety, this mere repetition might have been avoided. Another point of merit is that all the arches do not agree with us in an example of something decided and marked by one striking peculiarity in regard to its plan: the Victoria Arcade at Ryde in the Isle of Wight, completed in 1836, after the designs of Mr. W. T. Davidson, consists of two compartments, each of which has in the centre of it a high circular dome covered with a flat-topped dome with a single row of large panels, but the avenues are not arched. Although in point of architecture this example is exceedingly plain, the general combination is highly effective and pleasing, and also suggestive of many other ideas. The central avenue of Covent Garden Market also affords an example of what, though not so called, may be classed as an arcade, inasmuch as it is a covered street of shops; and it is referred to as exhibiting a very different character from the preceding ones, the prospect towards which is less deformity, yet producing much architectural expression in its upper part on account of its open timber roof, and the 'clerestory' formed by openings which are left unplastered in the upper part of each side; consequently the light is admitted, yet vertically, and in a manner that produces the effect of something different from that attending lanterns or skylights.

In regard to degree of architectural adornment this example ought to be placed first, as being of far more primitive character than the others, and also the least attention to ornament of any kind. In the new Exeter Change, on the contrary (erected 1848-9, by Mr. Sydney Smirke), decoration of quite a novel kind, for this country at least, is introduced, there being no previous application of it, in any such place. The Pantheon is a Peacock. Here you have, as it were, prominently, a polychrome embellishment, which is there applied both on the upper part of the walls (in ornaments and pannels between the windows over the shops) and on the cove of the ceiling. The plafond of the latter may be said to be open, it being merely glazed so as to form a continuous skylight over the avenue, which circumstance constitutes a strong point of difference between this and all the preceding examples. No less difference is there in several other respects; the windows are the apparatus of a place of thoroughfare and business. Besides that it is of short proportions, the length being only about five times the width, it is more enclosed, therefore has more of in-door character, for instead of being open at the ends, or entered immediately, as it is in the other, it is entered by a very small number of them polygonal in plan, yet not exactly alike, the one being a hexagon, the other a heptagon, which are ingeniously adopted in order to obviate the difficulty of size, viz. the oblique position of the 'passage' between the two streets which it connects. It is perhaps to such difficulty alone that we are indebted for a novelty of plan and ensemble, that without it would not have been sought for. Those vestiges greatly enhance the effect of the avenue itself, inasmuch as they render it by contrast lofter than it would otherwise appear. It should be added also that the Pantheon near Belgrave Square is a 'passage' of the kind, which although of plain is of pleasing character, and has a peculiar air of spaciousness and cheerfulness. Among the Parisian arcades, the Passage Colbert is one of the most striking, for its extent and architectural display, towards which last its Rotunda contributes in no small degree.

ARCA'DIUS CHARIUS, AURELIUS. [CHARIUS, P. C. S.]

ARCADE COURT OF. At the time when the former article under this head was written (P. C.), it was expected that the Court of Arches would have been affected by a general measure for the reform of the ecclesiastical courts; but the attempts which have been made to accomplish this object have not hitherto been successful, and more than one bill for consolidating the jurisdiction and improving the practices of these courts has been abandoned. In the session of 1844 a bill was brought into the House of Commons 'For facilitating the proceedings of the Court of Arches,' and it was expected it would tend to the saving of expense, and to the better administration of justice, if either litigant party in any contested suit in any ecclesiastical court, either in the province of Canterbury or in the province of York, had the right to remove their cause gratis to the latter court, and to avoid the payment of a fee to the former. The bill was brought forward in the House of Lords relating to the ecclesiastical courts generally, which, among other things, provides that in these courts the fees arising from the exercise of jurisdiction, of the Prerogative Court of Canterbury, by transferring the jurisdiction of the latter court to the Court of Arches; but this bill was not carried. By 3 & 4 Vict. c. 65, the dean of Arches is empowered to sit as assistant to or in place of the dean of Canterbury, when vacated, or when by reason of his being a prince or of possessing the office of archbishop of Canterbury, he is debarred from sitting in that court. Advocates admitted in the Arches Court of Canterbury are admitted to be advocates of the High Court of Admiralty of England.

A Parliamentary Paper (No. 397) printed during the session of 1844 contains some information respecting the practice of the Court of Arches. There are no bye-laws, regulations, or resolutions made by proctors of the Arches or Prerogative Courts of Canterbury relating to the articling of clerks to proctors, or to the admission of proctors. The articling of clerks and admission of proctors are regulated by a statute of the archbishop of Canterbury, bearing date the 50th of June, 1896. By this statute, the number of proctors of the Arches or Prerogative Courts does not exceed sixty; forty, it was, among other things, ordained that there should be no less than forty in the Arches Court, each of whom should have power and privilege to take clerks apprentices, and that the remaining proctors should be esteemed and called supernumeraries, who should not have the right to take more than one clerk apprentice at a time. And there is added, that no proctor having one such clerk should be capable of taking another at the same time, until the first should have served five years. It is in practice required that a proctor shall have been five years on the list of the thirty-four seniors before he becomes more than a proctor, and he is to have the above rule with respect to age has, under particular circumstances, been occasionally dispensed with by the judge. The date and authority for these two rules are not known. The court has been seated, or has sat, by virtue of a writ of prorogation to a judge of the Prerogative Court, mentioned in the statute as made in 1896, do not appear to have been registered. It is conceived that they must have been rules and regulations to be observed in the conduct of suits, and not to the articling of clerks on masters. The Office of Archdeacon of Canterbury is that of the official principal of the Arches Court, or his surrogate, and are registered in the Arches Court. According to the present rules, a candidate for admission as an advocate is required to deliver into the office of the vicar-general of the province.
of Canterbury a certificate of his having taken the degree of Doctor of Civil Law, signed by the registrar of the university in which he belongs. A petition, praying that in consideration of such qualification, and of the services he has rendered, he may have access to the records of the university, is then presented to the archbishop, who issues his fiat for the admission of the applicant, directed to his vicar-general, who thereupon causes a rescript or commission to be prepared. In 1599, when the archbishop of Canterbury, empowered and requiring him to admit the candidate an advocate of that court. This commission contains a proviso that the person to be admitted shall not practise for one whole year from the date of his admission. The rescript of the archbishop, the records of the Archers Court; the rescript of the archbishop being first read, and the oaths of allegiance and supremacy, with two other oaths, taken. This admission in the Archers Court is the first for being any of the other ecclesiastical courts of Doctors' Commons.

The number of advocates is twenty-four.

The Court of the province of York which corresponds to the Court of Archers is called the Chancery Court of York. The number of advocates practising in this court has never exceeded four. They are admitted by fiat of the archbishop, directed to his chancellor, and have power to practise in all the courts of the archbishop; but it is not necessary that they should be Doctors of Civil Law. (Parliamentary Paper, 287, 235, 1844.)

ARCHIMEDEAN SCREW. [SCREW PROFESSORS, P. C. S.]

ARCHIGRAPH. [CLOGHRAF, P. C. S.]

ARD, LOCH, is a lake in Scotland, in the county of Perth, and in the parish of Aberfoyle: it lies south of Loch Katrine, or Katrine, from which it is separated by huge mountain masses, the summit of which, known as Ben Veen, rises to more than 3000 feet above the sea. On the west the lake is enclosed by high mountains. Ben Lomond, which rises 3197 feet above the sea, is only about four miles distant. Between the two mountain-masses lies Loch Chon, where the river Forth originates. It runs in a narrow valley to Loch Ard, and from thence to Loch Katrine by a channel about half a mile wide. To the south and east of the lake are hills, descending towards its shores with a moderately gentle slope. Where the river leaves the lake there is a small cataract, below which it runs through a narrow valley, called the Laggan, to a more level country.

(Sinclair, Statistical Account of Scotland.)

ARDWICK LIMESTONE, a calcareous bed or series of beds containing shells and fish remains, in the upper part of the Silex of Manchester and Leebmouth. There is a coal-bed above it at Manchester.

ARETINO, SPINELLO, one of the most distinguished of the early Italian painters, was born at Arezzo in 1316. He derived his surname from his birthplace, Arezzo. He was one of the most celebrated painters of his time. His father, Luca Spinelli, was a Florentine, who settled at Arezzo when the Gibellines were expelled from Florence. Aretino was the pupil of Jacopo del Casentino, whom however he surpassed even as a boy. He obtained a reputation very early by some frescoes illustrating the life of San Niccolò, which he executed in a new church of that saint, built at Arezzo by Dardano Aciacutti, expressly for the occasion of a council to be held there by Pope Eugene IV.

This church was destroyed by fire in the time of Vasari, and Arezzo, however which Aretino painted in it procured an invitation from Baroni Capelli, a citizen of Florence, to paint the principal chapel of Santa Maria Maggiore, with subjects from the life of the Virgin, and of Saint Antonio Abate, his father's patron. His first work in this style was the fresco of San Antonio Abate and the Virgin, in the church of the same name in the monastery of Santa Maria della Pieta, in Arezzo, which still remains; others in the monastery of San Bernardo, near Arezzo; and others in derelict, in the monastery of Monte Oliveto near Florence. His next work was the frescoes illustrating the life of San Barnieri, in the Campo Santo of Pisa, where Vasari reckons among his best works; scarcely anything of them now remains, but there are prints of them in Lasinio's 'Pitture a Fresco del Campo Santo di Pisa.' These frescoes, which were dedicated to the bishop, are represented in a series of three, the picture of the Madonna and infant Christ by Spinelli; it was in the old Duomo, or cathedral, and when that church was pulled down, the fresco was cut out of the wall, and placed in a small chapel, which was built in the old church of the Madonna del Duomo, taking the name of the picture.

The principal works of Spinelli are not mentioned by Vasari; they are in the town hall of Siena, and are from the P. C. S., No. 18.
efforts to promote a taste for such studies among his country-
men. He was one of the most active and influential members of
the Academia de Letras Humanas at Seville, which institu-
tion played a part in the development of posterity. He moved
in each of the five provinces of Spain, sent members of the
jewelled order of the Grand Cross of the Order of the To
delo of the Star, and was a favorite of the Regent Duke of Orlan
des, and had apartments in the palace of St. Cloud. He came to
England in 1721, with letters of introduction to the Prince of Wales,
afterwards George II., and returned in 1756 to his own coun-
try with a fortune of 800,000 francs; he died at Geneva, in 1769.

Featherstonhaugh, Whistle, in an Address, 1748, to the Representa-
tives of the State, in which he laid before them the state of their
affairs, and the various curiosities to the library of that place. Part of
his bequest was some pieces of a drawing of a Ledo, which is
made in Paris, said to have been copied from a basso-relievo by
Michelangelo. It appears to have been a wonderful perform-
ance, and it is supposed to have been originally executed in the
style of Raphael, but destroyed in 1784, and cut up into fragments,
distributed in various directions. Arlau'd was originally exclu-
sively for the church; he was a man of general acquirements, and
was well versed in languages. While in this country he
accomplished a manuscript in Latin, and finished it with Sim's
help, after his retirement to Geneva. Among the mini-
atures which he painted in London was one of the celebrated
duke of Marlborough. He painted also one of the Prin-
cess's, upon which Count Hamilton wrote a poem, which
was in the fourth volume of his works. There is an
ote on Arlau'd's Ledo in the third volume of the Writs
of M. de Bar, Amsterdam, 1759.

(Arulm, La Vie des Peatrimisand, etc.; Ecce, An- leinungen der altertumswissenschaftlichen Ver-
brosen; Walpole, Anecdotes of Painting in England.)

ARMAGH OBSERVATORY. The Observatory of
Armagh was endowed and founded in 1791 by Archbishop
Robertson, the greatest bachelor and improver of that ci-
ty. It was a gift of the revenues of the diocese, and was
entirely carried on by his immediate successor, till the present
primate, Lord John George Bereford, completed and surpassed the original design.

It stands north-east of the town, on an eminence of compact
cliff, raised above 100 feet above the surrounding land, with
substantive rock is mountain limestone. At the north
west, the ground rises about 89', at a great distance; but to the
south at six miles a hill has 238' altitude.

From the centre of the dwelling-house a tower rises 60 feet, with
which the whole town is visible, the building being placed, under
a revolving dome 16 feet in diameter, on an insulated pil-
lar. This, which for many years was the only available instru-
ment, was conceived, by its illustrious maker, to be capable
of supplying the place of a transit and a meridian circle. It
was, for this cause of mistakes, taken to the public, but it will appear, by a refer-
cence to Mr. Pond's description of the Westbury circle (see results of its observations are given), that it was not inferior to
any instrument then existing. Its hour-circle of 50 inch
circles, 3 feet diameter, divided into 360 parts, the declination-circle, 50 inch
circles, 5 feet diameter, divided into 360 parts, the equatorial portion of 50 inch
circles, 21 feet diameter, divided into 360 parts, the polar circle, 30 inch
circles, 10 feet diameter, divided into 360 parts, the polar circle, 20 inch
circles, 9 feet diameter, divided into 360 parts, the polar circle, 10 inch
circles, 5 feet diameter, divided into 360 parts, the polar circle, 5 inch
circles, 3 feet diameter, divided into 360 parts, the polar circle, 2 inch
circles, 2 feet diameter, divided into 360 parts, the polar circle, 1 inch

At the east of the house, but connected with it, are
1. A calculating-room, containing the observatory library,
2. The transit-room, 19 feet by 13, with an observing apar-
ature (or chase) of three, contains a transit instrument, by
Thomas Jones, of 68 inches focal length and 8 aperture.
This is constructed with the same precision as the other,
but is peculiar in the arrangement of its Ys, which have
bears, 5-inch ears, long, faced with quartz, and have not even
marked the pivots, after the constant use of 16 years. The
base or center of the instrument being removed, and the
painters are prevented from disturbing the meridian plane of the
instrument. Besides the usual circles at the eye end of the
telescope, it has one of 10 inches diameter on the axis, which
allows polar distance, and is now exclusively used. The
transit is by Earnshaw, and may be reckoned unique; as
the similar one, which was made for the late Mr. Larking,
is said to have disappeared. It is jewelled with singular
precision, and its cases made as nearly air-tight as possible.
The micrometers screwed into the box, are of-that cloth admits, to
which probably it is owing, that after 50 years its wheelwork
exhibits no trace of wear. It even works unaided through
its valve. It moving weight is 3 lbs., and its original telescopic
size is a griffon weighing 21 lb., but it was not constructed
compensated for temperature, this was changed for a mercarial
ARM

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ARM

The constant of the observatory are, as far as they have yet been determined,

Height above base-plane of Ordnance Survey 2110' feet.
Magnetic variation, Sept. 12, 1833 25° 27' west.
Duration of Dip, September 12, 1837, 1 h. 19 m.

Intensity 1-0242

Mean temperature 47-76°
Mean barometric pressure 29-669

ARMIN, ROBERT, a favourite comic actor and small part author, was a son of William and Sarah Grubb, and was presented to the Primacy by her Majesty, along with several other of its instruments. It turns freely in an insulated cast-iron framing, for the purpose of revolution, and is in perfect steadiness. One of the best works by this class; the injudicious combination of wood and brass in its structure, does not keep its adjustments: this defect however is about to be remedied. The telescope has 44 inches aperture; the cross 6' on each side of the sextant, and 12 feet radius of curvature, by done. In the main tower, under a sliding roof, is also placed a journeyman time-piece, and a triple 34 feet achromatic provided with wire, and divided object-glass micrometers.

4. The circle-room, 15 feet 13, has a mural circle by Thomas Jones, 68 inches diameter, and bearing a telescope similar to the transit. It is divided on the face next the pier, on an alloy of gold, and is read by twelve achromatic microscopes, so large that the observer's eye is 35 inches from the object-glass bearing, in a such manner, that it can be changed with temperature. The illumination of them, as well as of the clock (by Earnshaw), and of the spider lines in the telescope, is effected by a single light placed in the centre of a circular frame bearing reflectors; and the movements of the instrument are taken up by a spider consisting of 35 threads, very similar to the standard one of the Royal Society; and the external thermometer, and other meteorological instruments, are at a northern window in the passage to the eastern dome.

5. This, also of 15 feet diameter, contains a large reflector equatorially mounted by Mr. Grubb of Dublin. It is 16 inches aperture and 115 feet focal length. It is Cassegrainian, with the higher powers; but for sweeping and observing assumes the Newtonian form is preferred, as giving a wider field. It is mounted on large 10 feet Newtonian, made specially by Sir W. Herschel for George III., and one of 2 feet focal length and 6 inches aperture by Short, in excellent preservation, which can be used in any of the three forms. These are, when employed, moved to any desired point by a strong-ovoboat, and the movements of the circle are regulated with the speed of the observations, and to the standard one of the Royal Society; and the external thermometer, and other meteorological instruments, are at a northern window in the passage to the eastern dome.

6. This also of 15 feet diameter, contains a large reflector equatorially mounted by Mr. Grubb of Dublin. It is 16 inches aperture and 115 feet focal length. It is Cassegrainian, with the higher powers; but for sweeping and observing assumes the Newtonian form is preferred, as giving a wider field. It is mounted on large 10 feet Newtonian, made specially by Sir W. Herschel for George III., and one of 2 feet focal length and 6 inches aperture by Short, in excellent preservation, which can be used in any of the three forms. These are, when employed, moved to any desired point by a strong-ovoboat, and the movements of the circle are regulated with the speed of the observations, and to the standard one of the Royal Society; and the external thermometer, and other meteorological instruments, are at a northern window in the passage to the eastern dome.
In this occupation he spent the last fourteen years of his life; and during that period, though so diligently engaged in his studies, and with so many important public duties, he still found time for two great public events and political questions of the time. He was one of the most decided opponents of the Oxford new school of theology. His idea of a Christian church was first given in his pamphlet on Church Reform, which he was induced to publish in 1837, in which he forcefully and clearly expressed his sentiments on the subject. These sentiments were afterwards embodied in his Fragment on the Church recently published; in which he hits the key-stone of the Tractarian heresy, in attacking what he considers to be their false notions of the Christian priesthood.

In 1836 the office of a Fellow of the Senate of the new London University was offered to him, on the retirement of Dr. Spring Rice, the Chancellor of the Exchequer, and the office was accepted. Dr. Arnold at first consented to join the University 'without insisting on a Scriptural examination, on the alleged ground of fact, that such an examination is not practicable on account of the objections of different classes of Christians, and on the hope, which he distinctly expressed, that the Christian character of the University might be secured without it.' But he subsequently became convinced that the examination of the School was of such importance that he did not think it unjust or indisputable, and he gave notice of his intention of recommending the introduction of the Scriptures as a part of the classical examination for every degree. In December, 1837, his success was assured; Dr. Arnold's proposal was adopted by the Senate, and the examination either in one of the Four Gospels or the Acts of the Apostles in the original Greek, and also in Scripture History. In consequence of the remonstrances from various bodies of Dissenters and from the Council of University College, London, and partly in consequence of the strong representation of the Secretary of State (Lord John Russell), through whom an appeal had been made by the remonstrants to the law officers of the Crown, a larger meeting of the Senate of the University was summoned by the Vice-Chancellor in 1838, in which the former motion was overruled, and in its place it was resolved, 'that examination in the Hebrew text of the Old Testament, and in the Greek text of the New, and on Scripture History, shall be instituted in this University; and that all candidates for degrees in arts may, if they think proper, undergo such examination.' The Senate immediately proceeded to institute a voluntary examination, with prizes, in the texts of the Old and New Testaments and in Scripture History. Dr. Arnold was brought before the Senate of the London University, in November, 1838, being led, 'after the fullest consideration and inquiry, to the conclusion that the voluntary examination would not be satisfactory,' and 'at the request of Borough (Dr. Arnold, li. p. 126), or, as he expresses himself in another passage of the same letter, would not satisfy, either practically or in theory, those principles which appeared to him indispensable.'

The history of this transaction is given at length in Stanley's 'Life of Arnold' (ii. p. 10, &c.), and Dr. Arnold's views and opinions appear from various letters in the same volume (pp. 13, 83, 91, 94, 107, 126). The history of the London University is given in P. C. [University of London], and the various documents relating to examination on religious subjects in that university are contained in the Parliamentary Papers (No. 586) relative to the University of London, printed by order of the House of Commons in 1840 (pp. 25, 27).

Dr. Arnold's mind was early directed to the social condition of the working classes of this country; and many efforts were made, and a variety of plans devised by him, not only for improving it, but for directing the attention of the public to a subject of so much importance. With this purpose he gave lectures at the Rugby Mechanics' Institute, started a new paper in 1831 expressly for the use of the lower orders, and in the same year, and also in 1832, wrote letters in the 'Sheffield Courant,' and subsequently in the 'Herts Reformer,' for the purpose of introducing a moral element into the measures intended for the social benefit of the masses; and although much of the franchise would be useless, if not pernicious.

The Whigs, to whose party he was more nearly assimilated in opinion than to that of the other, offered him a position which he did not accept. The year before his death, however, he was appointed by Lord Melbourne to the regius-professorship.
of modern history at Oxford—an appointment which gave him the opportunity of devoting his time to only his introductory course of lectures. At the very summit of his reputation as a teacher, and at the time when the editor, for which the liberality of his religious and political opinions, his name had been held by men of his own pro-

fession, the dignity of a major, or in any case, an ex-

ceived was every day becoming more manifest and more distinctly understood, he was seized with a fatal disease, which carried him off in a few hours. He died on the 12th of June, 1842, and the 58th section has another retrospective effect, empowering all persons in execution at any time of the act on any judgment in any action of debt, wherein the debt, exclusive of the costs, did not exceed the sum of 20l., to apply to a judge to be forthwith discharged out of custody; the judgment however is still to remain as a personal or the discharge of the debtor, and the creditors may have their remedy by execution against his property and effects.

Pleaders' ed. note 23.

ARREST OF JUDGMENT.

ARREST OF JUDGMENT. When an action at law has been carried through all the stages previous to the judg-
ment, unless the defendant has obtained a new trial or verdict, he may be had in execution for the judgment; but if the defendant may still move in arrest of judgment: that is, he may pray the court to withhold or arrest the judgment from the plaintiff, on the ground that there is some error appearing on the face of the record, which vitiates the judgment or proceedings. In no case can the arrest of judgment be granted on the ground that the record may arise, from the commencement of the suit to this period, the court is bound to arrest the judgment. The form must be such as is apparent on the record; and generally speaking, it is not an error in a mere point of form. This was formerly otherwise; but certain statutes have been passed at different periods, called the statutes of jealously and amendments, by the effect of which judgments at the present day cannot be arrested, unless for any merely formal objection. The statutes of this kind are 14 Ed. III. c. 6; 9 Hen. V. c. 4; 4 Hen. VI. c. 3; 8 Hen. VI. c. 12, 16; 22 Hen. VIII. c. 50; 18 Eliz. c. 14; 21 Jac. I. c. 13; 16 & 17 Car. II. c. 6; 4 & 5 Ann. c. 16; 9 & 10 Geo. c. 20; 5 & 6 Geo. I. c. 19. For further information on this matter, see Blackstone's Comm. iii. ch. 24; Stephen On Pleading; Commen's Dig., tit. 'Pleading,' § 48.)

ARRESTMENT in the law of Scotland is a process by which a creditor may attach money or moveable property which a third party holds for behoof of his debtor. It bears a general resemblance to foreign attachment by the custom of London. [ATTACHMENT, FOREIGN, P.C., p. 56.] The person who is at

searched or arrested is called the arrestee, and the debtor is called the common debtor. It is of two kinds, arrestment in execution and arrestment in security. The former can proceed only on the decree of a court, on a deed which contains a clause of registration for execution, or on one of those documents, such as bills of exchange and promissory notes, which by the practice of Scotland are placed in the same position as deeds having a clause of registration. Arrestment in security is generally an incidental procedure in an action for the constitution of a debt; but it may be obtained from the Bill Chamber of the Court of Session on cause shown, as a method of constituting a security for a debt not yet due. This latter class of arrestments is under the equitable control of the judge who issues it; and it is a general principle that it cannot be obtained unless the claimant show that circumstances have occurred which have a tendency to make his chance of payment less than it was at the time when he entered into the engagement with his debtor. An arrestment may be recalled on it being proved that it should not have been issued, and an arrestment in security may be 'loosed' on the debtor finding security for the pay-

ment of his debt. An arrestment in execution expires on the lapse of three years from the date of the judgment or arrestment in security, on the lapse of three years from the day when the debt becomes due. In the meantime, the person in whose hands the process is used, is liable in damages if he part with the property arrested, but it cannot be attacked after he has parted with it, or handed it to a surety for the debt. The arrestment is made effectual for the payment of the debt by an action of Forcibige, in which the common debtor is cited. It concludes for payment of the money if the arrestment be made on money, or for their sale for behoof of £.
ART

EDITOR, if it be laid on other moveable goods. The arrestee may plead against the arrestor whatever defence he might have. His common defence was that the order of the local courts was enlarged in regard to arrestments, and the process was generally regulated, by the 1 & 2 Vict. c. 114. The practice on this subject will be found in Darling's 'History of the Chancery.' At a later period a sort of assize of the annual subscription-list, which takes place early in the spring, the Committee of management set apart a portion of the aggregate sum for the purpose of engraving and printing the various objects laid open to the subscribers. It was a copy of a word list for each guinea subscribed. By the combination of a very great number of persons to subscribe for this one work of art, and the avoidance of risk, incidental expenses, and publisher's profits, this print, though at least equal to what would have been a larger guesswork in the way of subscriptions, was allotted to the subscribers at so small a cost as to leave by far the greater part of the sum subscribed, as a fund applicable to the purchase of pictures, sculpture, and other works of art. This plan was adopted in the national subscription, in which the 3d prize, ranging from 10l. to 400l., and on the day appointed for the annual meeting of the society these prizes are distributed among the subscribers by a process resembling the drawing of a lottery, which gives an equal chance for every guinea subscribed. The prizewinners are allowed to select works of art to the value of their respective prizes from any of the five annual exhibitions of works of art in the metropolis, for the current year, which works, when selected by the prizewinners, are purchased and paid for by the committee, which, therefore, has not only an eye on the purchase of pictures, sculptures together, and exhibit them gratuitously for some weeks, first to the subscribers and their friends, and afterwards to the public. When the selected works fall short of the amount of the prize, the difference is paid out of the fund to the Reserved Fund of the association, and when they exceed it, the difference is paid by the prizewinner.

A PORTION of the funds is also applied to the offering of premiums for original designs, and the production of bronzes and medals. The amount of subscriptions in the second year, which was on 21st of January, 1837, was 489l. 6s., but it has increased so rapidly that the last report, that for 1844, shows a subscription of 14,843l. 1s., of which 8850l. was set apart for the purchase of works of art, being divided into 256 prizes of various amounts, in the proportions which every supporter understands from the outline illustrations of the 'Pilgrim's Progress,' the result of premiums offered by the society, and will also, on its completion, receive an impression of a line engraving by a first-rate artist from a landscape by Stanfield. The annual exhibition of prizes, or selected pictures, affords another important means of fostering a national love of art; that of the year 1843 was open for four weeks, during which it was visited by nearly 200,000 persons.

The committee of the Art-Union of London' has given rise to many similar associations, one of which has for its object the promotion of the fine arts in Ireland. In this, and some others, the works of art are selected by the committee themselves, and a subscription of 1l. 6d. for each of the Committee of the Art-Union properly so called, has also brought into existence several lotteries for the disposal of works of art, in which, notwithstanding the adoption of a similar course of proceeding, the principle is essentially different, such being considered by many persons as mere revivals of a species of dissipation which has long been illegal in this country: and, notwithstanding the opinions of some eminent counsel in favour of the legality of Art-Unions, the difficulty of dissociating them from lotteries unquestionably illegal, led government to issue a notice in April, 1844, which had the effect of suspending their operations for some months. A parliamentary committee was subsequently appointed to inquire into the subject, with a view to placing them on a basis of law and regulations, and some slight encouragement to the improvement and diffusion of art through the different classes of the community; but, as the investigations of this Committee could not be brought to a close in time for introducing a bill for their regulation in the session of 1844, a short act was passed by the legislature against such penalties as they might be considered subject to, for one year, so as to allow their proceedings to be immediately resumed, and the money then in hand to be expended for the purchase of pictures. This act expired by the standing that early in the present session (1846) a bill will be introduced to carry out the objects for which the Committee was appointed.

ART

A R T

AWESERI S A B S I N T H I U M (Woadroot). Medicinal Actions and Uses. This indigenous perennial herb is found wild on waste places, but which is required for medical use is mostly cultivated. The upper part of the stem, with the

who choose to subscribe two, three, four, or five times that amount being considered to have a proportionate number of votes. One member of the Select Committee is 'to inquire into the best means of extending a knowledge of the arts, and of the principles on which they are founded, to the people of the turing population of the country,' and 'to inquire into the constitution, management, and effects of Institutions connected with the arts,' it is observed that among exhibitions connected with the arts, that then, and which had been called to the Institutions established in Germany under the name of 'Kunst Vereine,' and which were even then introduced into this country. These associations, for the purchase of pictures to be distributed by lot, observe the Committee, 'form one of the many instances in the present age of the advantages of combination. The smallness of the contribution required brings together a large mass of subscribers, many of whom without such a system of association would never have been patrons of the arts.' The Committee further remark that the German Waagen and Von Kleben, two of the witnesses examined by them, highly estimated the advantages conferred on the arts by such associations, which, according to Waagen, were introduced into Prussia about the year 1760, and thanks the patronage of the king and his minister Von Humboldt.

Down to the time at which this Report was published, such associations had made comparatively little progress in this country; but shortly after its appearance a number of gentlemen, among whom were Mr. Ewart, the chairman of the Select Committee referred to, and four other members of parliament, established a society under the name of 'The Art-Union of London,' which immediately obtained considera-ble advantage and which has since increased its number to a magnitude far greater than that of any kindred association. The professed objects of this institution are 'to aid in extending the love of the Arts of Design within the United Kingdom, and to give encouragement to Artists beyond that afforded by the patron-
irises, and unexpanded flowers, should be collected, for these pass possess the peculiar aroma, with a strong bitter taste; while the lower part of the stem is merely aromatic, and devoid of bitterness. (Golger.) It imparts its properties to wine peculiarly to a certain extent, and medicinal forms of it are—the watery infusion (boiled with cold water) and the extract: but the domestic preparations are numerous; these are made either by digesting it with alcohol, to form a disagreeable spirit, or by distilling it in small quantity while using any of the sweet wines, such as Tokay. This practice may have been derived from the ancients, most of whose wines were very rich and luscious; and in those times, when corrected for refraction and parallel, is equal to the angular elevation of the object above the true horizon of the place.

Artificial horizons of the kind just mentioned are generally used on land for the purpose of obtaining the altitude of a terrestrial object by means of the sextant, a circular disc, either held in the hands or supported on a small pillar; occasionally also, it is employed to obtain the angular elevation of a terrestrial object, as the top of a tower, a mountain, &c. The rays of light from the object, falling on the quicksilver, are reflected from thence to the eye of the observer; and, by the laws of refraction, the angles made with the reflecting surface by the incident and reflected rays are equal to one another; hence the reflected image of the object appears as much below the horizon, or surface of the quicksilver, as the object itself is above it; and on bringing, by the motion of the index of the sextant, the direct and reflected images to coincide, the angle read on the arc will, the eye being very near the quicksilver, be equal to twice the angle of elevation.

When the atmosphere is very clear, a glass roof may be used instead of quicksilver, but almost the least agitation of the air is sufficient to disturb the reflected image.

On a journey the conveyance of quicksilver is often inconvenient; and therefore scientific travellers have attempted to supply the place of an artificial horizon, as an artificial horizon, which through the frame of the mirror at equal distances from one another.

Since, with the usual reflecting instruments, double altitudes exceeding about 120 degrees cannot be observed, the artificial horizon just described would be useless, if the altitude of the object were greater than 60 degrees; but it may however be employed with instruments similar to those invented by Captain Fitzroy and Beechey, by which angles exceeding 180 degrees may be observed.

The artificial horizons permit very accurate observations to be made on land, but it is evident that they cannot be used at sea, even though well suspended in jibsails, on account of the unsteady motion of the ship; and some means of enabling a seaman to observe correctly the altitudes of celestial bodies is absolutely necessary, or but faint and even through the vapours near the horizon, is still a desideratum.

It is known however that when a conical or a cylindrical body terminating at the lower extremity in a point is caused to revolve rapidly on its axis, that axis soon takes, and for at least half an hour maintains, a vertical position; and efforts have been made to employ such a body, having a mirror on its upper surface, as an artificial horizon on board a ship. A 'Nautical Top,' as it was called, was proposed by a Mr. Serocold, in the Philos. Trans. 1760; but, on being tried at sea, its irregularity was found to be great, and the contrivance was abandoned. The late Mr. Troughton however, in 1818, made considerable improvements on the original construction, but his success was not such as to render the machine available. He made the top first cylindrical, but he afterwards gave it the form of a frustum of a cone; the reflecting plane formed the upper surface, and immediately under this was a stem terminating below in a steel cone, whose surface formed the reflecting plane of a steel cup. A rapid motion was communicated to the machine by the small wheels of, of which the first was turned by means of a handle on a ship.
the bubble of air: a line was traced on the horizon-glass, and a contact of the limb, or centre, of the celestial body was to be made with this; the instance. As a result, the latter aggregate to bound the reflected image of the bubble. The are passed over by the index would then express the altitude of the celestial body above the horizon. Instruments very similar to this have been executed by Mr. Robinson, and, for merely numerical purposes, their position of the altitudes obtained with them being within two or three of their true values.

ARTILLERY, APPLICATION OF. [TACTICS, P.C.]

ARTISIA. (Feet.) This name is equivalent to Stegaste, p.c.s. At present the opinion prevails that this is an internal portion of another plant, and not a pain-stem, as once conjectured. Coal formation.

ARTOYTTIES. [COMMISSION, P.C.]

ASAS. [NEW YORK.]

ASCLERIAS. [New York.]

ASCLEPIAS, a genus of plants, the type of the natural order Asclepiadeae. [ASCLEPIADACEAE, P.C.] Many of the species possess powerful medicinal qualities, and hence the name of the genus from Asclepius (Aesculus), the god of medicine. The genus is characterised by possessing a reflexed 5-parted corolla; a 5-leaved corona seated on the upper part of the tube of the calyx; the lacinias curved inwards, being in two or more rows, and the style terminated by a minute style. Pollen masses compressed, fixed by the taping tops, pendulous; the stigma depressed; the follicles smooth; the seeds coarse. Most of the species are native to America, herbaceous, with opposite, alternate, or verticillate leaves.

ASCLEPIAS, Syrian Swallow-wort, has simple stems with lanceolate oblong or oval leaves, gradually acute, and tomentose beneath; drooping umbels. Lamarck states that the Syrian Swallow-wort grows wild in Syria and Egypt. The latter species is the root of the true Ipecacuanha (Cephalis Ipecacuanha). The roots of A. prolifica are also emetic.

Asparagus, Bastard Ipecacuanha, has a simple stem, with oblong-lanceolate phylloclade leaves, tapering at both ends; umbels erect, solitary, lateral. It is a native of Curacao, Essequibo, Cumana, and Trinidad. Its roots are frequently sent to England as Ipecacuanha. The juice in the West Indies is reputed to be antihelminthic and styptic. The root is made into the principal ingredient to spin into intestines for wearing apparel; it is however more adapted for stuffing mattresses and pillows.

A. Curassavica, Bastard Ipecacuanha, has a simple stem, with oblong-lanceolate phylloclade leaves, tapering at both ends; umbels erect, solitary, lateral. It is a native of Curacao, Essequibo, Cumana, and Trinidad. Its roots are frequently sent to England as Ipecacuanha. The juice in the West Indies is reputed to be antihelminthic and styptic. The root is made into the principal ingredient to spin into intestines for wearing apparel; it is however more adapted for stuffing mattresses and pillows.

A. tuberosa, Tuberous Swallow-wort, has suberect stems, very hairy, and branched at top; scattered oblong-lanceolate, hairy leaves; umbels disposed in a terminal sub-corymb. It is native to North America, in stony places and sandy fields.

The roots are famed for diaphoretic properties, and in Virginia it is used for this purpose in inflammatory diseases, more particularly rheumatism. The roots of some authors is probably only a variety of this species, and has the same properties.

Many other species of this genus are used as medicines in the countries where they grow. The authors of A. stipitatus are composed of numerous small islands and pointed rocks, and has broken ground about it, so that it can only be approached with caution. A. Stipitatus is called the Group. The middle, or Peak's Group, consists of three islands of moderate size. The largest, Peak's Island, is four miles and a half long. The whole group occupies nine miles in length. The southern group is called Bally's Group. The islands are surrounded by a body of water. They rise from the water's edge with a steep ascent, but not to a great elevation. Between the mountain-masses are small valleys, almost every one of which contains a stream of water. The declivities of the mountains to the very top are clothed with large forest-trees, among which the Arecas olaraces and fan-palms are most conspicuous. The shores of the small bays, which are numerous, are lined with ledges and coral reefs. During the winter the wind is from the north and nor’easter, directed with much violence; in summer it blows from south and south-east, and the weather is fine, but even then the air is moist, and the islands at sunrise are involved in dense fogs. The animals are—vampires of a large size, herons, pelicans, swipes, rails, wood-pigeons, the common black crow, and some smaller birds. There are several kinds of fish, and sharks are very numerous; there are also crayfish and other shell-fish. Green turtles are so numerous as to cover nearly the flat sandy beaches of the small inlets: they weigh from twenty to forty pounds. Captains have seen two English sailors, who had grown pumpkins, water-melons, potatoes, sweet potatoes, and fricoli beans; they had also planted some coca-cut trees, and kept hogs and pigeons. It appears that these have been discovered by the Spaniards, but it is not known at what time. The wholesalers in the Pacific go from time to time there to take in water, and get a supply of fresh provisions by killing turtles. It does not appear that these islands have ever been regularly settled by any nation. On the western side of Peak's Island is a small but good harbour, called Lloyd's Harbour; it is surrounded by high hills, and is apparently the crater of an extinct volcano. On the eastern side of the same island is Fittow Bay, which is rather large, but open to the south-east, so as to be unsafe during the south-eastern winds, which prevail in summer.

Beechey, Narrative of a Voyage to the Pacific.

A'SAPPHIS (Brommiati), a very extensive genus of fossil Crustacea (Trilobites), most abundant in the lower Paleozoic strata of Michigan and New York. The Bemidji fossil beds of northern Michigan are prolific in this type, and with the Bemidji limestone form the Bemidji formation, one of the lower Silurian, as A. caudatus is frequent in the upper Silurian beds.

ASCARRIDIES. [ENTOZOIA. P.C.]

ASCLEPIAS, a genus of plants, the type of the natural order Asclepiadaceae. [ASCLEPIADACEAE, P.C.] Many of the species possess powerful medicinal qualities, and hence the name of the genus from Aesculus (Aesculus), the god of medicine. The genus is characterised by possessing a reflexed 5-parted corolla; a 5-leaved corona seated on the upper part of the tube of the calyx; the lobes of the calyx twisted inwards, being in two or more rows, and the style terminated by a minute style. Pollen masses compressed, fixed by the taping tops, pendulous; the stigma depressed; the follicles smooth; the seeds coarse. Most of the species are native to America, herbaceous, with opposite, alternate, or verticillate leaves.

A. Syrriaca, Syrian Swallow-wort, has simple stems with
The principal ingredient of the asphalting mastic termed Seydel Asphalte, is a dark brown bituminous limestone, found near the Jura Mountains. This stone is broken to powder and mixed with a portion of mineral tar, when intended for fine work, and with a greater portion when it is required to be resting upon a bed of pipes, as in the case of tanks, and application as cement; or, when intended for the coarser purposes of pavement and flooring, with mineral tar and sea-grit; and the whole is exposed for several hours to a strong fire, where the asphalting mastic and caldrons are provided for re-melting it upon the spot by fires of wood or coke. In this operation 1 lb. of mineral tar is first put into the caldron or boiler, to which, as soon as melted, 56 lbs. of powdered mastic, the pieces of not more than 1 lb. each, are added, the whole being stirred together with an iron instrument, formed something like a spoon with the centre of the bowl cut away, so as to reduce it to an oblong loop, and curved in such a way that the striker may pass the instrument close to the sides and bottom of the caldron, and lift the portions of mastic in contact with the surface, to prevent burning and ensure the perfect mixture of the ingredients. The caldron is then covered over, and a brisk fire kept up for a short time, to melt the asphalting mastic. In later processes it is added and stirred in. The caldron is again covered for a few minutes, and further quantities of tar and mastic are added, in the proportion of 1 lb. of the former to 113 lbs. of the latter, until the caldron is full, and the whole is completely melted and mixed. After the addition of the full quantity of the floor, jets of light smoke from the mastic, which will drop freely from the stirring instrument. It should be observed that for this purpose, as well as for the original mixing of the asphalting, note but mineral tar, resembling that with which the limestone is impregnated, should be used; and also that where the mastic needs to be very stiff, as for kitchen-floors, or for use in tropical climates, a less proportion of tar than the above should be used. In such cases also a larger quantity of grist must be added to the mastic, and the grist is added at this work as desired to convert fine mastic into coarse, it may be done by mixing, at the time of melting, 30 lbs. of fine clean grit to every 112 lbs. of mastic, increasing, at the same time, the proportion of tar from 1 lb. to 24 lb. for every 12 lbs. of mastic. When ready for use, the mastic mastic may be carried very quickly to the spot where it is to be applied, either in iron ladles, or, if it be necessary to remove it to a greater distance, in heated iron buckets. In all cases however it is desirable to keep them in a vault or basement, or, if covering brick arches or arch roofs, it may be hoisted to the top of the building, care being taken, whenever it is necessary to set it upon an asphalting part, to lay a few inches thick, and to lay the first row of bricks to support it, and to shelter the finished work from injury.

The method of laying foot and carriage pavements in asphalting having been noticed in Road, P.C., it is sufficient here to advert to the necessity of securing a firm solid foundation, whenever the ground is soft, must be accomplished by ramming, or by removing the soft earth, and substituting a coarse concrete, consisting of seven parts of deep river-sand or gravel and one part of grey stone-lime, fresh ground to a fine powder, these materials, together with mastic dry, and water when necessary, only or mixed with oil, should be added to moisten the mass, which must be immediately thrown into its place, levelled, and rammed solid. A much finer concrete should then be floated over the surface to fill in the hollows and crevices, which should be allowed to dry before laying the asphalting, which, if this precaution be neglected, is liable to be full of air-holes, in consequence of its heat converting the moisture of the concrete into vapour. The risk of such failure may be diminished by sifting fine sand over the concrete when dry. Under these circumstances is sure, and in rainy weather, if the work cannot be protected with tar-papling, which is highly desirable, injury may be prevented by laying sheets of brown paper, tacked on the under side, between the coats of mastic. Mastic is regulated by gauges or slips of wood, which are laid down so as to divide the pavement into compartments, seldom exceeding, where but one person is employed to spread the mastic, thirty inches wide (though in very cold weather the latter or portions of mastic may be double that width, and two spreaders may work together), and the composition of

P. C., No. 19.
second layer of equal thickness will complete the work, and fill up defective places caused by the blistering of the first. A more effectual way, which may even be resorted to in situations exposed to the heat of the sun, is to build a new half-brick wall of asphalted bricks, set in mastic, adjoining the wall to be protected, filling the intervening space with mortar or cement. If water percolates through the original wall towards the new wall of asphalted bricks, asphalted tiles, set in Roman mortar, may be applied as a filter to the wall, and to their asphalted surface the new brickwork may be laid solely with mastic. The lining of tanks and reservoirs is an operation so similar to the above as to need no detailed notice. If a pitch of flat spandrils be covered with fine asphalt, laid upon a thin coat of fine concrete, supported by a rough boarding of dry wood. It is well in such cases to cover the concrete with canvas, and to remove the concrete for a width of about three inches wherever the mastic is applied, to allow the water, supplying its place with asphalt, so that if water should percolate at the joint in the upper coating, it will be unable to penetrate further. The lines of junction with walls must also be carefully secured by a kind of flashing, and scooping out the mortar to allow the asphalt to take hold of the brickwork; or, in the case of a stone wall, by cutting a groove to receive the upper edge of the flashing or fillet of mastic. It is recommended that, where roofs are not intended to be walked upon, and especially where the walls are exposed to the sun, the surfaces should be strewed with grit, as above described for rough pavements. Respecting the covering of arches, it is sufficient to observe that the asphalt may either be applied immediately to the saving brickwork forming the extrados of the arch, with an intervening thin coat of fine concrete; or the spandrils may be filled with concrete so as to form a level surface for the arch, even with the crowns of the arches; or, advancing a step further, the concrete may be laid up to the level of the roadway, and the covering of asphalt be used as a pavement, as well as for the exclusion of water. On the Greenwich Railway viaduct, upon which a surface of 480,000 square feet has been covered with mastic, an intermediate plan has been adopted; the asphalt being laid in an undulating surface, with a full easy way.

In whatever way asphalt may be applied, the greatest care is necessary to secure a solid foundation, to ensure the dryness of the concrete or brickwork to which it is applied, to use the mastic as hot as possible, and to make the joints perfect. Wherever any part needs repair it may be softened by laying some hot mastic upon it for a short time, and then cut away with a chisel without injuring the adjacent parts. The old mastic may be remoulded, and, the edges of the old work being cut square, the hot material will readily adhere to them, if they are carefully freed from dust and moisture. It only remains to notice that the thickness of asphalt used for pavements varies from half an inch to about an inch and a quarter, the mastic being soft for commercial purposes, not intended for carriages, and from three-quarters to an inch being the least allowed for carriage pavements; half an inch to five-eighths is sufficient for roofs and the covering of arches to prevent the infiltration of water, and for the lining of tanks and ponds; and about half that thickness is sufficient for covering the ground-line of brickwork, to prevent the rising of damp.

ASPIDIADIA (Preal.) Several species of the Lepido
dendra of Sternberg are thus named. From the coal forma
tion.

ASPIDIUM, a genus of Ferns, and one under which many species were arranged by older botanists, which are now placed under the name of Pteridium. For an account of the male and female genera see Filicae, P. C. S. One of the most remarkable species of this genus is the Aspidium Boreale, or Tartarian Lamb, recently referred by Mr. Smith to the genus Cibotium. This plant, from its peculiar colour and form, was at one time really supposed to be a kind of vegetable animal, as the follow

ing account from Struys, an old traveller, proves: 'On the western side of the Volga,' he says, 'there is a elevated salt plain of vast extent, but wholly uncultivated and uninhabited. On this plain, to complete the features of the scene, there is with salt, grows the Boranace or Bornitech. This wonderful plant has the shape and appearance of a lamb, with feet, head, and tail distinctly formed. Boranes, in the language of Mus
covy, signifies little lamb, and a similar name is given to this plant, as it is called the little lamb, and written down as some silk. The Tartars and Muscovites esteem it highly, and pre

serve it with great care in their houses, where I have seen many such lambs. The sailor who gave me one of these precious plants, found it in a wood, and I had its skin made into an under-waistcoat. I learned at Astrasch, from those who were best acquainted with the subject, that the lamb grows upon a stalk about three feet high; that the part by which it is sustained is a kind of navel, and that it turns itself round, and bends down to the herbage which serves for its food. The leaves are very little divided, and end at least in the grass sails. Struys adds many other wonderful things about this plant. His statement is however substantially correct. The rhizome of the A. Barones renders a rude resemblance to an animal. It is covered with a silky down, and when cut into has a soft inside with a beautiful flesh-coloured appearance sufficient to account for the origin of the fables with regard to its animal nature. It is not improbable that this fern dries up when the grass does, but of course the one has no dependence on the other. The plant is a sprig, and the astringent property which is common to all ferns; hence its name. Dried specimens have sometimes been brought to this country, but the plant has not yet been brought alive.

Aspidium filicis alias (now Lastra filicis Mus), the male
fern, is a native of Great Britain, and is admitted into the British Pharmacopoeias on account of its anthelmintic proper

ties. It has bipinnate fronds, obtuse and serrated pinnules, the sorii near the central nerve, the lateral nerves forked. It is abundant throughout Europe, and grows in stony places on the roofs of old houses, and on earthy banks of streams. The part used in medicine is the root, or rather the rootstock. This

part of the plant is collected for medicinal purposes between the end of May and the middle of September. It will not be found in any considerable quantity after the end of August. It has often been chemically analysed, and is found to contain,

Lignin 45
Starch 10
Arsenical sugar 10
Gum 7
Fixed oil 4
Resin 4
Sols, volatile oil 8

The antients used this plant as a vermicifuge, but it was

not lately given up by modern practitioners of medicine when

Pecchioli pointed out the conditions in which he had found it efficacious in expelling tape-worm. The best mode of ad

ministering it is an urchinal tincture: the adherent seems
to dissolve up the resinous oil on which the active properties

of the plant depend. The dose of the root according to Pecchi

is about one dram.

A. dilatatum (Lastra dilatata), a British fern, is often

found with the last for medicinal purposes. It has subtri

pinnate fronds; oblong, blunt, inciso-pinnatifid lobes; spinose, mucronate segments; a decided unfringed inclusion. This is common in joy. It is found common in dry corners of our

woodland. The part used is the fronds.

A. filicis-seminis (Athryum filicis-Rhynia), Lady-Fern, has

a lanceolate pinnate frond; plane linear, acute, regularly pin

nate; pinnules linear-oblong, quite distinct, deeply serrate or pin

nitidum; segments with 3-2 teeth. This is one of the most

beautiful of the British ferns. The root is sometimes gathered

for that of the male fern. It has a short perpendicular root

stock, black externally, with black root-fibres; and the tufts or

bases of the leaf-stalks, which compose the greater part of it,

form a very acute angle with its axis, while those of the male

shield-fern extend outwards at a more open angle.' (Christi

on.)


ASPIDORRHYNCHUS, a genus of fossil Ganoid fishes, from the Ilias and oolle of England. (Agassiz.)

ASPIDURA. A fossil species of ophichthid Echinoder

thomas is thus named by Agassiz. From the Ilias of Yorks

shire.

ASPLENIOPTERIS (Sternb.). [Pterophyllum, P. C. S.]

ASPLENIUM, a genus of plants belonging to the na

ture of the road to Scotland, containing compound

straight sori, with an indusium opening towards the central

nerve or midrib. The species of this genus are known by

the name of Spleenwort; several of them are common in

Great Britain.

A. lanceolatum of Udace has lanceolate doubly pinnate

fronds; the pinnules ovate and deeply and sharply toothed, or lobed; the sori short, nearly marginal. It is a native of
England and Wales, on rocks and walls, but its distribution is very local. It is also a native of France, but its European habitats are few.

A. Adiantum-Nigrum, Black Spleenwort, has triangular attenuated fronds, twice or thrice pinnate, the pinnae and pinnules triangular, sharply toothed; sori elongated, central. This plant is a native of Europe, and is abundantly distributed throughout the United Kingdom, where it occurs on rocks, walls, in two or three classes, sometimes in abundance. It is much used in medicine, and is stated by Ray to be efficacious in cough, asthma, pleuritis, jaundice, stone, gravel, and other diseases. It has not however any reputation amongst modern practitioners of medicine.

A. Blackstoni, Wall Rue, has bipinnate fronds, the pinnules rhomboid wedge-shaped, notched or toothed at the end; the indusium jagged. This fern is very common on rocks and old walls, in Great Britain and throughout Europe, and in many parts of North America. It has sometimes been used as a remedy in coughs and asthma, obstructions of the liver, and in cutaneous diseases; but has now fallen into disuse.

A. Trychomus, Common Spleenwort, has pinnate linear fronds; roundish ovate, crenate, stalked pinnae; the nerves forked below the sori. It is very common throughout Great Britain on rocks, walls, churches, ruins, bridges, and hedge-rows. It is a native also of Europe, Africa, and the United States, and is one of the most useful of our ferns. It is not included in any of the previous species but has now entirely disappeared. Other British species of Asplenium are A. alternifolium, A. septentrionale, A. marinum, A. ciliatum, and others.

These and other ferns may be easily cultivated, by placing them in situations resembling their natural habitats. They require a pure atmosphere, plenty of space, and natural shade, with a due supply of water. They may be planted on decayed wood, in holes of rocks and brick, with almost any soil. One of the most elegant modes of cultivating them is by means of inverted jars, under which they will thrive in any sandy or light soil. Cases well adapted for growing ferns are constructed on this principle, constructed according to directions laid down by Mrs. G生活中, it has the merit of having first suggested this mode of growing plants.

(Babington, Manual; Newman, History of British Ferns; Ward, Growth of Plants in Glassed Cases.)

ASSAULT in Scotland a punishable offence, usually prosecuted by the public prosecutors to the sheriffs courts, to the police courts established by statute, and to the justice of peace courts. It is seldom brought before the supreme criminal court, unless it be of a highly criminal character, when the case, according to the circumstances, is tried either as a capital or as a civil cause; but it is not a capital crime in Scotland. The 6 Geo. IV. c. 196, however, relative to assaults connected with combination, applies to that part of the kingdom. The respective punishments of the various kinds of assault have thus, in Scotland, been in a great measure fixed by the practice of the several criminal courts.

AST, GEORGE ANTON FRIEDRICH, an eminent German scholar, was born in 1778 at Gotha, at the gymnasium which place he was educated. In 1792 he entered the University of Jena, where he remained almost entirely to philosophical and philosophical studies. In 1802 he began his career as an educational lecturer at Jena; and in 1805 he was appointed professor of ancient literature in the University of Landshut, where he remained until the transfer of that institution to Munich, in 1812. He spent the remainder of his life at Munich, where he died on the 30th of December, 1841.

AST was one of the best and most industrious of modern scholars, and a very excellent teacher. His merits were recognised and rewarded by various distinctions which the Bavarian government conferred upon him. He occupied himself not only with philology, in the strict sense of the word, but also with several departments of philosophy and its history, and these merits led him, during the latter period of his life, to devote himself almost exclusively to the study of Plato, for the understanding of whose works he has done more than any other scholar. His numerous works may be divided into the following classes:---(1) Works on the life of Plato; (2) Works on the Writings of Plato, among the former we must notice especially his 'Handbuch der Ausgewisse,' Landshut, 1807, 8vo.; 'Grundliicn der Philologie,' Landshut, 1808, 8vo., an excellent introduction to the study of antiquity; 'Grundliicn der Grammatik, Hermeneutik und Lexikion,' Landshut, 1808, 8vo., a most valuable work on the Grammar of the Greek Language; 'Philosophie,' 2nd edit., Landshut, 1825, 8vo., a very good introduction to the study of philosophy; 'Hauptsliicn der Geschichte der Philosophie,' Munich, 1829, 8vo.; 'Plato's Studies in Greece and Sicily,' Munich, 1834, 8vo., a work on the travels or works on Plato that have been written in modern times, and forming a very useful introduction to the study of that philosopher. Among his philological works we may mention 'Observationes in Proprieti Carminis,' a youthful production which he published before entering the university in 1798. In 1809 he began editing a number of separate dialogues of Plato, such as the 'Phaedrus,' 'Symposium,' 'Alcibiades,' 'Laches,' and others, which were well received; and this led him to publish in 1810 the complete edition of Plato's works in five volumes (Leipzig, 1819-32), in 11 vols. 8vo., with a Latin translation, and a commentary which occupies the last two volumes. He next published, as a sort of supplement to this edition, a 'Lexicon Platonicum,' Leipzig, 1854-59, 3 vols. 8vo., which is regarded as one of the best and most valuable of the critical point of view, his edition of Plato is greatly surpassed by some of the more recent editions of that philosopher.

(Biographical Dictionary of the Society for the Diffusion of Useful Knowledge; Brockhaus, Concise-Lexicon, 9th edition.)

ASTERACANTHUS, a genus of fossil Plicoid fishes, including five British species, from the colitic and lia formas.

Asteraceae. (G ammunition.)

ASTEROHYLLITES (Brongniart), a genus of fossils, containing many species, from the coal formations of Europe and America.

ASTEROPYTHUS, a genus of fossil Plicoid fishes, from the mountain limestones of Ireland.

(Aston.)

ASTLEY, JOHN, a portrait-painter, born at Wem, in Shropshire, in the early part of the eighteenth century, more distinguished for his good fortune than for his works, though there is no doubt that he possessed a great deal of merit, especially those of his earlier years. He was the fellow-pupil of Reynolds with Hudson, and was at Rome also at the same time with Sir Joshua. He was very poor when studying in Rome; and Northcote, in his Life of Reynolds, tells a story of him that is well known to all. One day, in the summer of a summer's evening ramble near Rome with other English artists, his companions took off their coats and advised Astley to do the same, to which he objected; and his persisting to keep his coat on appearing unaccountable to them, caused them to make some jokes at his expense, which at last forced him to follow their example, when the mystery was out,—the back of his waistcoat was made out of one of his own sketches, that the poor painter, with a waterfall on his back, made a ludicrous figure, which afforded his companions a hearty laugh.

After his return to England he spent a few months in London, and then tried his fortunes in Dublin, where he practised with such success that in three years he saved £2000. He considered this capital sufficient to enable him to venture his fortunes in London; and 'as he was painting his way back to London,' says the writer in 'Adams' Biographical History,' 'in his own post-chaise, with an outrider, he loitered with a post-horse through various villages, and arrived at the visited Knutsford Assembly with another gentleman. Lady Daniel, a widow then present, was at once so won by his appearance, that she contrived to sit to him for her portrait, and then made him this offer of his hand. He was the latter of Sir William Daniel, and was possessed of a very large fortune, the whole of which she bequeathed to Astley, besides the reversal, at her daughter's death, of the estate of Addenfield Lodge, Cheshire, worth 8000£. a year. The Lady Daniel died not long after her marriage, and her daughter did not survive her many years. Astley obtained possession of
one property, and gave himself up to a life of pleasure. He purchased the house in Pall Mall which had belonged to the Duke of Schomberg, of which Persimmon, in his 'London,' says, 'I have possessed myself or divided it into three, and most whimsically fitted it up for his own use.' He fitted up also a villa at Barnes, in Surrey, according to a peculiar fancy; and he made many improvements at Ducket Lodge. After a life of pleasure, as he was growing old, be married again, a young lady, by whom he left two daughters and a son. He died at Ducket Lodge in November, 1787. Before his death his character changed; he regretted the part he had adopted; he led the life of a man who had profiting the case; and what was formerly called the gate of the New Agora, is proved both by its style and inscription, not to have been a gate, but part of a building erected out of the donations of C. Julius Caesar and Augustus to the house of the Archons. That which is now the Agora is supposed to have been, was in the time of Theodidas not occupied by houses, but consisted of garrets. (Thucyd. ii. 171; Xenoph. De Vetears. 2. 6.)

The form and basins of the Port of Piraeus have been the subjects of much discussion, and the late Professor Ulrichs endeavoured to establish an opinion which was solely opposed to that of Leake, as well as to the later one of Ones. but it is as yet impossible to say which of the conjectures of Leake and of Curtius, or of Ones and of Halle, 1842, 8vo.; Ulrichs, O lyamin et ro malis trigv ypepov, Athens, 1843.)

We cannot here upon an explanation of the main point; but we shall only give a few of the most interesting discoveries, and corrected by late investigations; the student must refer to the works quoted at the end of this article. We shall sit only a brief account of the most interesting discoveries that have been made at Athens. The Acropolis is the only place in which excavations have been made on a large scale, with something like systematic order. Operations were commenced there in 1833 by a private society of antiquaries. The year after, when Athens was made the capital of the kingdom of Greece, the government took the work into its own hands. The excavations were conducted by the celebrated German architect L. von Klenze, and afterwards by Professor Ross, assisted by the architects Schaubert and Cleasine, whose place was soon after supplied by Iliass. Ross was succeeded in 1836 by Pittakis. The results of the excavations down to 1843 are briefly but well described by Curtius, Die Akropolis von Athen, Berlin, 1844, 8vo.

The operations in the Propylæa began in 1834. The first thing that was done was to remove the modern constructions which blocked up the entrance to the Acropolis. The great upper battery which extended from the pedestal of the statue of Agrippa in the north to the corner of the Cimiezian wall in the south, was next taken down. The discoveries there made were the most interesting of all. The temple of Victory unvilled (Nike Apteros) were found almost complete, and very little injured; many fragments of the Propylæa, consisting of sculpture and pieces of architecture of every kind, and the whole burnt them in one whole district in view of Athens. A considerable part of the marble flight of steps leading to the Propylæa was laid open at a somewhat later time.

In the winter of 1836-37 operations were commenced in the Propylæa itself; the central part and the northern wing were cleared from the modern constructions built in them, and then the battlements which had been erected upon the walls in the middle ages. In the central part, the six Ionic columns of the vestibule are still standing, though only about two-thirds of the height of the temple are still standing; the parts of these columns, however, which had fallen down, were found among the ruins, but the capitals are much damaged. The northern wing is in perfect preservation up to the cornice; and the tower of the southern wing is still standing, but no trace has been found of any of the temple of Victory saw in the Propylæa. The most remarkable discovery is that of the temple of Victory mentioned before. As all the fragments were in a state of almost perfect preservation, it cannot be said that there is much difference between the temple as it stood in ancient times and as it still stands; it was probably taken down by the Turks in 1684, for the purpose of using the masonry in constructing the great battery. Out of all that thus remained, the attempt must be made to reconstruct this beautiful edifice, and in 1836 the restoration was nearly completed. It was conceived by Ross, Schaubert, and Hansen, but after the withdrawal of Ross in 1838 the progress was somewhat delayed. At present however, the restoration is complete, and the temple of Naxus which claim this honour. The most probable opinion is, that he entered Athens by the Pireas gate, between the Museum and Pnyx, as is sufficiently expressed by Stuart, who has recently been completed by Müller, Forchhammer, and Curtius.
once more is seen in its full beauty; it serves as a temporary Museum in which some of the newly discovered relics of antiquity are deposited.

As the government had resolved upon clearing the whole plateau of the Acropolis from the rubbish, and modern buildings, excavations were also made in and around the Parthenon. Here were found most valuable fragments of the metopes, the frieze, and of the statues in the pediments, which are deposited in the building of the southern excavations of the Acropolis. In 1842 the mosque which had been built within the cells of the Parthenon was cleared away, and the place where the temple-statue had stood was found. The area on the eastern side was cleared, namely the foundations of the north half. Now that the cells of the new Hermes Street. This, which may be considered the main street, extends through the city from east to west, and two other principal new streets, Zéolus and Athene streets, run into it on its north side. The new street called Stadion seems to be the principal one in the city. The whole is now deposited in the temple of Theseus and other places, and whatever others may either happen to be discovered or to be purchased by the state; also models of the ancient buildings are remaining in a state of decay.

ATMOMETER. called also Atmometer or Atmosmeter (from der, a 'vapor,' and μέτρον, a 'measure'), an instrument employed to measure the quantity of exhalation from a humid surface in a given time. Allusion is made in the ' Athenian Constitution' of Pericles (309 B.C.) to a kind of thermometer described by Professor Richman (in the Nov. Comment. Petrop., vol. ii. p. 121), with the nature of which we are unacquainted; but the instrument to which the name is usually applied is one invented by Professor Leslie, which consists of a very thin wall of porous earth, and two or three inches in diameter, to which is cemented a long tube of glass, marked by a division with divisions, each of which is capable of containing as much liquid as would, if spread over the outer surface of the tube, form a film in thickness equal to the sixth part of an inch. The open end of the tube is fitted with a brass cap and a leather collar; and when in use the instrument is filled with distilled or boiled water, and suspended vertically with the ball downwards, the end of the tube being perfectly closed with the cap and collar. The water then percolates through the porous ball precisely in proportion to the evaporation from its outer surface, of which its weight in the tube forms an accurate indication. The vacuum in the tube, caused by the evaporation, and the pressure in the operation, gradually filled with air which enters through the porous ball. When the tube becomes empty, the cap is removed to re-fill it. This instrument is not only useful in meteorological observations, but is also capable of being applied with advantage to topographical operations, and in the application of science to agriculture.

ATMOPHERIC RAILWAY. In a brief sketch of the history of this invention, a lecture delivered by Mr. Vignoles (then professor of civil engineering at University College, London), to the Royal Cornwall Polytechnic Society, in October, 1842, that gentleman observed that the idea of producing motion by atmospheric pressure was conceived by Papi, the well-known French architect, two or three centuries since; and that, after slumbering for more than a century, the subject had been successively taken up by Messrs. Lewis, Medhurst, Vallance, and Pinkus, and lastly by Mr. Clegg, by whom, in connection with the late Mr. Jacob Samuda, the beauty of the idea was thoroughly proved.* Of the connection of the name of Lewis with this invention the writer has no other intention; but the publications of the late Mr. Medhurst, who was a practical mechanician or engineer, and well known on business as the inventor of an ingenious printing-press, show that he not only cherished the idea of locomotion by atmospheric pressure for many years, but also devised, among other plans for its accomplishment, one which, excepting in practical detail, greatly resembles that of the present writer. Mr. Medhurst published a short account of his scheme in 1810, under the title of ' A New Method of Conveying Letters and Goods by Air,' and in 1819 he issued another pamphlet of calculations and remarks, 'to prove the safety, cheapness, and advantages of such a mode of conveyance; but, as he observes

* A condensed report of this lecture, originally published in the 'Cornwall Gazette,' appeared in the 'Railway Times' of Oct. 9th, 1842.
In a more recent work, 'these publications met with that indifference and contempt which usually attends all attempts to devote so widely from established customs.' In the pamphlet from which this remark is quoted, which was published in 1827, entitled 'A New System of Inland Conveyance of Goods and Passengers,' is a full account of the various modes in which it was proposed to accomplish the desired object, the principal of which were, first, the construction of an air-tight tunnel of sufficient magnitude to admit the passengers and goods to be conveyed in it, running from the place where it was proposed to be opened to the dynamic traveller, which was impelled forward by the pressure of the atmosphere in its rear whenever, by the means of pumping machinery connected with the tube, a partial vacuum was produced in the front of the tunnel, and by the admission of sufficient air to the rear. Within this tunnel, running parallel to it, was placed the dynamic apparatus, by which the vehicle was drawn, and immediately after the passage of this connecting-rod the valve was restored to its place, a sides being freshly lubricated by an apparatus attached to the governor, and the whole being pressed firmly down by wheel or roller. In this form of the apparatus the governor and the carriage attached to it ran upon rails attached to the external sides of the tunnel, and, as the mean of propelling a second carriage, for passengers, running upon a railway either above or alongside of the tunnel, in the open air; and, fourthly, the construction of a railway or tram-road, in the centre of which should be laid a still smaller air-tight tube, containing a travelling piston which should be connected, as in the last-named contrivance, with an exterior carriage, the modes in which it would be necessary to unite the carriage outside the tube with the piston within it was by an air-tight water-valve, which however would only have been applicable on a perfect level, and with a very low pressure of air, so that another apparatus, to all levels, was formed by thin elastic sheets of iron or copper, shutting down upon a soft substance, so as to form an air-tight joint, but capable of being readily lifted up to allow the passage of the connecting-bar, by the action of a wheel connected with the piston. In all cases it appears that the apparatus had to have contemplated moving the piston by forcing air into the tube behind it, and thereby forming a plenum, in preference to forming a vacuum by exhausting the tube in advance of the piston. It was also necessary to have a very independent idea of the degree of atmospheric pressure necessary to produce rapid motion, imagining that in a tunnel of thirty feet sectional area carriages might be propelled at the rate of sixty miles per hour without the condensation of the air becoming uncomfortable to the passengers, who, according to his original plan, would not have been shielded from its effects.

Before the publication of the last-mentioned pamphlet of Medhurst, but many years after the original promulgation of his principles, a railway of the above public interest proceeded to a similar project, which, being brought forward at a season of extraordinary speculation, excited much interest, as well as little ridicule. Van'sche's scheme, which was fully explained in a pamphlet published by him in 1825, entitled 'On the Exploitation of Railways,' was, like Medhurst's original design, for conveying passengers along a railway laid within an air-tight tunnel, which he proposed to construct either of cast-iron or of vitrified clay, resembling common brickwork, but less permeable to air; but, knowing that experiments had proved a very great loss of power from result to the attempt to impel air through a long pipe, he proposed to set the piston-carrying in motion solely by exhausting the tunnel in advance of it, and sufficient force of vacuum should be capable of the purpose required. This plan, which was patented in 1825, was brought into experimental operation at Brighton upon a sufficiently large scale to prove the possibility of so singular a mode of transportation. But it is difficult to determine whether there were any difficulties in the objections of the travelling public to transmission in a dark tunnel would have proved sufficient to prevent its general adoption.

About the year 1825 the subject was revived in consequence of the great success of the Liverpool and Manchester Railway, the passengers of which seemed to have left off the idea of travelling by inland tunnel. In their place, in 1825, there was laid a line of only 11 tons cwt. in two carriages. This experimental line, which had an atmosphere of only nine inches diameter, was publicly exhibited in action at intervals, for many months.

The first half of 1844 and the whole of 1845 was occupied in constructing and laying down the line of this important railway, the intention of which rendered it unsuitable for working by locomotive engines. This line, which was so far completed as to be ready for working in August, 1845, is at present (December, 1844) the only one of atmospheric railways in the country whose first-mentioned line having been removed to allow the completion of the West London Railway, which is worked by locomotives; but though no other lines are yet made, the London and Croydon Railway Company have recently obtained parliamentary sanction to a plan for laying down a line of atmospheric Railway along side of their present road, from London.
to Croydon, and making an extension of the same from Croydon to Epsom, by which arrangement there will be a complete atmospheric line of about 18 miles, half of which will run parallel with and close to a railway worked by locomotive engines. Thus affording the most favourable conditions for comparison between the two modes of transport.

A further line from Epsom to Portsmouth, and several other projected railways of considerable extent, are also proposed to be constructed in this manner.

The most important point in which the atmospheric railway of Messrs. Clegg and Samuda differs from previous contrivances of the like character is the construction of the valve, which, even when the speed of the piston and train is increased to 60 or 60 miles per hour (a speed frequently attained in experiments upon the Dalkey line), performs its office with surpassing efficiency. The subjoined diagrams, without pretending to give minute details, will show the nature of this contrivance: Fig. 1 representing a cross-section of the valve open, and Fig. 2 with the valve closed, to Fig. 2, with the passage of the connecting-bar between the piston and the external carriage. The tube, which is formed of cast-iron, in convenient lengths, and flanged together, is laid in the middle of the railway track, and closely lined on each side with two pieces of iron, the undermost of which exactly fits the slit in the pipe, and has its lower surface concave, so that when it is shut down, as in Fig. 1, the internal circumference of the tube is perfect and unbroken, while the upper parts have been retracted, and it prevents the valve being forced into the tube by the superincumbent pressure of the atmosphere. The leather is, on the side marked b, considerably wider than the upper plate, and its projecting edge is attached to the flat floor of the valve-trench, at the base of the valve, so as to form a continuous hinge. The more perfectly to prevent the ingress of air, the opposite or opening edge of the valve, is when closed as in Fig. 1, hermetically sealed with a composition of wax and tallow, which fills the small groove or space left between it and the edge c, and is indicated by a dark mark in the cut. To protect the valve more thoroughly the trough is closed in with a sheet-iron cover d, formed in lengths of about five feet, with lap-joints, lugged with leather to the top of the edge d, and shut down closely upon the top of the edge c. The interior of the tube is completely lined with a soft composition, which fills up all little irregularities, and renders the passage perfectly smooth and even; and the piston is surrounded by leather collars in such a way as to be perfectly airtight, and yet to move with very little friction. It is attached to the edge e of a rod which is seen in section at f (Fig. 2), and which carries rollers so fixed as to lift up and open the valve when the connecting-bar has passed, thus bringing it into the position indicated in Fig. 2, which allows room for the passage of the connecting-bar e, by which the piston is united to the foremost carriage of the train; the iron cover d being previously raised and held open by a coulter and a series of wheels or friction-rollers attached to the carriage. After the connecting-bar has passed, a roller attached to the carriage presses the valve down into its seat, while a heater gliding along the mass of composition at its opening edge melts it, and thereby seals the joint already formed. The air is thereby allowed to fall into its place, and all is ready for the passage of another train so soon as the piston shall have quitted the pipe so as to allow of its being exhausted afresh. The end of the valve being in a horizontal line, to admit the air by which the piston is to be impelled; but on the admission of the train is closed, and the air is pumped out from the pipe by a branch pipe near it, leading to the air-pumps, which may be worked either by a steam-engine or by any other prime mover. It is proposed, in an extended line of railway, to place engines at intervals of two or three miles, and to break or interrupt the continuity of the atmospheric tube at the principal stations, so as to allow of the use of switches, turn-tables, and the other ordinary arrangements of a railway station; but it is needless here to enter upon an explanation of the various means by which these objects are accomplished.

It is sufficient to observe that the train is pushed forward by manual labour until the piston has entered the tube, which it may do, by the aid of an ingeniously contrived valve, without impairing the partial vacuum which may have been previously produced in it; it then advances with a speed proportionate to the rate at which air is admitted through the air-pipes, at the opposite end of the tube, where, without the aid of an antagonist, the valve which has closed the tube flies open, and the piston and train proceed by momentum until they are stopped by brakes if requisite, or, if it be desired to pursue the journey without stopping, by pistons engaged in the piston pipe. As soon as it has passed out of the first length, the end-valves are again closed, and the engine immediately commences the rarefaction of the tube in readiness for another train. Both in the experimental line at Woodrow, in the tube and the atmospheric railway at Dalkey the inclination of the road is sufficient to produce rapid motion in one direction by gravity alone, so that the atmospheric pressure is only required in ascending, while in descending the piston is moved against in such a way as to clear the way and compensate for the mode of propulsion is equally applicable to working in both directions, either by means of two separate tracks, each having its own atmospheric tube, or by a single track and tube, along which the piston is impelled alternately in either direction.

While the opinions of leading engineers continue at variance as to the merits of this mode of working a railway, it may be well to say very little of its proposed advantages. Some of it is claimed that it claims in this mode of working to be far superior to the stationary by stationary instead of locomotive engines [Railway, P. C., vol. xix., p. 260], of which the principal are the facilities which it affords for ascending steep gradients, and is consequently for the conveyance of railway goods at less cost. Vast heavy cuttings and embankments are avoided, in order to procure easy slopes for the locomotive; the saving in the wear and tear, and consequently in the necessary strength and cost of the railway itself, in consequence of not having to convey the moving power with the train; and the security against collision, owing to the impossibility of moving two trains on the same stage or engine-length of railway at the same time. In like manner also some of the objections raised to this apply to every mode of using stationary engines: such are the necessity of providing and constantly maintaining a power sufficient to conduct the largest amount of traffic which can ever be conveyed, which would render it as costly, as regards some large items of expense, to maintain a railway for the passage of four or five trains as fast as upon which trains are constantly succeeding each other; and the liability of derangement to the whole system in consequence of the failure of a single point in it. These are the superficial grounds which belong to the question of infallibility of the system, or, in other words, the comparative want of power to modify the mode of working according to the fluctuations of a variable traffic or the exigencies arising from accident. In drawing a comparison between atmospheric and rope railways it is less fitting in some points the merits and demerits of the two are identical. The vacuum in the one supplying the place of the rope in the other, it cannot be questioned that the train of an atmospheric railway keeps the road more free from accident, especially upon curves, it being as it were tied down to the track by the piston travelling within the tube; and also that,
the difficulty of producing a valve which shall open with sufficient facility and close with sufficient exactness being once overcome, which it appears to be most perfectly, the friction and waste of power must be less in the atmospheric system, where a single rope and a long series of pulleys have to be put and kept in rapid motion; to say nothing of the chances of accident by the breaking of the rope, to which there is no equal risk as a parallel objection to the atmospheric system. Indeed one of the greatest advantages claimed for this mode of working a railway, as the worst which could happen in consequence of the failure of the apparatus would be the stopping of the train. In case it should be necessary to stop in the middle of a line of stations, the brakes will generally be found sufficient for the purpose, as there is not the immense momentum of the heavy locomotive to overcome; but it is proposed, if needful, to introduce a safety valve in the piston, or an arrangement for lifting his in front, in case of emergency. It is proposed generally to lay out atmospheric railways so nearly on the natural surface of the ground as to take advantage of many slopes of sufficient steepness for working by gravity alone; but while this has been much insisted upon by some advocates of the system as an advantage, it appears to be too little remembered that the advantage gained in one direction must inevitably produce a corresponding disadvantage in traversing the line in the opposite direction, and some of those who have questioned the economical application of the atmospheric in lieu of the locomotive system, consider it well adapted for use upon such inclined planes as have hitherto been worked by ropes or by assistant engines.

Another advantage which is claimed by Mr. Attiret upon the early plans of atmospheric propulsion may be obtained from the pamphlets alluded to in this article, and, so far as those of Pinkus are concerned, from the Railway Magazine, First Series, 1856-6, and Second Series, vol. 1. 1856, and Herber's Engineer's and Mechanic's Encyclopaedia, vol. 1. pp. 35-40. Clegg's atmospheric railway has given rise to several pamphlets, chiefly of a controversial character, and, especially in connection with the Croydon and Epsom Railway Bill of 1860, the controversy may be said to have been settled by parliamentary committees; but the most complete body of information on the subject, with accurate records of the principal experiments at Wormwood Scrubs and at Dalkey, will be found in the columns of the Railway Times, from 1840 to the present time.

ATRIPLEX, a genus of plants belonging to the natural order Chenopodiaceae and the tribe Atripliceae. It has monocious, rarely perfect flowers, the perigone of two or less connected parts, two stigmatic branches, and two carpels; the seed is vertical, attached by a lateral bilum, either near the base or by means of an elongated funiculus in the middle of the side; the radicle basal; the stamens five, continuous. Most of the species of this genus are annuals and perennials, and are abundant in pastures, as well as in corn-fields. Bahnhong, in his 'Manual of British Botany,' enumerates ten species as inhabitants of Great Britain. The most common forms of the genus on cultivated lands are A. aquatica, A. erecta, A. prostrata, A. littorea, A. portulacastrana. Bahnhong has described recently a new species, which is also found in cultivated and waste places, not uncommonly in Great Britain. This is A. deltoidea (Bab.): it has an erect stem with spreading branches; opposite leaves, all hastato-triangular, with two descending lobes unequally acute on the sinus-dentate; the perigon of the fruit ovato-triangular, dentate, tunicated on the back, rather longer than the fruit, collected into a many-flowered, branched, dense panicle; seeds smooth, shining, A. rosularis, a frequent plant along the sea-coast. A. prostrata is a coast plant, but is rare in Great Britain, and Bahnhong suspects that it may be a maritime form of A. patula.

(Bahthon, Manual of British Botany.)

ATTIRET, an aforesaid, a subdivision of the great genus Terebratula, chiefly (if not entirely) confined to a fossil state, and to the Palaeozoic strata. Many of the Siphiriodes Sowerby (as Sp. glahm, fimbrata) and some of the Terebratula of the same authority (as uterus) have been referred to the very ill-characterized genus T. pitticosa is the recent analoge.

ATTENDANCE TERM. [TERM OF YEARS, P. C.]

ATTIRET, JEAN DENTS, called Frère Attiret, a French painter attached to the Jesuit mission at Peking, in the year 1760, was born in the Franche-Comté, in 1702, and was first instructed by his father, an obscure painter of Dôle. He completed his studies at Rome, whither he was sent by the Marquis de Brois. After practising a short time at Lyon, he settled at Avignon, and became a lay-brother of the Jesuits of that place; and when, in 1770, the French Jesuits of Peking requested their brothers at home to send them a painter, Attiret undertook to go, and set out in the same year.

In China Attiret soon obtained the favour of the emperor Kien Loong, by presenting him with a picture of the Adoration of the Kings, which he ordered to be placed in one of his own apartments; he however expressed a dislike to the glass of oil, and employed Attiret only as a water-colour painter. But the right to execute the works of art, whether in oils or even in wood, was reserved to a painter, an order he received from the emperor to restore a painting in one of the inner apartments of the palace, a commission as disagreeable as it was honourable to the French painter. He was locked up in the room from seven in the morning until five in the afternoon, with several eunuchs, entirely in attendance on him, but really as a guard over him. Palace etiquette would not allow him any convenience, and he was compelled to work in constant danger of breaking his neck, as a chair placed upon a table was a deadly scaffold he could procure. In addition to these evils, he was forced to leave his dinner and content himself with fruit and biscuits, as the emperor, in consideration of his great ability, sent him his dinner daily from his own table, but before it reached Attiret, was usually cold and spoiled. Attiret himself, in passing to and from the chamber in which he was at work, was obliged to deliver himself into the hands of various sets of eunuchs, and was wont to be molested locking and unlocking the door.

Attiret met also with many vexations from the Chinese court painters until he employed them to execute the secondaries portions of his works, and confounded himself in some degree to the Chinese taste. He found that the Chinese painters executed the costume, landscapes, and even animals, much quicker and quite as well as he could do himself.

Between the years 1763 and 1760, when the emperor Kien Loong was at war with the Tartars on the north-western confines of China, Attiret was ordered to return to France, and prepare some designs to illustrate his triumphs. Attiret arrived at the seat of war in 1754, and made many accurate drawings of triumphs, processions, festivals, &c., from which he afterwards painted pictures, some of which were preserved in the palace, and shown only by special permission of the emperor. Attiret painted the emperor's portrait, and introduced a great many portraits into these drawings, of Chinese officers, many of whom had to journey merely for the purpose of being painted, their usual place being in the supreme councils. These drawings were sent to France to be engraved, under the direction of C. N. Cockey the younger. They were engraved by various artists, on so large a scale that it was necessary to make paper expressly for them. As soon as they were completed, they were sent to China, where they were only few impressions only being reserved for the royal family of France and for the Parian Library. Helman the engraver made a small copy of them. The originals are not all by Attiret; afterwards, by the Jesuit Castiglione and Sicilier. They are defective in design, and it is evident that the authors have paid too much deference to the taste of the Chinese to satisfy that of the Europeans.

The emperor created Attiret a mandarin, but by his position as a Jesuit it was impossible for him to assume the worldly distinction: he died at Peking in 1768, aged 66. The emperor gave 200 ounces of silver towards the expense of his burial.

(Extrait d'une Lettre du Père Amiot, de Mars 1769, de Pekin, contenant l'édite du Frère Attiret, &c., inserted in the Journal des Savans for June, 1771.)

ATTORNEY. By an act (6 & 7 Vict. c. 73) passed in 1843 the whole of the laws relating to attorneys and solicitors practising in England and Wales were scattered over less than sixty statutes, were consolidated. In the new act special care is taken to prevent unqualified persons practising, and persons seeking to be admitted attorneys are subjected to a regular examination. The control of the profession, which had fluctuated from the period of its origin, when it was held in relief, is now conducted by a board of attorneys, continuing in practice, is confined to the Incorporated Law Society, which is appointed registrar of attorneys and solicitors. The Commissioners of Stamps are not to grant any certificate forinidad, until the attorney's or solicitor's name is written on the stamp paper, or any bearing the same design as that of the stamp, and applying is entitled thereto; and the commissioners are annually to deliver to the registrar all such certificates, with the
ATTRACTION. The possibility mentioned in the article Cornusor, P. C., of bringing under one law both the attraction of gravitation and that of cohesion, has been since reduced to more than a possibility, namely, to a considerable extent, if the law can be actually stated. This remarkable addition to the nascent theory of molecular forces is the work of O. F. Mossotti, and was published in a pamphlet entitled 'Sur les Forces qui régissent la constitution inférieure des corps,' apéros pour servir à la détermination des lois de l'action à distance, par O. F. Mossotti, in 1836, 4to. This paper is translated in Taylor's 'Scientific Memoirs,' vol. i., and Mr. Pratt, in the second edition of his 'Mechanical Philosophy,' observing that Mossotti's theory can be conceived with an ultimate view to complex application, is, for the present, one of the most remarkable cases, has given the mathematical view necessary to include those simple cases and no more, in a perfectly sufficient manner.

The observed facts are, that particles which are very nearly in contact with one another repel each other in a manner which certainly depends, among other things, on the temperature; but that at a certain distance they cease to repel, and begin to attract, each other, and that with considerable force; at a still greater distance that attraction becomes comparatively feeble, and coincides with what is called the attraction of gravitation, varying inversely as the square of the distance. That this attraction of gravitation, and no other (or, at least, a very small one) exists at ordinary sensible distances, is satisfactorily proved by the Cavendish experiment. [Wetson or the Earth, P. C.]

Many hypothetical laws might be constructed which fulfil all these conditions; but the great interest of Mossotti's investigation, and perhaps much of its value, consists in the bearing taken by his analysis of the existing facts, imagined upon grounds with which his views had no necessary connexion, and upon his having given a basis of the utmost simplicity to the numerical law on which he proceeded. This basis is no better than that all molecular attractions and repulsions vary inversely as the squares of the distances.

When Epinus explained Franklin's electrical theory, his hypothesis was that the particles of matter repel one another, and also the particles of the electrical ether, which he supposed to be attached to and existing round each atom of matter. But he supposed the particles of ether to attract the particles of matter; so that of the two species of particles, called matter and ether, each repels the particles of its own kind and attracts those of the other. Epinus even went so far as to suppose that the attraction of gravitation might be a necessary consequence of such a theory, on the supposition that the attraction of the matter and ether was a little greater than the repulsions. So far Mossotti has adopted and accepted his views, but he has shown that Epinus could not have had the least reason to suppose, namely, that attraction of cohesion, the repulsion which takes place when the distance is smaller than that of cohesion, and the attraction of gravitation, which exists at distances too great for cohesion, are all to be found among the consequences of this theory.

If there exist in space molecules of matter which repel each other, in a fluid or ether of which the particles also repel each other, while the particles of the matter attract those of the ether, it is obvious that each of the particles of matter will, by its attraction, collect about it a condensed atmosphere of ether. If the attractions and repulsions be all inversely as the squares of the distances, then Mossotti finds that, in consequence of the atmospheres of ether, two molecules at a distance \( r \) (the attraction of the particles of matter for those of ether being presumed a little, and but a little, greater than the repulsion of the particles of matter from each other) will repel each other with a force represented with great approximation by the formula

\[
\frac{1}{(1+\frac{a}{2})r^2} \cdot \frac{a}{2} \cdot \frac{b}{2},
\]

where \( a, b \) are certain positive constants. To make the results agree with observed facts, \( a \) must be considerable, and \( A \) much greater than \( B \). When the formula is positive, repulsion is represented; when negative, attraction. When \( r \) increases to a very small, the force of the cohesion, or the force of attraction of cohesion, when \( r \) increases to a certain value, it vanishes, and afterwards becomes negative; at the value of \( r \) just mentioned there is stable equilibrium. As \( r \) still increases the attraction increases. At the maximum, a minimum at another certain value of \( r \), and afterwards, if \( a \) be considerable, diminishes as the inverse of
squares of the distance, or in a ratio incommensurably near to it.

All this agrees with the facts of observation, and with the numerical law of the facts as far as we know it; to which it must be added that an increase of the density of the ether would increase the distance at which particles are in equilibrium, which is generally done, indicating that the caloric, are made consequences of one law, which was never done before. This law may or may not be the law of nature; in the latter case it may still be valuable as a suggestion towards a law of nature.

**ATTraction, Electrical.** Under this designation it is intended to notice the apparent attractions and repulsions which take place when bodies are in particular states with respect to electrical power.

From a very early time it was known that amber, when excited by being briskly rubbed, seemed to draw towards it such light bodies as straws and feathers; and the phenomenon, as well as that of an apparent repulsion, is now exhibited in a more striking manner by presenting a cylinder of excised glass or of excited wax to a pit ball suspended by a silk line. [Electricity, P. C., pp. 335-6.]

In attempting to explain by what means these actions might arise, it is imagined that there may exist in all material substances, fluids, which participate in a particular manner one another attractive or repulsive powers, while a mutual attraction may take place between the fluid particles and those of the substance with which they are combined.

The hypothesis of Watson and Plateau was that there exists but one kind of such fluid: it was supposed that, in exciting glass and some other bodies by friction, the fluid was abstracted from the earth through the material by which the friction was produced, and accumulated upon the surface of the body, which thus obtained more than its natural quantity. It was supposed that this excess readily passed into any body near it, provided the latter had less than, or only its natural quantity, or at most had not so great a quantity in proportion to its size as the quantity lost by the glass. In the attraction of resuscious bodies it was supposed that the fluid passes from those bodies, through the material employed in the friction, to the earth; and thus the resuscious bodies were supposed to have less than the natural quantities. Hence arose the distinction between positive and negative, or repulsive and deficient electricity; and the theory of Elinpsus and Cavendish relating to the distribution of electricity on the surfaces of bodies is in conformity with this hypothesis. But the hypothesis is open to some objections: thus, when bodies are combined, it is which, when they are made a part of, the ordinary state, is combined with them, they are observed to repel each other mutually; and it must therefore be inferred that the particles of bodies exercise upon each other a strong repulsive power, a circumstance which is not reconciled with the history of electricity existing among the bodies in nature, or with the cohesive power by which the particles of all bodies are held together. It is moreover impossible to conceive, as Biot observes, that negative or repulsive electricity, that is, an absence of fluid, be developed on the surfaces of bodies according to the hydrostatical laws by which a real fluid would be developed.

To this hypothesis succeeded that which is now generally received. It was proposed about the same time by Symmer in London and by Galvani in Italy, that the whole of the Coefficient of Electricity, or the elasticity of the matter, consists in the assumption of two fluids, of directly opposite qualities, existing at the same time in combination with the particles of all bodies in nature: the particles of each fluid are conceived to exist in every body in strong repulsive force, while the particles of the unlike fluids mutually attract each other. The experiments of Coulomb with the electrical torsion balance have proved that the attractive and repulsive forces vary in intensity inversely as the squares of the distances between the particles, and that equal distances the attractions and repulsions are exactly equal.

The manner in which the mutual actions of electrical particles produce the phenomena of attraction or repulsion in bodies, which are generally done, consisting in the consideration of the effects arising from the decompositions of the natural electricities of the bodies, is conceived to depend in part on the pressure of the atmosphere, and in part on the conducting powers of the bodies. Thus, if by any excitement electrical particles be collected on the surfaces of two bodies (oppose two spheres) which are non-conductors, they will be retained there by the pressure of the surrounding air, and by the impermeability of the material: hence the bodies must take the motions which result from the repulsion or attraction of the fluids on them, according as those fluids are of the same, or of unlike kinds, and of equal or unequal thickness, or are driven in abundance to the opposite side, so as to be more dense, or to form a thicker stratrum there than on the side nearest to the non-conductor. But the reaction of the electrical fluid against the surrounding atmosphere is proportional to the square of the thickness of a stratum, it follows that there is an excess of force tending to make the conducting body recede from the other; and it is easy to perceive that a like explanation may be given of the contrary movement which takes place in the conducting body when the two are charged with unlike kinds of electricity.

The circumstances relating to the distribution of electricity on the surfaces of bodies agreeably to the hypothesis of two fluids, have been determined with the aid of a most refined analysis, by La Place, Ivory, and Poisson; and the 'Theory of Electricity,' in the 'Encyclopedia Metropolitana,' contains an investigation of the distribution on the surfaces of spheres. The results are there computed numerically, and compared with the phenomena; and the discrepancies are found to be only such as may fall within the limits of the unavoidable errors in the experiments themselves.

The hypothesis of electrical fluid, moving in opposite directions, is also adopted in order to explain the phenomena of galvanism and electro-magnetism; that which is considered as positive flowing from the zinc, through the neutralized copper, and thence to the passive magnetized bodies on one another are capable of being explained on the hypothesis of two fluids, the particles of which repel each other according as they are of the same or of unlike kinds, and of equal or unequal thickness; the forces being inversely proportional to the squares of the distances.

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ATTHEM, P. C.] The negative current. may be understood to be revolving at the same time in like manner, but in a contrary direction. The currents thus revolving are supposed to set on the particles of the magnetised needle, disposing them to arrange themselves parallel to its axis, and so as to bring the latter in the position of a tangent to the curve described by the fluid about the wire.

The hypothesis of Ampère differs from that which has been generally adopted since having formed the conducting wire into two parts which could be so connected with the opposite poles of a galvanic battery that the current of positive electricity might be made to pass along the two parts in the same direction; the two wires being placed side by side, in the former case, the wires (which were deliberately suspended in horizontal and parallel positions) seemed to attract, and in the other case to repel one another. He from thence inferred that the fluids passed in rectilinear directions, or parallel to the axes of the wires, and that the particles were attracted, as is the case with two magnets, when the poles of opposite sign are placed near each other, and that the phenomena observed in the former theory were in reality effects of the general law of attraction and repulsion among the particles of matter.

It has been ascertained that the current of electricity produced by the electrical machine causes deviations in a magnetised iron or brass organ, when it is placed on a table, of the same direction as that of a magnetic needle, that the effect produced on the needle is the same as that which was before described for, as the planes of the revolving currents are supposed to be perpendicular to the axis of the magnetised body, that axis must and does itself in the direction of a tangent to a circle supposed to be perpendicular to the axis of the conducting wire of the battery.

The negative current, it is observed, has been produced by means of the galvanic battery, and by the action of the electric, galvanic, and magnetic fluids, if such there be, are identical. An experiment made by Mr. Faraday, in which a magnetised needle caused to float on water was found to enter a glass tube having its axis on a level with the surface and about which a galvanic conducting wire was spirally wound; while such magnetised needle would not enter the bore of a hollow magnet placed in the same situation as the glass tube—seemed however to show that the nature of the galvanic and magnetic fluids, which church has been hereafter to be published; but it is to be hoped, both for the sake of the author and of the public, that his representative will not allow such undeniable proofs of his father's genius—compositions which will add so much to the resources of our clergy—remain sterile particles of obscurity.

ATTRACTION OF BALLS. [WEIGHT OF THE EARTH, P. C.]

ATTRACTION OF MOUNTAINS. [Attraction, P. C.]

ATTRACTIONS, ELECTIVE. This name is given to those tendencies by which the particles of bodies unite, or combine together, to form other bodies; and, as these tendencies exist in different degrees between the particles of different bodies, the name is intended to denote an approximate choice of the particles of one kind in preference to those of another kind. [Affinity, P. C.]

ATWOOD, THOMAS, a composer of great eminence, eminent for the production of compositions, by the Dublin chamber, and the theatre, was born in 1765, and commenced his professional education, as one of the 'children of the Chapel Royal,' under Dr. Nares, and his successor, Dr. Ayrs. On the change of his voice, and consequent retirement from the king's service, he intended abroad, by and by the expense of his patron, the Prince of Wales, for the purpose of completing his studies in the schools of Italy. He first went to Naples, where he continued two years, receiving some instruction from the regio director of the royal theatre, the chief maestro, one of the episcopal favourites of the last age. But the discerning young student, seeing that the musical art was rapidly on the decline in the country where it had flourished so long, and that it was renovated and full vigour in Germany and Italy, and immediately returned to London, and entered the pupil of Mozart, with whom he formed an intimacy which led to a daily intercourse, and to the importing not only the usual information, but also a knowledge of those deeper recesses of the art which seldom, if ever, is, or can be, communicated in the course of ordinary lessons. This happy result is manifest in all Attwood's compositions, the best of which are by the great master, who said—according the report of Michael Kelly, the singer—'Attwood partakes more of my style than any pupil ever had.' (Kelly's Reminiscences.)

Soon after, the young Englishman's return to his native country, he was engaged by his majesty, at the suggestion of a number of illustrious pianists, an appointment however which he soon relinquished, his friends not thinking it altogether compatible with the station he was entitled to hold. On the arrival of the Duchesses of St. Albans, who were his musical predecessors; and on the ill-fated marriage of the Prince of Wales (afterwards George IV.), he was constant in his attendance on the princess, to whom he gave almost daily lessons. In the conscientious performance of this duty, which he continued to perform after it became impossible for him to travel, he instructed many pupils. One of these, a young man, at the time his illustrious pupil would not be displeasing in another quarter, he gave offence to his patron, who, for several years after, made his resentment felt.

In 1795 the dean and chapter of St. Paul's elected Mr. Attwood as organist of that cathedral, and in the following year, on the death of Dr. Dupuis, he was appointed composer to the Chapels-Royal. For the solemnity of the coronation of George IV., he was required officially to compose an anthem. The king was pleased with the composition of a work which has since been heard and admired in all parts of the kingdom, as a proof of the skill of his organist, Mr. Attwood. He was appointed to his prominent place, in the uppermost gallery, at the chapel service, and was received with the received with the usual honours.

Mr. Attwood's compositions are so numerous, as to be in the class before named, that we can only say, generally, that a more than usual proportion of them are likely to reach distant proximity. His cathedral works, which unite the elegance of the modern school with the becoming sobriety and dignity of the old, have been performed with one and all; but it is to be hoped, both for the sake of the author and of the public, that his representative will not allow such undeniable proofs of his father's genius—compositions which will add so much to the resources of our clergy—remain sterile particles of obscurity.

AUDIAN, or AUDEANS, a sect of heretics, so called from their founder Audius, or Audeus, who is said to have been a native of Messerenia, and who lived in the first century. Having begun, as usual with religious reformers, by attacking the manners of the clergy, and perhaps also the government of the church, he proceeded in this fine till he was expelled from the body of the faithful; upon which he resumed the episcopal see, and was hereupon immediately banished by the emperor Constantine to Scythia. This is stated to have been about the year 338. Among various erroneous opinions and practices attributed to Audius and his followers of Easter, he is also accounted the author of the practice of allowing the Jews, the admission of all descriptions of persons indiscriminately to the Lord's Supper, the doctrine of the eternity of fire, water, and darkness, and especially that of anthropomorphism, or the resemblance of the Deity to the human form. This last heresy, in particular, as a Christian article of faith, appears to have originated with Audius, spread extensively. 'The pilgrim Cassian,' Gibbon writes, 'who visited Egypt in the beginning of the fifth century, observes and imitates the reign of anthropomorphism after the usage of the Jews, the admission of all descriptions of persons indiscriminately to the Lord's Supper, the doctrine of the eternity of fire, water, and darkness, and especially that of anthropomorphism, or the resemblance of the Deity to the human form.' (Dec. and F. of Rom. Emp., chap. 47, note.) But we have no account of the tenets of Audius, either from himself or any of his followers. For we are not informed for all we know of him upon the statements of the orthodox writers and the writers of that and the next age, Athenæus, Augustine, Ephyrius, and Theodoret. He is admitted to have been a

X 2
person of learning, and Epiphanius acknowledges that in his exile he exerted himself with great success in converting the barbarians.

AUGMENTATION, COURT OF. This was a court established by 27 Hen. VIII. c. 27, for managing the revenues and possessions of all monasteries under 200l. a year, which by an act of the same session had been given to the king's prerogative and determined to remain incorporeal. The revenues under that sum were to be called ' the Court of the Augmentations of the Revenues of the King's Crown,' and was to be a court of record with one great seal and one privy seal. The officers of the court were, a chancellor, who had the great seal, a treasurer, a king's attorney and a king's advocate, all ten men and 8s., seven receivers, with clerk, usher, &c. The oaths of the different officers are given in § 4 of the act. All the dissolved monasteries under the above value, except those preserved in the act for the use of the university and the survey of the court, and the chancellor of the court was directed to make a yearly report of their revenues to the king. The annual revenue of 376 monasteries under 200l. a year, which were suppressed, was 52,000l. and the value of their goods, chattels, plate, &c. was estimated at 100,000l.

The records of the Court of Augmentation are now at the Augmentation-Office in Palace-Yard, Westminster, and may be searched on payment of a fee.

CHRISTIAN JOHANN WILHELM, a celebrated German theologian, was born on the 27th of October, 1771, at Eschenberge, a village near Gotha, where his father was pastor. After receiving his preparatory education in the gymnasium of Gotha, in 1790 he entered the university of Jena, under the late illustrious devotus himself, theology and philology. After the completion of his studies several years passed before he obtained an appointment, but although he had to struggle with great difficulties in gaining a livelihood, he still continued his studies with great activity; he began his literary career by contributions to theological journals, and at length in 1798 he resolved upon entering on the career of an academical teacher at Jena. In 1800 he was made professor of Oriental literature, and in 1808 he succeeded Ittig, in the chair of Oriental literature, which he held until his death in 1807, on that of theology. The popularity of his lectures and the many valuable works which he published during his residence at Jena, not only induced the Duke of Saxe-Weimar to make him a member of his consistory, but other German universities made great efforts to draw him from Jena. In 1811 however he accepted the chair of theology in the university of Breslau, to which he was invited by the Prussian government, and in addition to which he was honoured with a seat in the consistory of the state of Silesia, of which he had hitherto chiefly distinguished himself as a writer upon theology and ecclesiastical matters, had now ample opportunities for displaying the practical character of his mind. His influence upon the progress of the church in Silesia and upon the education of his pupils was very great. At the time when the French marched into Russia, Augusti was rector of the university, and it was owing to his intrepidity and patriotic spirit that the property of the university was preserved. His conduct was severely censured by the tildos, and those who would have yielded to the enemy, but the cullumous reports which had been spread about him were soon shown in their true light, and the Prussian government acknowledged its gratitude to him by various honourable distinctions. In 1818 Augusti was honoured with the chief professorship of theology in the newly established university of Bonn, and with the title of Councillor of the Consistory at Cologne. The influence which he had by the Protestant Church in the Rhine province of Prussia rapidly increased, and in 1833 he was placed at the head of the ecclesiastical affairs of that province, by being appointed director of the consistory of Coblenz. Notwithstanding the numerous duties which this office devolved upon him, he still continued his literary labours. In 1833 he died, while his death was deplored by the Khristische Literaturzeitung, and several persons, among whom were M. Wilms and M. Becker, met at his death. M. Becker may be considered an orthodox Lutheran. His writings, most of which are of an historical or archaeological nature, are very useful as works of reference; but they are deficient in elegance and simplicity of form, and contain no evidence of learning and industry than of the true spirit of an historical writer. The following list contains the most important of his works: — 1 , Exegetisches Handbuch der Geschichte der älteren Religionsvölker. 2 , A continuation of Berger's Praktische Einleitungen in das Alte Testament, 3 , Apologien und Parallelen Theologischen Inhalts, 4 , Beiträge zur Geschichte des Reichs, 5 , Die Kirchenordnung des Philippus, 6 , Leipzig, 1806, 8vo., 5 , Historisch-Kritische Einleitungen ins Alte Testament, 7 , Leipzig, 1806, 8vo., 6 , System der christlichen Dogmatik nach dem Lehrbegriff der christlichen Kirche, Leipzig, 1805; 7 , Denkwürdigkeiten berühmter Christen, Breslau, 1787-55, 8 , Jena, 1857. The Augmentations Office has been most important of all Augusti's works; he subsequently condensed it into a Manual of Christian Archaeology, 9 , Endbuch der Christlichen Archaeologie, 3 vols. 8vo. Leipzig, 1830-57. 10 , General and Historical and Ecclesiastical History of the ancient Eastern churches, 11 , Leipzig, 1832, 8vo., 10 , Historische Ecclesiastischen Epitome, Leipzig, 1834, 8vo.; 11 , Entwürfe zur Christlichen Kunstdenkmäler und Litteratur. 0 , this work only one volume, was published when Augusti died. (Jenaische Altorientalische Literatur-Verzeichniss.)

AULA'CODON. [CLELODES, P. C. S.] AUL's, a fossil genus of Polyplacophora, Aulopraxis, from the Silurian strata.

AURELIUS, CELIUS. [CELIUS AURELIUS F. C. S.]

AUST CLIFF. In the bone-bed of this famous locality, usually classed with the lias formation, occur a few euripus remains which appear to belong also to the keuper deposits. This has been thought sufficient reason for removing the bone beds out of the lias. But if we regard their minoetrical and geological relation, this displacement will hardly be allowed.

AUSTEN, WILLIAM, an English metal-founder of the fifteenth century, and the contemporary of Donatello and Ghiberti, the most renowned of his foreign rivals. A very interesting document respecting Austen and other artists has been preserved by Sir William Dugdale in his 'Warwickshire.' Austen had a great share in the construction of the celebrated tomb at Warwick, in St. Mary's church, of Richard de Beauchamp, earl of Warwick, who died in 1459. In the document in question, which is the covenant between the earl's executors and the artists to be employed in the construction of the tomb, he says: ' AUSTEN, citizen and founder of London, xvi. Martii 20 H. 6, covanant, &c. to cast, work, and perfectly to make... of the finest latten (brass) to be gilded that may be found, in such figures emboased, of lords and ladies in divers manneres, called weepers, to stand in hounours about the tomb, those images to be made in breadth, length, and thickness, &c. to xiv. patterns made of timber. Also he shall make xxvii. xxvi. lease images of angels, to stand in other housings, shall be appointed by patterns, wherefore ix. for one side, and ix. after another. Also he must make an heare to stand on the tombe above and about the principal image that shall be in the tombe according to a pattern; the stude and workmanship to the repairing to be at the charge of the executors. And the executioner shall be bound to make an image that shall lye on the tombe, of the weepers so made in laette, xxvii. iv. d. And for every image of angels so made &c. And for every pound of latten that shall be in the heap. And shall also pay the costs of the said Austen for setting the said images and heare.'

'The said William Austen, xi. Feb. 28 H. 6, doth covenant to cast and make as image of a man armed, of fine lattin, garnished with divers patterns; a man with a griffon with a garter, with a helmet and crest under his head, and at his feet a bear musted (muzzled), and a griffon perfectly made of the finest latten, according to patterns; all of which to be brought to Warwick and layd on the tombe, and shall repair and ayse the said images, or any part thereof for the image, perfectly made and layd, and all the ornaments in good order, besides the cost of the said workmen to Warwick, and working there to lay the image, and besides the
cost of the carriages, all which are to be born by the said executors, in total £137.

In the opinion of Flaxman, these works of Aiken are equal to what was done in the same time, and though he is acknowledged only as the founder, he may be termed the great designer of the figures, as the patterns spoken of in the covenant may have been made in relation to size and costume, and not as exact models to prepare the casts from. The pay of 1s. 6d. for the free copies of the models, was fixed at that time the price of an ox. The tomb itself cost 1,250l., the figure of the Earl 40l., and there was an additional expense of 10l. for gilding. The whole expense of the tomb and the chapel, called Beausite, to the Chapel, was 945l. 4s. 7d. The other artists employed in this design were—John Essex, marbler; Thomas Stevency, cooper-smith; John Bourde, of Corfe Castle, marbler; Bartholomew Landspring, Dutch goldsmith, of London; John Frudie, of Westmeader, citizen and stayner of London; and Kristian Coleburne, also a painter or stainer of London. The monument, one of the earliest and best in England, is still in a state of preservation, and is of brass; the meaning therefore of the word latten, which has been disputed, is, apparently brass. (Dugdale, Antiquities of Warwickshire, p. 446.)

AUSTEN, JANE, was born December 16, 1775, at Steventon in Hampshire, of which place her father was rector. Mr. Austen was a man of liberal education, and high acquirements, and he bestowed upon Jane an education superior to what was then general among females of her rank in society. But if education did much for her, nature did more, creating the beauty of mind and person, with sweetness of disposition and sensibility, and desirable engagingness of manner. During the latter years of Mr. Austen's life she resided chiefly at Bath, but after his decease his widow and her two daughters retired to Southamnton, where they continued till May 15, 1817, and afterwards to the village of Chawton, where Jane wrote her novels. There they remained until her declining health rendered it desirable that they should remove to Winchester for the sake of nursing and economy. She died July 34 of that year, and was buried in the cathedral.

Of her six novels, four were published in her lifetime, but unanimously—"Sence and Sensibality;" "Pride and Prejudice;" "Mansfield Park;" and "Emma." The two others, "Northanger Abbey," and "Persuasion," did not appear until the year after her death—an extraordinary circumstance as regards the former, that being her first production, and having besides been actually disposed of to a publisher, who nevertheless, in a letter much noticed, makes allusion to the domestic class—are all of them delineations of every-day life and actual society, entirely free from that professional conventionality as to characters and incidents which gives a certain artificial quality to nearly all productions of the kind. In spite of this, and the denominated of her being the foremost rank of that species of fiction, they exhibit extraordinary graphic power and truthfulness, and reality without exaggeration. Nor is it their least merit that they are all of them works of artists, of great and painted tendency, without any praise of moralizing. They have all been translated into French by Madame de Montolieu and others.

AUSTRALIA, SOUTH. (South Australia, P. C. S.)

AVANZI, Jacopo di Paolo D', a celebrated old Italian painter of the fourteenth and fifteenth century; he lived at Bologna, but whether he was a Venetian or a Bolognese is doubtful.

There was an ancient noble family of Bologna of the name of Avanzi, of which Jacopo may have been a member, but there were of the same name of Jacopo di Paolo, who may have been the father of Jacopo. This was Maestro Paolo, the oldest known painter of that city. In the sacristy of the Piacentine there is a painting by him with the following inscription—"1386, Paolo de Venetia pintit hoc opus;" however, Maestro Paolo may have been the master of Jacopo, as it was not an uncommon practice in the earlier centuries for painters to sign simply their Christian names followed by that of their master or father upon their works, as is the case sometimes with the signs of cutaneous diseases, and the same omission is urged himself "Jacobsus de Avantis." Franco Bolognese and Vitale dalle Madonne are both said to have been his masters, but without the slightest countenance. Jacopo was himself sometimes called Dalle Madonne, and Vitale, painted at one time almost exclusively Madonnas.

Jacopo is generally mentioned in company with Simone da Bologna, or Simone de' Crocifissi, or Crocifissi, as he was called, for the same reason that Jacopo was called Dalle Madonne. They became partners, and each painted a part of their joint productions, a circumstance which has led to theayer of treating of Simone separately. But it would have been, in the present instance, that the figure of the tomb was not Avanzi, but Benvenuti, according to the manuscript of Orelli.

Most of Jacopo's works have perished, but some remain. He painted the tomb of San Francesco da Padua, in the church of Sant' Antonio at Padua, which was long attributed to Giotto, but painted by Jacopo in 1376. He painted also, in partnership with Simone, many frescoes in the old church of the Madonna di Mozzaratta, without the Porta San Matteo, at Bologna, which were much praised by Michelangelo and the Caracci, considering their period. Besides which he painted two triumphs in a public ball at Verona, and some works in company with Aldighieri da Zevio in the chapel of San Giorgio in the church of Sant' Antonio at Padua. The former were considered works of extraordinary merit by Mantegna; the latter have been lately recovered from dirt and oblivion by Dr. E. Förster, one of the editors of the Kunstkamb. They were described by him in that journal, pp. 18 and 22, of the year 1838. Jacopo died probably in the early part of the fifteenth century. There are two pictures attributed to him in the gallery of Bologna. (Vasari, Vita de' Pittori, &c., and the Notes to Schom's German Text of Vasari, Miscellanea Uffizii, Storia Pictoria, &c.; Giolandi, Piscicatoce della Bologna.)

AVE—Medical Properties of: Several varieties, chiefly of the species A. sativa, are cultivated in Britain, particularly the north of England and lowlands of Scotland, though on the west and north-west coast of Scotland it is found that this kind of hemp is near the limit of the kingdom. The climate of Scotland is peculiarly suitable to the profitable cultivation of this plant, which flourishes where wheat and even barley languish (Oakes, P. C., vol. xvi. p. 881), while the constitution of the seed renders it a suitable article of diet for the inhabitants of that country. The seeds, which are official, are at once delineal and medicinal. The fruits or grains consist of the skin or husk, which is inclosed by machinery, and the seeds, which, when coarsely ground, form the wild-colt of Scotland. This inclosed seed in various of the different varieties, and in different seasons and localities. Vogel, who is commonly followed on this point, gives the amount at 66 meal and 34 bran or husks; but under proper culture, it is often as high as 78 meal and only 22 of husk per cent. (Bousingsault, Rural Economy, translated by G. Law, p. 229.) The meal or farina consists (per cent.) of starch 59 (sometimes as high as 728, Dr. Christison), 1075 procachus nutructions, 43 of albumen, 2 ossea, the mass, 24 ligneous fibre and moisture. The seeds, or derived of husks, or decoricated (gratum), are employed under the name of groats or gits to form with water the Decoctum Aveae, or water-gruel. When bruised, ready for use, they form the wild-colt of Scotland. This in small quantities and moderate doses may be used in a pint of water, according to the object in view. When employed for an article of nourishment, the gruel may be used thick; when the nostrum is designed for more severe perturbation at the commencement of a cold, it should be thin; and the addition of butter, spices, and wine, or anything save a little salt and sugar, is to be avoided. This is regarded as a light and digestible article for invalids. With some, it naturally produces hearburn and thirst: the same objection is urged against oatmeal, whether eaten in the form of oat-cakes, or employed to form porridge, the usual breakfast of the labouring classes, and of the children of the middle classes in this country. This is inflammable, and may be very dangerous if not properly boiled. It is certainly true; but as a national fare, nothing could be found more fitting. It gives a warmth and support to the system, far superior to wheaten bread, and therefore most proper for a cold and damp climate. The Derbyshire miners, from choice, prefer it to all other breakfast articles. This plan of nourishment appears to me to enable them to support their strength and perform their labour better. (Sir Joseph Banks, in Davy's Agricultural Chemistry, 5th ed. p. 145.) The idea that oatmeal is the proper food in all diseases has in a large measure foundation (Cullen's Materia Medica, vol. i. p. 279.) The husks are frequently steeped in water for a few days, and then drained off. The liquid when boiled stiffs into a dish called aowsen in Scotland. This is slightly acid, and forms with milk a most nutritious food of great utility. The husks are esteemed as a most suitable article of diet in summer, in a climate where, for a short period the heat is intense.
When oats are used as food for horses, it is very advantageous to steep them in water for two or three days, till they sprout or spire; the saccharine matter is thereby developed, and the grain becomes nutritious and digestible.

**AVERAGE.** *Shipp, P. C.*, p. 403.

**AVERTMENT.** *Pleading, P. C.*

**AVES (Fossil).** Fossil birds have been recognised by Mr. Hitchcock in the red clay of Connecticut (Hitchcock), in the Wealden of Sussex (Mantell), in the chalk of Maidstone (Owen), in the tertiary beds of England and France (Curvier), in the bone-caves of Kirkdale (Buckland), and in many late deposits. From New Zealand comes the Diornis of Owen.

**AVICENNA, a genus of plants belonging to the natural order Myoporaceae.** The calyx is 5-parted, persistent, the segments erect, subovate, obtuse, concave; the corolla monopetalous, 2-lipped, upper lip square, emarginate, flat, lower limb, with ovate, equal, flat divisions, tube bell-shaped, short; the stamens 4, didymous; ovary 2-celled; style, subulate, erect, length of stamens; the stigma bifid, acute, the lower division bent down; the seed single, large, albuminous. The species are natives of New Holland and America.

A. *tomentosa*, White Mangrove, has coriace, ovate leaves, tomentose beneath. It puts forth twigs from the stem, resembling those of the common mangrove. The bark is found in New Zealand, and is used in commerce.

**A. resinafera** is a native of New Zealand, and is said by Forster to yield a green resinous substance that is eaten by the New Zealanders as food. It is remarkable also for its clusters of resinous globes, of a nature similar to that of the *A. aurita*.

*Benjamin, Outline of Lindley, Natural System.*

**AVIDUS, CAISSIUS.** *Cassius Aviades, P. C. S.*

**AVOIDANCE OF A BENEFICE.** *Benfice, P. C.*

**AVORIES.* *Replevins, P. C.*

**AWARD.** All that is necessary on this subject is contained under *Ambition, P. C.*

**AXINUS (Sowerby), a fossil genus of Conchifera, of which some species occur in the magneisian limestones, and one in the London clay.** To those which are found in the magneisian and other palaeozoic limestones, Mr. King applies the title of *Schizodes*, P. C. S.

**AXIS, in Botany, a term that is applied to the root and stem of the whole plant.** The result of placing the seed of a plant in a place fitted for its growth, is the development of the embryo. The plumule ascends into the air, whilst the radicle descends towards the earth. The former is said to be the *ascending axis* of the plant, the latter the *descending axis*. It is around these axes of growth that all other parts of the plant are arranged. Those which are found upon the ascending axis, or stem, are collectively termed the *appendages of the axis*, and individually constitute the scales, leaves, bracts, fruits, flowers, and modifications of those parts of the plant; all these parts are in connection with the vascular system of the axis, and must not be confounded with mere expansions of the epidermis and the like, such as ramenta, tendrils, &c., which are no real connections with the axis.

The cause of the direction taken by the ascending and descending axis of plants has been variously explained. This is evidently a complicated question, and one which involves the great mass of facts in the organization of plants, and probably animals, which determine their peculiar forms, habits, and movements. Dutrochet, who has lately written on this subject, and who is quoted by Lindley in his 'Introduction to Botany,' says:—"The downward direction of the roots may be understood: it may be said that, like all other bodies, they have a tendency towards the centre of the earth, in consequence of the known laws of gravity (as is the opinion of Knight in 'Phil. Trans.' for 1806); but on what principle then is to be explained the upward tendency of the stem, which is by means of the expansion of its leaves and here lies the difficulty. Dodart is the first who appears to have paid attention to this circumstance; he pretends to explain the turning backwards of seeds sown in an inverted position, by the gravity of the earth. It is probable that the root is composed of parts that contrast by humidity; and that the stem, on the contrary, contracts by dryness. For this reason, according to him, it ought to happen, that when a seed is sown in an inverted position, the radicle will turn back towards the soil, while the part of the humus on which the contrary, turns to the sky, or rather atmosphere, a drier medium than the earth. The experiments of De Hamel are well known, in which he attempted to force a radicle up-wards and a plumule downwards by enclosing them in tubes which prevented the turning back of these parts. It was found that the radicle and plumule, in the natural direction, they became twisted spirally. These experiments, while they prove that the opposite tendencies of the radicle and the plumule cannot be altered, still leave us an ignorance of the cause of such tendencies. The well-known fact of the stems of plants growing upright in the dark places, has led De Candolle and other observers to attribute the tendency of the stem to an upward growth to the influence of light. Another well-known fact, that of the tendency of plants growing in the shade, is the cause of its growing upwards. He found by experiments the Mirabilis jalapa and other plants, that although roots lay in general no tendency towards the light, yet such a disposition does become manifest provided the terminal shoot of a root becomes slightly green, as occasionally happens. It found that the ends of the roots of Mirabilis jalapa became occasionally coloured, and, on placing the plants in damp ground, he found these roots had a tendency to come to the series towards the light. This is also supposed to be the cause of less stems of such plants as Sagittaria sagittifolia are known to assume the directions of roots. In this plant shoots are produced from the axilla of all the radical leaves which grow at the base of the water, their growth is directed towards the sky, like those of all vegetables. To young stems which are produced by these shoots are entirely colourless, like roots; and instead of taking a direction towards the sky, as coloured stems would do, they tend downwards, retreating towards the centre of the earth. The tornament next stem takes a horizontal course, and does not assume any tendency towards the sky until the plants become green."

H. von Kielmeyer gave a report on the direction of the organs of plants, to the assembly of naturalists at Stuttgart, in 1835, in which he explained the upward and downward growth of the axis of plants by the theory of polarity. He supposes that there is acting upon plants a principle the analogy of magnetism and electricity, which, polarizing the cells of which a plant is composed, give to one set an upward and to another a downward growth. Although every writer on the subject has endeavoured to give to one agent the position of a cause in this phenomenon, it will be found on inquiry that the particular directions of the stems of plants can no more be referred to one cause, than the growth in particular direction of the organs of animals. Growth, in whatever direction, is the result of all the forces that are acting on an individual organism, as the changes of position, temperature, light, the chemical constitution of the tissues, and electrical agency are all involved in producing the determination of the particular direction of the roots and stems of plants.


**AYLiffe, John, LL.D., an English jurist, of the circumstances of whose life hardly anything is known.** He left behind him in his works substantial monuments of his industry and learning. He styles himself Fellow of New College, Oxford. In 1714 he published in 2 vols. 8vo. 'The Laws of Powers and Pawns as they are used in the Romans,' &c. In 1722 he published 'A work of which a great portion is avowedly an abridgment of Wood's 'Athenae.' In 1726 he published in folio 'Paragon Juris Canonicorum Anglaurum, or a Supplement to the Canon and Constitutions of the Church of England,' in which he brings much learning and learning; against the exercise of a separate and independent legislative power by ecclesiastical bodies. In 1732 he published 'The Laws of Wills and Powers as it was in Use among the Romans;' and in 1734, 'A Law-Book of the Royal and Municipal Laws of Rome, as it was established in that Empire,' &c. This volume covers the greater part of the author's subject, but the complete work was never published. Ayliffe's books give an explanation of those scientific terms of reference to the Cure of justice which often puzzle casual readers of the foreign civilians.

**AYMESTRY LIMESTONE, one of the calcareous beds in the upper Silurian series, which has been produced by
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BABER, or rather BABBER, is an island of the Indian Archipelago, and sometimes included in the Moluccas; but it must properly be included in the large group which is called the Tenasserim Islands. Babber lies between 7° 49' and 8° 11' lat. and is traversed by 190° E. long. According to Kolf's chart it may be about 20 miles long and 10 miles wide. It is surrounded by several smaller islands, of which the largest is Wetang, which lies west of it; and between Babber and Wetang it lies from 14 to 160 fathoms. The island is mountainous, but it does not rise to a great elevation, except towards the extremity, where a summit rises to a considerable height. The interior of the island is uninhabited, except on the western and eastern shores, where there are several small settlements. They constitute two independent communities, which are continually at war with one another; and the principal object of their military incursions is to kidnap young persons, who are sold as slaves to the vessels that visit the island, or obliged to cultivate the fields for their captors. The greater part of the land is still covered with trees and bushes; but the remainder is cultivated, and produces several kinds of roots, Indian corn, and plantsains. There are also considerable plantations of cocoa-nuts and sago-trees. The principal animals are cattle, buffaloes, and goats. Fowls and birds are numerous, especially several kinds of pigeons. Fish is also plentiful, but the natives do not turn it to account. The inhabitants belong to the Malay race, and resemble in their manners, dress, and food the inhabitants of the neigh-
bordering islands, to which they occasionally visit the neighbouring islands; but it does not appear that they have any regular exchange of commodities with them. There come every year to Babber one or two country vessels from Bandia, which import small pieces of cotton-cloth, and export a few slaves and some provisions. When the Dutch spread over the Indian Archipelago, they had a small establishment on this island; but they abandoned it after some time, and it does not appear that the inhabitants have had any dealings with them to-day. The Dutch government has again opened some communication with them. (Kolf, Reise door den weinig bekenden zuidelijken Molu-
schena Archipel).

BABIROUSSA, or BABYROUSSA. [Sudee, P. C.]

BA'BRIUS (Βαβυρίους). Since the publication of the article BA'BRIUS in the P. C. a considerable number of his fables have been discovered and published. Among the numerous MSS. which M. Miniope Minas found in the convents of Greece, there was one containing the choliambic fables of Babrius, which was found in the convent of St. Laura on Mount Athos. He took a copy of it (the price which the monks asked for the original being too exorbitant) and brought it with the rest of his treasures to Paris in 1842. M. Villainé entrusted the office of editing the fables to M. J. F. Boisnade, and the work appeared towards the end of 1844 in one octavo volume. The Greek fables which were thus rescued are now before the world, but are not however the complete collection which Babrius made. Their number is 128; they are arranged in alphabetical order, that is, according to the initial letters of the fables, and the present collection does not go further down than the letter Β, and therefore contains only five fables. The fables are arranged in sections, and each of them is preceded by a preface and a proem. The preface in which the poet Babrius lived, and which was formerly believed to have been the last century before the Christian era, is at present more doubtful than ever, on account of certain allusions which occur in the fables. M. Boisnade, who believes that Babrius was a Roman, has not entered upon the question of the Babrius; but he has written a monograph upon the subject. Boisnade has added a critical commentary and a Latin translation: the title is Babriou Moêlîâon, 1 Babríi Fabûle Iâmbiques CXXII., nunc primum editi. J. F. Boisnade recensuit, Latine ex recensione editus, CXL. (Classical Museum, part vi. p. 412, &c.)

BABYLONIA (Βαβλωνία), the territory so named from the city of Babylon on the Euphrates. [BABYLON, P. C.]

It was considered by the ancient geographers as a part of Assyria; but its boundaries cannot be fixed. The physical character of the Babylonian Plain is described in the articles BABDAY (Pashahic) and TIGRIS, P. C.

BACHELOR, an unmarried man. The legislation of the Romans placed the unmarried (casulæ) under certain disabilities, the chief of which were contained in the Lex Julia et Papia Poppea. The original Lex was simply called Julia, and was passed n.c. 18. (Dion Cassius, liv. 16.) The Lex Papia et Poppea, which was intended as an amendment and supplement to the Lex Julia, was passed a.D. 9; and both these laws seem to have been considered as one, and they are often referred to under the title of the Lex Julia et Papia Poppea. One object of the Lex was to encourage marriage. An unmarried person (casu-
le), who was in other respects qualified to take a legacy, was incapacitated by this Lex, unless he or she married within one hundred days. (Ulpian, Frag. xvii. 1.) The law was the same, whether the whole property (hereditum) was left to a casule. (Gaius, ii. 111, 144, 368.) It was the opinion of the lawyers, that though a casule could not take directly under a testament, a casule could take by way of fidei commissum, or trust; but the Senatus-consultum Pegusianum, which was passed in the time of Vespasian, rendered a casule equally incapable of taking anything by way of fidei commissum. (Gaius, ii. 286.) A testamentary gift, which failed to take effect because the heir or legatee was a casule, was called Caducum (and the word was applied to other cases in which the possessor of a thing was equally incapable of taking anything by testamentary gift) than the Senatus-consultum Pegusianum, which was placed in the time of Tiberius, extended the penalties to unmarried persons of both sexes who were above sixty and fifty years old respectively, and it made them for ever subject to the incapacities. However, a Senatus-consultum Claudianum, passed in the time of Claudius, mitigated the severity of the Priniciamus, in case a man married above the age of sixty, provided he married a woman under fifty, for the Roman law considered a woman under fifty as still capable of procreation. (Ulpian, Frag. xvi.; Suetonius, Claudius, c. 28.) An unmarried man who had attained the age of twenty-five was also allowed to take on orbi, that is, married persons who had no children from the age of twenty-five to sixty for a man, and twenty to fifty for a woman. Childless persons who came within the terms of the Lex lost one-half of any hereditas or legacy; and what they could not take became Caduceum. The Lex also gave direct advantages to persons who had children. The original object of this Roman law was perhaps only to encourage marriage, but it was afterwards used as a means of raising revenue. In the preceding exposition of the Lex Julia et Papia Poppea, it has been assumed that the provisions above enumerated applied both to males and females. The word casuleb, indeed, seems to be applied only to males, and the Latin term for an unmarried woman is Vidua, which means any woman who has not been a husband. But the expression of "married" is not very common in the law. "Qui intrà sexagesimum vel quæ innaquinquagenísum annum neulli legi (the Julia, or Papia Poppea) parens," &c., shows that the provisions applied both to males and females. The phrase "married" is not absolute, but the phrase would be "qui Quaeve," &c. That the Lex applied to women also, appears from other evidence. (Cod. viii. t. 57.) Under the republic there were also penalties on celibacy, and legal inducements to marriage, which are mentioned in the laws of Cato the Elder, Plautus, and Juvenal. The Lex Julia and Claudianum were intended to check the marriage of Augustus. Julius Caesar, in the division of the Campanian lands, gave allotments only to those who had three children or more. (Dion Cass. xlvii. 7; Appian, Bell. Civ. ii. 10.) These concerns are also laid to the

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have had the power of imposing a penalty called Access Uxorium, "wife-money," on men who were unmarried. (Festus v. 
"Uxorium.") It was a tax payable by the priests of the Roman and Bactrian religion, and by the Romans, in order to encourage the propagation of children; the object of the English law imposing extraordinary payments on bachelors, and relieving to a certain extent married persons with children, was apparently to raise money, though a certain vague notion that marriage was encouraged seems to have been held to the tax. The law-maker. A constitution of Constantine (Cod. viii. 
tit. 58) relieved both unmarried men and women from the penalties imposed on caelisili and orbi, and placed them on the same footing as married persons. This change was made 

in favor of the heretics, many of whom abstained from marriage for religious motives.

Not only bachelors, but widowers have been unequally taxed in this country, and there is more than one instance, which were enacted in the 18th century, in which bachelors have been favored by special exemptions, or have been charged less on account of the number of their children. In 1695 an act was passed (6 & 7 Will. III. c. 6) entitled "An Act for granting to his Majesty certain rates and duties upon marriages, births, and burials, and upon bachelors and widowers, for the term of five years, for carrying on the war against France with vigour." Bachelors above the age of twenty-five, and widowers without children, paid 1s. yearly, and further according to their rank. Therefore, being no duke the tax was charged on the 3rd, 4th, and other ranks. The provision was charged on the 3rd, 4th, and other ranks. The provision was made by William Pitt. In 1765, when Mr. Pitt proposed a tax on female servants, he exempted persons who kept only one servant, and who had two or more lawful children. Certain children under the age of 14 living in the house with them. But to make up for the deficiency, he proposed that the tax on servants should be higher for bachelors than for others; and he stated that the idea of this tax was borrowed from Mr. Fox. This differential rate has not been continued to the present day, and the number of servants charged at the higher rate in 1843 was 11,851, or rather more than one-tenth of the whole number charged. Roman Catholic diocesans are exempt from additional duty. When the income-tax was imposed by Mr. Pitt, in 1798, deductions were allowed on account of children, and an abatement was made of 5 per cent. to a person with children, when the income was above 60l. and under 400l.; and other rates of abatement were allowed according to the amount of the term and the number of children; the present law extended to incomes of 6000l. a year and upwards.

There does not appear to be a tax on bachelors in any country in Europe. In the city of Frankfurt an income-tax is imposed on persons who work in the city, "if they are foreigners, and not married."

BACILLARIA, a large family of Infusorial animalcula, constituted by Ehrenberg, who includes in it upwards of thirty genera. The siliceous shields of these animalcula are amongst the most numerous of the forms of Microscoria in the cretaceous, tertiary, and suprapermian. Xanthidia occur in the chalk and its included nodules of flint: Galloto- neae, Navicula, Actinoecyli, Coscinodiscii, Gomphonemia, and other genera, abound in the tertiary marls of Greece, Italy, Bohemia, England, and North America. The siliceous beds of Bohemia (Poliarschier), which are fourteen feet in thickness, contain innumerable shields of Navicula, and probably few of the superficial lacustrine deposits of Europe are which few occur in these beds. No one supposed that the first type was made of glass in any quantity, as are to be sold by the measure and for little more than their intrinsic value. This is actually the case now in some places in India and Afghanistan, though with little effect on the prices of the plants that are cultivated. The late Colonel Tod made a collection of plants during his long residence in India, of which several are of high interest for the botanist. A description of them was given with engravings in the first volume of the Transactions of the Royal Botanic Society of Edinburg, vol. 2, p. 283. The plants are Agap- todotis and of Menander, both Bactrian plants. Their hys- torical value, says Wilson, is undiminished, but nothing of great importance was discovered in these two volumes. The remarkable diminution of their value as objects of rarity within the last twelve years. Instead of only two medals, the cabinets of Paris and London now possess nearly two thousand of it.
coins of Manendar and Apollodorus, of silver and copper, of a great variety of types, and mostly in excellent preservation. The country on both sides of the Indus and north of the Hindu-Koosh has been explored with a view of searching for Bactrian sites. General Ch. de Vigneron, Aïard, and Court, Dr. Swayne, James Prinsep, Sir Alexander Burnes, Masson, and many others, mostly British residents in India, have made collections of Bactrian coins, which enabled him to construct a complete series of Bactrian kings, of Greek and barbaric descent.

Under the term Bactrian coins are understood in this article only such medals as were struck by kings of either Greek or barbaric descent who ruled over the ancient kingdom of Bactria or parts of it; but barbaric coins of Mohammedan princes who reigned at Kabul and other places in Afghanistan. The Greek coins may be divided, with respect to their inscriptions, into pure Greek and bilingual coins. The Greek types, such as, Thadostes I., Thadostes II., Euthydemes, Demetrius, and Eucratides, who ascended the throne in n.c. 181, and perhaps reigned as long as n.c. 165. Of Thadostes I. two coins are known. One, a gold medal, was bought at the fair of Nishni-Novgorod in Russia, and is now in the Royal Cabinet of Paris. It corresponds in weight and style with the gold coins of Antiochus II., and the portrait bears so close a resemblance to that of Antiochus, that it is supposed the artist copied the head from a portrait of him on some gold coin of the same time.

The reverse has a naked figure of Jupiter erect, with his back to the spectator, and turned to the left; he is in the act of hurling his thunderbolt from his right arm raised, whilst his left arm extended bears the sceptre; on one side, in the field of the obverse, is an olive branch, and on the other a sheaf of wheat.

The legend on each margin of the reverse is ΒΑΣΙΛΕΩΣ ΔΑΙΜΟΝΙΩΝ ΤΩΝ ΡΩΜΑΙΩΝ ΠΑΤΡΩΝ, perfectly distinct. The second coin is a silver tetradrachm, presented by Sir Alexander Burnes to the British Museum, where there are also many coins belonging to the other Greek kings of Bactria. The bilingual class consists of coins with Helioetes, who reigned about n.c. 147, but bilingual inscriptions are also found on the square copper coins of his predecessor Eucratides. The two languages are Greek and Pehlevi, of which the latter is represented by two characters, forming the Arian or Arianian alphabet. The oldest bilingual coins are all square, the barbaric inscriptions having been adopted together with the barbaric shape, but the later coins are both square and round. Fourteen kings with Greek names are ascribed to this class, the last of whom is Pantaleon, who reigned about n.c. 120. The Greek letters on these coins are naval-headed; the design is generally good, on some very fine, and probably done by Greek artists; but there are also many of very inferior political and artistic character. The circumstance of Eastern emblems of royalty, and different Indian animals and other figures, betrays the decline of Greek civilization. Among the animals, the elephant and the elephant's head, which we find on the coins of Demetrius, Manendar, Apollodorus, and others, is particularly striking. The bull, the bulls' and the rams' horns, the coins of Philexenos, Diomedes, and several other kings, are supposed to indicate dominion in India. The wild horse however and the double-humped camel are believed to have exclusive reference to Bactria. Barbaric dynasties reigned over Bactria from the end of the second century before Christ.

The coins struck by them are bilingual, and betray the decline of art and prevalence of Eastern influence. To this class belong the coins of several kings of the Aramaic dynasty, such as Vemakes, Vandusk, and others. These coins seem to have been independent of the Aramaeidae in Parthia. These coins are rare, and they are bilingual.

Only two Bactrian gold coins are known, one of Diodotus and one of Euthydemes; all the others we know of are of silver, of billon, or of copper.

As early as the beginning of our era parts of Bactria were conquered by princes of Scythian (probably Turkish) descent, whose seats were at Kabul and Jalalabad, and who were finally subdued byander his wife with her family, by the Persian princes, who were exclusively of gold and silver, and bilingual—a proof that Greek civilization, although on its decline, had still some influence upon the people, as was the case in Parthia many centuries before. These were also many coins found in Afghanistan; a fact by no means extraordinary, as the power of the Sassanians in Persia extended occasionally as far as the Indus, so that those Scythian kings were not always independent, but paid tribute to the Persians. The prince of Ikardsa, in the upper valley of the Indus, pretends to be descended from Alexander. As the Greek power in Bactria was maintained in some parts of the Hindu-Koosh after the Scythian conquest, the princely residence of Ikardsa may be a remnant of the Bactro-Greek empire, and a closer investigation into the history of Ikardsa and the whole upper valley of the Indus would perhaps lead to interesting results.

The obscurity prevailing in the history and chronology of Bactria has of course an influence upon Bactrian numismatics, and makes it next to impossible to see the principal writers on these subjects at variance on most essential points. [AFGHANISTAN, P. C. S.]

(Wilson, Ariane Antiqua; Lassen, Zur Geschichte der Griechischen und Indo-Skythischen Königre in Bactria, &c.; Grotfeud, Geschichte der geschichtlichen Parthischen, und Indo-Skythischen Königre von Bactrien, &c.; H. T. Prinsep, Note on the Historical Results deductible from recent Discoveries in Afghanistan.)

BADALCHOW, an Italian painter and engraver, born at Parma towards the close of the sixteenth century. He was the pupil for and some time the assistant of Annibal Carracci at Rome. He was highly raised by Annibal as a draughtsman, who confessed that he surpassed himself; but in painting he was much inferior to Guido or Domenichino.

His engravings are not numerous: the most celebrated are the so-called Bible of Raphael, which he executed in company with Lanfranc, and dedicated to Annibal Carracci; and the four sets of Greek coins which he engraved. Among the most celebrated engravings the best was Galatea, in the Vereosi palace at Rome; a San Francesco at the Capucins of Parma, was also one of his best works; but like his friend Lanfranc, says Lanzi, he always did less than he was capable of doing. The date of his death is not known. [Lanzi, Storia Pittorica, &c.; Malvasia, Felsina Pittorica; Bartch, Le Peintre-Graveur.]

BAGGESEN, Jens, a writer of considerable distinction both in Danish and German literature, was born at Corona in the island of Zealand, February 16, 1764, and was educated at the University of Copenhagen. From his earliest youth he displayed unusual liveliness of imagination, of which, together with satirical humour, his first production, at the age of twenty, gave due evidence; and he obtained a most favourable reception from the public. Yet he himself says that he had no taste for the comic; that in writing his tales he consulted that of the public far more than his own. And that he published them for the purpose of paying off his father's debts and assisting the family: from which it would appear that they were left in embarrased circumstances. Still he seems to have been for some time afterwards without fixed pursuit of any kind, except that of writing some of his best and the only popular books of a Danish character. He had however acquired the favour of the Prince of Holstein-Augustenburg, who bestowed on him a small pension. In 1789 he visited Pyrmont in hope of benefiting from the waters, and meeting there with his friend Count Molcke, gave promise of doing an invalid service. He accompanied him to Switzerland, and returned home through France and Germany. Of this journey he has given a full narrative, or rather picture, in his 'Labyrinthen,' one of the most interesting of his works, it being, as he himself calls it, his 'Dichtervorleser,' or 'Wanderings of a Poet,' in which he records his varied feelings, opinions, and contemplations, and portrays his own character. For that period of his life to which it refers, it may in fact be considered a piece of autobiography, and it certainly enters at some length into one rather important circumstance of his personal acquaintance—his acquaintance with Sophia Haller, the granddaughter of the poet, whom he married at Berne, in March, 1790, after which he immediately returned to Denmark. Notwithstanding his attachment to his native land, he did not remain there long: he fancied it a sphere too contracted for him, felt unsettled and unable to apply to anything seriously, so set out again for Germany, taking with him his wife, his son, and his cousin, VERY. He then visited Paris, being at that time an ardent enthusiast for the French Revolution, and there he became acquainted with many of the public characters of the day. On his second return to Copenhagen he visited the then new city of Berlin, but found it too irksome for his disposition, and as change of climate was thought necessary for his wife's health, he set out the following year for Germany, but lost his wife at Kiel. Instead of returning, he proceeded to England, where he married his two young children; and in 1798 again visited Paris, where he married Sanna Reibus. This planless mode of life
BAGLIONE, GIOVANNI, a Roman freeco and oil painter of the seventeenth century, at present better known for his "Lives" of his contemporaries than for his paintings, though in his time he enjoyed the highest patronage. He was born at Rome about 1673, and was for a short time the pupil of a Florentine painter, Francesco Morelli. He attracted the notice of the popes Sixtus V. and Paul V., the latter of whom created B. a Cavalier del Altino di C. In 1618 he was elected Prince of the Academy of St. Luke. The date of his death is not known; he was still living in 1642. He executed a great many works in Rome, some at Naples, and some at Florence, but he painted very little, and his works are rarely seen in collections; he excelled in colour, and in light and shade. One of his best works is the Resurrection of Tabitha, in St. Peter's at Rome.

His book of memoirs, of which he has written 81, is written in an extremely simple style, without the slightest attempt at criticism, and if he ever ventures upon a qualifying remark, it is sure to be one of commendation. G. B. Passari published an edition of it at Naples in 1738, with the addition of the Life of Salvador Ross; there is also a memoir of B. in Sigismondo, which contains a long list of his works. The following is the title of the book—Le Vite de' Pittori, Scultori, Architetti, ed Intagliatori, dal Pontificato di Gregorio XIII. nel 1572 fino a tempi di Papa Urbano VIII. nel 1642.' The edition appeared at Rome in 1642, and a second appeared in 1649, according to Orlandi.

BAGLIONI, an historical family of Perugia in Italy, which in the middle ages produced many distinguished warriors, and was esteemed powerful over many native towns. Perugia was in those times one of the most populous and important cities of central Italy, and governed itself as a municipal community, under the nominal protection first of the Emperors and afterwards of the Popes. Like most other Italian cities, she distrusted a strong church and the nobles, and that of the people. The Baglioni belonged to the nobles. We find in the twelfth century Ludovico Baglioni appointed Imperial Vicear of Perugia, by the emperor Frederick I., who in his will, made his grandson, Count of Orvieto, head of the house, and successor of the male line of the Baglioni.

After the fall of the Sabinian dynasty, the nobles and the popular party had frequent conflicts with alternate success. In the year 1393 a general outbreak took place, when Pandolfo and Pellino Baglioni, with seventy other patricians, were killed in flight in the streets, and their alternates being left as ruffian poemen, the city remained in possession of the town, until 1416, when Braccio Fortebraccio, as the head of the nobles, re-entered the town by force, and proclaimed Lord of Perugia. Malatesta Baglioni, son of Pandolfo Baglioni, had succeeded in the possession of the town, when Braccio died in 1416, but his uncle, Pandolfo Baglioni, was appointed General of the Holy See by Pope Callixtus III. He defeated Francesco Sforza near Lodi in 1433, and took Lord of Spello by Stius IV., and died in 1474. His wife, Margaret of Mantua, died in 1480. He was succeeded in the kingdom of Naples by his son, Francesco, who, however, did not live very long, but returned in 1414 once more to Copenhagen, where he was warmly received, yet soon embroiled himself in a violent feud with Oehlenschlager, whom he opposed as the bearer of the race of poetry. He led him to make Paris once more his place of residence, with occasional visits however to Copenhagen. On his health beginning to decline, he went, in 1425, to Carlsbad for the benefit of the waters, and was returning thence to Copenhagen, when he died at Hamburg, October 3, 1426. After his death, in the same year, appeared his 'Adam and Eve,' a most extraordinary subject for a 'humorous epic,' not less so for being chosen by one who had told the public that there is no relief for the human spirit, which he nevertheless indulged when on the verge of the grave. The warm-heartedness and enthusiasm of his youth must have been exchanged for a very different temper of mind before he could have brought himself even to the contemplation of such tremendous subjects, and his famous 'Philosophia,' his Klopstock must have evaporated altogether. He is said to have left in manuscript a poem of similar and even stronger character, of which Faust was the hero. His correspondence with Reinhold and Jacob, in two volumes 8vo, was published by his sons in 1833; and a complete edition, in twelve volumes, of his 'Danske Verker,' comprising all his Danish poems and other writings in that language, his translation of Holberg's 'Nels Klim' inclusive, was published by his sons and C. A. J. in 1827-32. A well-executed portrait of him is prefixed to it.
Hungarian wars against the Turks. He afterwards served Charles V. in Italy and on the coast of Tunis; and he rose high in the favour of Pope Paul III., who restored to him his paternal estates. Lastly he entered into the service the republic of Venice as a private soldier, in several important situations. He was governor of Famagosta in the island of Cyprus when the Turks besieged the place in 1670. After a long and brave defence he was obliged to capitulate, in August, 1571, on terms of capitulation, which were somewhat severe. But Mustapha Pasha, disregarding the capitulation, caused Baglioli and the other Venetian officers to be beheaded, except Bragadino, who was fayed alive by order of the Pasha. Several of the individuals of the family of Baglioli distinguished themselves in the Italian wars of the fifteenth and sixteenth centuries.

(Crispolti, Perugia Augusto; Sansovino, Della Origine e dei Fatti delle Famiglie Illustri d'Italia; Vernaghioli, Vita et Imago Militari di Malatesta Baglioli, Rome, 1839; Fabretti, Biografia dei Capitani Venturieri dell' Umbria, Montepulciano, 1840.)

BAGSHOT SAND. One of the higher members of the tertiary group of England is thus designated. It has been investigated by Mr. Warburton. (Geol. Trans.)

BAI]. [F. C., vol. iii. p. 287.] The general principles of the Law of Bail remain unchanged. But as, since the statute 1 & 2 Vict. c. 110, § 5, all personal actions are to be commenced within six years, the periods of the peace, important and other situations in which the right of bail may be held in civil causes are now confined to those which are specified in the third section of that statute. It is thereby enacted that if a plaintiff in any action in any of the superior courts of law in Westminster, in which the defendant is sued, is satisfied of the evidence of a judge of one of the said courts that such plaintiff has a cause of action against such defendant or defendants to the amount of 20l. or upwards, or has sustained damage to that amount, and there is probable cause for believing that the defendant or any one or more of the defendants is or are about to quit England, unless he or they be forthwith apprehended, such judge may order the defendant or defendants be held to bail in any sum he may think fit, not exceeding his or their own personal estate, or damage done, or liable to be done, if they may thereafter sue out a writ of capias, and arrest the defendant, or, when so arrested, to remain in custody till he shall have given a bail bond to the sheriff, or shall have made deposit of the sum endorsed on such writ of capias, together with 10l. for the costs, according to the present practice. All subsequent steps of the proceeding are to be conducted according to the present forms. The power given by the statute to a judge, to grant an order to hold bail, is not affected by the sections 7 & 8 Vict. c. 50 (Lord Drougham's Act). With regard to criminal law, the statute 7 Geo. IV. c. 64, has been somewhat altered by the 5 & 6 Will. IV. c. 35, § 3, which, in Rothe's, Montefiore's, and Argyle's cases, if they shall think fit (of whom or one or other shall have signed the warrant of commitment), may admit any person or persons charged with felony, or against whom any warrant of commitment for felony is signed, to bail, in such sums and with such sureties as they shall think fit; notwithstanding such person or persons shall have confessed the matter laid to his or their charge, or notwithstanding such justices shall not think that such charge is groundless, or shall think that the circumstances are such as to raise a presumptive of guilt.

BAILLIE, ROBERT, was born in Glasgow, April 30, 1602. His father, Thomas Baillie, is described as a citizen of Glasgow, and was a younger son of the family of Baillie of Jerviston, a small property near the town of Lanark. Baillie married his cousin, Mary Lanarkhair (not to be confounded, as it has often been, with the family of Baillie of Jerviswood, in the same county, the head of which, in the latter part of the seventeenth century, was the eminent Presbyterian patriot Robert Baillie, who, after a long confinement in prison and suffering, was executed at Edinburgh in 1684). The subject of the present notice was educated first at the grammar-school and afterwards at the university of Glasgow, at which he was entered a student in March, 1618. He entered in 1620, and probably in 1629 or 1634 he entered into holy orders; in August, 1626, he was admitted to the office of one of the masters or regents (as the professors were then styled) of the college; and this situation he held till the year 1631, when he was ordained and consecrated rector of Kilwinning in Ayrshire. At this time Baillie's sentiments on the subject of church government were extremely moderate; his ordination was ecumenical, and he was attached on principle, as well as by education and habit, to that form of polity, which was indeed at this time the established civilisation system in France. Charles I. made his attempt in 1626 and 1637 to impose the tridentine rite upon the French canons upon the Scottish church [Sportwood, John, P. C., p. 379]. Baillie was induced to attend a meeting of the Supplicants, as the opponents of the obnoxious measures called the General Assembly held at Edinburgh in November, 1637, and October, 1637; and this proved the turning point of his life. He was probably far less zealous upon the subject of ceremonies and forms than any other person present; but he had studied the civil controversy, and was adopting antinomian views upon other points which then divided the English church, and, having been prevailed upon to explain the reasons upon which he confessed, although in mild terms, that he disproved of the new service-book, he spoke at some length, and so delighted the clergy and people present with the opinions avowed by Laud and his party, the authors of the book, that he was urged to send the substance of his speech forthwith to the press, and from this time he took his place as one of the chief managers and leaders of the Presbyterian and anti-court party. When he first rose to speak at the Edinburgh meeting, it, he tells us, 'with some piece of blushing, in such an auditory,' the like whereof he had never before addressed; but he adds that he was heard with great applause, and on evening was a famous man all the town.

He still however retained something of his original moderation when he made his appearance, as one of the members for the presbytery of Ayr, at the celebratory assembly held at Glasgow on the 21st of November, 1638; and so much so, that he stood alone in refusing to concur in the vote declaring episcopacy to have been always abjured by the Scottish church: he proposed that it should be declared to be removed now, but never before abjured. The prevailing party however were aware of his value, and he was soon entirely gained over. When arms were taken up, he appeared in the camp at Dunse Low, in the beginning of June, 1639, in qualitity presbyter and assembly of the general in the west; and tells us, as the fashion was, a sword, and a couple of Dutch pistols at his saddle—though he intended, he says, to fight no man unless he should encounter a robber by the way. A pacification was in fact arranged at Berwick (on the 15th of June) before any blood was shed.

In April, 1640, Baillie published what may be considered to have been an extension of his speech at the meeting of Supplicants, in a large quarto pamphlet at Edinburgh, under the title of 'A Reverend Wooster: or, An Evident Demonstration of the aforesaid Arminianism, Popery, and Tyranny of that faction, by their own confessions,' &c. In the following October, when the Scotch had again taken arms, he proceeded, on the invitation of the Earl of Argyll, to Newcastle, taking with him a number of copies of his book; and here he was nominated one of the four clerical commissioners who were deputed, with nine laymen, to proceed to London, under the protection of the great seal, as negotiators to a treaty with the king. He reached London on the 16th of November, and remained there till the beginning of June, 1641, having, during his residence, witnessed the trial of Strafford and other remarkable occurrences, of which his letters contain very detailed and graphic accounts. Some of his letters written during Strafford's trial, he writes, in a somewhat sanguine as well as sanguinary strain, 'When we get his head, then all things will run on smooth.' In June, 1642, Baillie was appointed to one of the joint universitaries of the University of Glasgow; but immediately after this he was again dispatched to England as one of the five clerical commissioners from the General Assembly to the Westminster Assembly of Divines. He reached London on the 10th of October of this year; and in the next three years: he did not leave till the 6th of January, 1645. He was sent back again before the end of March, when, as he was proceeding by sea, the ship was driven towards the coast of Holland, and Baillie and some of his companions endeavoured to run up to the Moray firth—when Baillie an opportunity of spending a few days at Middelbourg and Rotterdam. He remained in London on this his last visit till December, 1646, employing every moment that was not taken up in attending the Assembly, in reading, and in keeping in close and friendly intercourse in Scotland and elsewhere. He now resumed his duties as Professor of Divinity—continuing also, however, to take an
active part in public proceedings. After the execution of the king, he was one of two clergymen sent over to the Hague, in March, 1640, with the commissioners of the Scottish estates (or Parliament) to enter into negotiations with Charles II. Upon this mission he was absent till July, and during that interval he composed and published at Delft an answer to a pamphlet against Presbyterianism by Bishop Brumhall, under the title of 'A Review of Doctor Brumball, late Bishop of London.' In 1641 he was engaged in another Delft writing, 'A Writ to the Dutch Westindies.' When Cromwell advanced upon Glasgow, in October, 1650, after the battle of Dunbar, Baillie fled to the Isle of Cumnay with Lady Montgomery, but left, he tells us, all his family and property in the care of a relative. His courtesy was great; for he took such a course with his soldiers that they did less displeasure at Glasgow, nor [than] if they had been at London, though Mr. Zachary Boyd railed on them all to their very face in the High Church. Under the new government he was engaged in writing a Method of Divinity on the removal of his colleague to a chair at Edinburgh; but he was after this greatly disquieted by the promotion to offices in the University of various persons who went much farther than he was disposed to go in compliance with the times. In church politics Baillie now allied himself with the more moderate party, or those who were called the Resolutioners (that is, the supporters of certain resolutions passed at an Assembly held at Perth, in December, 1650), in opposition to those called the Remonstrants or Protestors. One of his great vexations was the appointment of Patrick Gillespie, one of the leaders of the latter party, as Principal of the university in 1653; but immediately after the Revolution that office was turned over to Mr. Baillie himself. He was now promoted to his office in January, 1661. He did not however long enjoy this preferment, having died about the end of August in the following year. He had been twice married, and had eight children, of whom only one was by his second wife.

Of Baillie's works the most important, besides those already mentioned, are his 'Disuasive from the Errors of the Time,' 4to. Lond. 1645; his 'Anabaptism, the True Fountain of Independency,' Antwerp, 1650; his 'Second Part of the Disuasive,' 4to. Lond. 1647; his 'Appendix Practica ad Joannis Buxtorffii Epitomen Grammaticae Hebraeae,' 8vo. Edin. 1653; and his 'Operis Historiae et Chronologic Liuthri Duci,' folio, Amst. 1653, and Basle, 1669. He also published several sermons and other short books. But all of the produce of his pen by far the most interesting part consists of his Letters, written to various friends, and especially to his relation, the Rev. Mr. William Spang, minister of the church at Edinburgh, who was one of the English congregation at Middelburg in Zeeland, which extend, with considerable interruptions, from 1637 to within a few months of the writer's death, and are to be ranked among the most valuable memorials of that important period of our national history. The letters were written by him mainly to the wife of Mr. Spang, to whom he was married, and to his own family and friends, and the transcript thus formed is now among the records of the Scottish church. Other transcripts, more or less perfect, also exist—the most valuable of which is one, in four vols. 8vo., made for the use of Baillie's family, and now in the possession of the Rev. Thomas M'Curie, of Edinburgh. An edition of them appeared at Edinburgh, in 1775, in 2 vols. 8vo., under the title of 'Letters and Journals written by the deceased Mr. Robert Baillie, Principal of the University of Glasgow; carefully transcribed by Robert Aiken' (supposed to have been schoolmaster at Anderton). This publication is said to have been undertaken on the recommendation of Dr. Robertson and Mr. Hume. It was originally published in 4to. for the Banlatyme Club, and the 8vo. impression, for the Edinburgh Society, afterwards taken off by over-running the lines. It is in all respects a very carefully edited book.

BALLY, FRANCIS, the best friend of astronomy among the English nation, and one of the most distinguished of its promoters, will be biographically known to posterity by a valuable memoir, read by Sir John Herschel to the Astronomical Society, in November, 1844. From this memoir, and the writer's personal knowledge of Mr. Bally, the following account is drawn up.

He was born April 28, 1774, at Newbury in Berkshire; his father was a banker at that place. He had, of course, a liberal education, and is said to have shown an interest in pursuits of physical science at an early age; his attachment to these branches of knowledge was afterwards increased by the circumstance of living in or near London, where his father's business was his own choice, and he accordingly served his time in the city of London. He then changed his views, and after travelling for about two years (1798-90) in the United States and the West Indies, he returned to London, and, in company with his father, he went into business as a stockbroker, being taken into partnership by his father's friend, Mr. Whitmore; this was before 1805, and probably not long after his return from America. He soon began to be known to the public, and became so eminent in his business as afterwards in his scientific pursuits. In 1806 he wrote a pamphlet in defence of the stockbrokers against the city of London, and in 1814, he was appointed by the Committee of the Stock Exchange to get up the evidence against the perpetration of the celebrated fraud of De Berenger (better known in connexion with the name of Lord Cockrange), which he is said to have done in so masterly a manner that no more complete chain of evidence was ever offered to a court of justice. He published two reports on the subject, and another on the distribution of the money stopped.

It is the peculiar part of Mr. Bally's history, that while actively engaged in business, in which he accumulated a large fortune, he spent much of his time in promoting the various objects of his mind. He first published his 'Tables for the purchasing and renewing of Leases' (1802, 1807, 1812, 8vo.); next the 'Doctrine of Interest and Annuities,' (1806, 4to.); then the 'Doctrine of Annuities' (1807, 8vo.), revised with the aid of the 'Appendix to the doctrine of Life Annuities and Assurances' (1813, 8vo.). Also, 'An Account of the several Life Assurance Companies' (1810, 1811, 8vo.), which is an extract from the work on life assurance. The book on leases was very useful; that on interest was accompanied by a reprint of the best tables (those of Smart), and was the most complete exposition of the subject which had been given. The work on life annuities (translated into French by Dr. C. 1818) was much sought after, and was exceedingly useful; it was the first in which a rule was systematically applied in a modern and symmetrical form to the whole of the subject; the first in which tables of greater vitality were allowed to compete with the North-american tables; and the first in which the fundamental principles of the subject (not so complete as the subsequent one of Mr. Milne) was made to represent cases of annuities, &c. by a distinct notation. The appendix arose out of the refusal of the Royal Society to print the book on the local Taxation. The method of calculating annuities proposed by Mr. Barrett. (Revisions, P. C.)

This method, which is now very extensively adopted, and will, beyond a doubt, supersed all others, would probably have been lost if Mr. Bally had not thus preserved and given it to the world; in doing which he made some justly severe remarks on the Society which had thus endangered a capital improvement in commercial mathematics. The whole work used to sell for four and five times its original price when it became a second-hand book. The book is now published nothing but the writings already enumerated, he might still have been cited as a remarkable instance of active and useful exertion during the hours of relaxation from a laborious occupation.

It was Mr. Bally's habit so methodically to commit to writing all he learned, that he made enables him to publish the 'Epitome of Universal History,' 2 vols. 8vo. 1813, a short account of the political changes of the world with dates attached, and valuable chronological tables at the end. He had previously (1812) published a 'Chart of History' with a complete table of dates, and an explanation of the scale of Pierre Charles Belidor, but cannot here minutely describe. In these researches he marked the unsettled date of the eclipse of Thales, and made the calculations and wrote the paper in the Philosophical Transactions of the year 1776. He was also engaged as the first astronomical paper, and previously to his retirement from business he had published in the Philosophical Magazine and
elsewhere a number of small tracts calling attention to dif-
ferent points of astronomical interest as they arose.

The observations as made in 1843, and those afterwards
left his chambers in Grey's Inn for a detached house which
he had bought, No. 37, Tavistock Place, which will always be
remarkable as the building in which the repetition of the
Cavendish experiment was performed. From this time till his
death, he wrote without all of his energy of his character
in the promotion of astronomy. Between the ages of fifty-
one and seventy, when most men in his circumstances
would have been enjoying the leisure to which commercial
men usually look forward, he contrived to make the catalogue
so as to add to his name of a lifetime. We can here only note a few heads, referring
the reader for a full list of his writings, and for further details,
to the memoir already cited.

He was (in 1820) one of the founders of the Astronomical
Society, whose name will always be as much for the promotion of its
science as any one ever did in its first quarter of a century;
and that so much can be said is mainly due to Mr. Baily, whose
attention to its affairs was as constant and minute as if it had been a
firm of which he was the chief clerk, with expectation of
being taken into partnership. 'Of his management of our
society,' says Mr. Sheepeahns, 'it is difficult to speak so as
to convey a correct idea. No assumption, no interference with
other people, no maritain spirit (which seems almost natural to all
men), was ever manifested by him; his memory was perfectly
and correctly, and without bustle. He hit, better than any chair-
man I have ever seen, the mean between strictness and laxity,
and while he kept everything going in its proper channel, he also
had the tact to give to every one who wished to do anything
useful, and his equal readiness to supply every deficiency and
to do the work of everybody else. He was also the person
who never was asleep and never forgot anything, and who
contrived, by his good humour, hospitality, and good sense, to
keep everything in train.'

He was one of those who exerted themselves to produce a
reformation and enlargement of the Nautical Almanac, and
whose efforts did at last prevail upon the government to place
it upon its present distinguished footing.

In pendulum experiments [Pendulum, P. C.] he was among the foremost of those who investigated the newly
observed effects of the air upon the instrument. When the
expedition which set out under Captain Foster returned with
the loss of its able commander, Mr. Baily reduced and digested his
observations, which take up the whole of the seventh volume of the Astronomical Society's Memoirs.

He superintended the formation of the same society's standard
scale, and wrote a full and valuable account (Ann. Astron.
Soc. vol. i.) of the history and present state of the subject,
with a catalogue, intended, to be transformed, on the
occasion of a committee-room of the House of Commons, the government
scale, of which that of the society is a copy, being under the
charge of the Speaker. As it happened, Mr. Baily's unac-
maining habit of writing the last and revision of this,
this copy; had the work lasted a few months more, as it
would have done in most hands, the copy would have been
destroyed with the original in the fire at the Houses of Par-
lament in 1834.

Of the repetition of the Cavendish experiment we have spoken elsewhere. [Weight of the Earth, P. C.] Had
that article not been written during his lifetime, we should have
said much more on the determined honesty with which the experiments were conducted and the cause of the observed
divergence of electricity detected. A very large number of hours
which have every reason to suppose undetected when it is
called twelve hundred, was spent in the mere act of watching the
movements of the torsion pendulum. The account of this
experiment forms volume xiv. of the Memoirs of the Astrono-
mical Society.

The Astronomical Society's catalogue of stars was the sug-
gestion of Mr. Baily and Mr. Gompertz, and was superin-
tended by the latter. Old star lists had been granted consent as to the method of reducing the stars. Sir
John Herschel says that this catalogue 'put the astronomical
world in possession of a power which may be said without
exaggeration to have changed the face of sidereal
astronomy.'

Of the remarkable circumstances attending the publication of
Mr. Baily's Life of Flamsteed (4to, 1835, with supplement in
1837) we have spoken elsewhere. [Flamsteed, P. C.]

To this work was annexed a new edition of Flamsteed's
catalogue, with such a complete examination of the original
material as has never been attempted. Mr. Baily, who knew Mr. Baily well can have any idea of the confidence
with which such an examination made by him is to be treated.
He had already revised Mayer's and Lacaille's catalogues in the
Astronomical Society's memoirs, volumes iv. and v.

Mr. Baily put the new work to hand in his catalogue in the 13th volume of the Memoirs of the Astronomical
Society, which is entirely his own work, and printed at his
own expense. It is the third complete volume (individually
published) of Flamsteed's catalogue, and is associated with about fifteen memoirs inserted in other volumes, almost
all the annual reports, and various addresses, notices, &c.
It contains a new edition of Ptolemy's catalogue in Greek, with
those of Ulugh Beigh, Tycho Brahe, Halley, and Hevelius.
Mr. Baily was not a professor scholar, but he had quite know-
ledge enough to do for Ptolemy more than any other scholar
could have done. An astronomer might have restored Ptolemy's
catalogue to what it ought to have been; a scholar might
have made a judicious collation of existing editions: but
the former alone would in many cases have undeniably
sacrificed the probable text to astronomical correctness; and
the latter would have let pass many instances in which a
correct text can be divested of astronomical impossibility and
restored, and perhaps probability, to what is now a mere
requisite, and experience, combined with methodical habit,
had given him extraordinary resources. It will be long, we
suspect, before the old catalogues can be properly cited from
any other writer.

He suggested to the British Association the republication of the immense catalogue of Lalande, called the Histoire
Celeste, combined with that of Lacaille; the two together
containing fifty-seven thousand stars. He suggested to the
same body the extension of the Astronomical Society's cata-
logue to ten thousand stars, accompanied by the coefficients
of reduction. He superintended the construction of these tables
and a portion of the printing, and he left the-preface to the
latter completely written. He had also undertaken the con-
struction of the new standard scale, wanted by the govern-
ment in consequence of the destruction of the old one.

This is a brief account of Mr. Baily's principal works; we
cannot enter upon one of the ninety heads under which all his writings, great and small, are given in the Memoir
cited.

In June, 1841, while crossing Wellington Street, a man
riding furiously to carry the news of some public event to an
evening paper, threw him down, and he received a severe
wound in the head. After lying for more than a fortnight in
the greatest danger, he slowly recovered, and began to apply
himself to the Cavendish experiment as usual. In the spring
of 1844 an affection of the kidneys came on (not, it is sup-
posed, of any duration), and he died on the 26th of August, 1844.
His last public appearance was at Oxford, on the 2nd of July, to
which place he went with some difficulty to receive the honorary degree of Doctor of Civil Law. He
was never married.

'To term Mr. Baily,' says Sir John Herschel, 'a man of
brilliant genius or great invention, would in effect be doing
him wrong. His talents were great, but rather solid and
sober than brilliant, and such as seized their subject rather than
with a tenacious grasp than with a sudden pounce.'

This sentence, read as it was to an assembly which had had long
experience of the qualities of his subject, was better under-
stood than it can be by those who were not acquainted with
him. He was in fact the reverse of that; a man who
knew not, and it is not easy to give a precise description
of that which distinguished him from other men. Again, his
biographer describes him as possessing 'a calm the reverse of
apathy, a moderation having nothing in common with indif-
ference, a method diametrically opposed to the rude
natural test.' This sentence will look as if it had been written for the sake of the points;
and yet there is an absolute truth about it which would have been sacrificed if it had simply been said that Mr.
Baily was calm, and that he spent his life in a monastic
mire which we have cited had been read, it being, his readers, well
as they thought they had known their deceased president, were
astonished to find how much they had underestimated the
enormous amount and collective value of his labours, until the mass
was placed before them; they could not do much for the items, but
had never rightly formed the sum total.

Mr. Baily's knowledge of his subject was great, and he
never began to carry a plan into execution until he had sedu-

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lovely examined his own views and those of others. His judgment was sound, and he really exercised it; he was one of the few men who ask advice to get the means of coming to a decision. But there was in his habits of execution something very methodical; we seem right to say that in this respect he was a genius of an uncommon order. Many persons thought he learnt this power in business; we are perfectly satisfied that he carried it to the Stock Exchange, and would have had it whatever walk of life he might have been through. Even when he was in research, as that required by his Life of Flamel, he was never to be found at a table loaded with materials for reference. To have painted his portrait as literary men are sometimes represented, near a mass of folios and manuscripts, would have spoiled the likeness: there should have been a pen, a paper, a book. When engaged in discussion with his astronomical friends in his own house, which generally required the production of some fresh volume every ten minutes, the books fell into their places again almost of their own accord, and without any apparent interruption of the conversation. These little things were perfect emblems of the manner in which he arranged his studies: his mind was as ready for use as his bookcase. He was not distinguished, as far as we ever knew, for having a great variety of occupation, seldom worked in an evening, and he was very much in society. Nevertheless his share of any work was always done before that of any one else. But with all this manner of proceeding that any able and required counsel, there was a suspension of operations without effort; and he could repeat the subject again and again, in private thought and discussion with his friends, from week to week and from month to month, as if he had been one of those slow and deliberative spirits who never do anything, but because they can never make up their minds precisely how it is to be done. In our opinion this was the greatest secret of his reputation: namely, that he could at pleasure, as occasion required, execute his judgment, or deliberate much and more certainly. It is no exaggeration to say that he did, in the last twenty years of his life, much more and better work than younger men of much greater original power have done in twice the time. And besides this, the admirable personal qualities to which we have already alluded, and which made it so easy to cooperate with him, led to his being able to make others do more than they could have done without him. His high moral worth added to his power; and all these together made him the greatest historian and father of the natural world. He had, we suspect, a strong love of fame, though perfectly free from vanity; but the same judgment which marked his selection of other things appeared in his choice of means to secure a lasting reputation. That he has won it is certain: the history or the natural world is complete without an account of his labours. Those who are well acquainted with Delambre's history of the science will easily imagine how much that severe judge would have abased of his vigour, had the same tone been his habit. The models of his thought, all but impeccable accuracy, careful research, and well-chosen objects, as the writings of Francis Baily.

BALA LIMESTONE, one of the most interesting of the carbonaceous deposits which have been examined by Professor Sedgwick in the midst of the older sandstone rocks of North Wales. There are two bands of this rock, exhibited on the west of the Berwyn mountains and on the east of Bala Lake. Two miles north-east of Bala, the limestone, and the schistose rock, are so nearly alike that they may be well said to have the same appearance: they are both of the same age, and must have been formed at the same time, in the midst of the same sea. They are both of the thickness of six miles. The upper of these two bands is the best known, as being the most accessible. It is quarried for lime, and is in many places still covered by a ロウ下部に石炭層の発見がある。これらの層は、灣と湖の東で、再び湾の東で見られ、これらは同じ時代に形成され、同様の海の中で形成されたと考えられる。それらの厚さには、6マイルの違いがある。上の二層は最もよく知られ、石灰の採取場所であり、一部はまだ被覆されている。上部の石灰岩帯は、湾の西や湖の東で見られる。二マイル北東のBalaでは、石灰岩とその隣接する石灰岩の層は、同じように見え、これらが同じ時代に形成され、同様の海の中で形成されたと考えられる。それらの厚さには、6マイルの違いがある。上の二層は最もよく知られ、石灰の採取場所であり、一部はまだ被覆されている。
Rigaud. It forms the frontispiece to the 'Recueil d'Estampes après les plus célèbres Tableaux de la Galerie de Dresden.' It was done in 1755, but the subject is a modern one. A number of characters were painted on canvas, he retained some of the impressions, and even damaged the plate before he sent it to the king, at whose expense it was engraved. His right of election to be a member of the French Academy of Painting, of which he was Aigré, equivalent to our Royal Academy, was forfeited in consequence, and he retired to Avignon, where he died in 1704.

(Heineken, Dictionnaire des Artistes, &c.; Wattelet et Levesque, Dictionnaire des Arts, &c.; Huber, Manuel des Artistes d'Académie.

BALLEN, HENDRICK VAN, a distinguished Flemish historical painter, and the first master of Vandyck and Snider. He was born at Antwerp in 1590. He went early to Rome to study his profession, having acquired the rudiments from Anan van Oort.

He was an excellent colourist, a good draughtsman, and painted with great facility. Of his works, which are numerous, one of the best is St. John in the Wilderness, an altarpiece in one of the chapels of the Cathedral of Antwerp; the background is by Velwert Breugel, who painted the landscape backgrounds of many of Van Balen's pictures. He died in 1632, and was buried in the church of St. Jacques at Antwerp. Vandyck painted his portrait; and it has been engraved by Van Helmont. The painter Jan Van Balen was the son of Hendrik. (Van Mander, Luver de Skilderen; Descamps, La Vie des Peintres Flamands, &c.; Heineken, Dictionnaire des Artistes, &c.)

BALISTA, ANTONIO, a distinguished painter of Verona, where he was born in 1666. He was brought up as a merchant, but before his 21st year he was studying as a painter under Bellucci at Venice. He afterwards studied under Maratta at Rome, and he eventually painted much more in the style of the Roman than of the Venetian. He however combined the chief beauties of Venetian colour with the characteristic correctness and solidity of design of the Roman school.

He is one of the most able painters of his time, and instructed at Venice a numerous school, in which were educated several very distinguished painters, as Giambattista Mariotti, Giuseppe Nogari, and Pietro Longhi. Lanzi mentions particularly, by Valesio, a Nativity, and a Deposition from the Cross, at Venice; a Santa Chiara at Padua; and a San Vincenzo, at the Dominicans, in Verona. He died in 1734, according to Guarienti, but in 1740, according to Zanetti and Oretti. Heineken mentions many prints after the works of this artist, which is equal in merit with those of himself. (Zanetti, Della Pittura Veronese; Lanti, Storia Pittorica, &c.; Heineken, Dictionnaire des Artistes, &c.)

BALISTICOCHUS. A fossil plant in the laminated lithographic limestone of Pappenheim, is named Balistochus, from the Greek 'balistos,' to throw.

BANA'NA. [Musa, P. C.]

BANDANAS, or BANDANNAS, a term originally applied to a peculiar kind of silk handkerchief made by the Hindoos, is the name now commonly given to silk and cotton handkerchiefs manufactured in this country, and decorated with patterns of similar character, though by a very different process. The distinguishing peculiarity of a handana handkerchief is that it has a uniformly dyed ground, usually of bright red or blue, ornamented with circular, lozenge-shaped, or other simple figures, either perfectly white, or in some cases of a yellow colour. These spots are said to be produced, in real Indian bandanas, by tying up the parts intended to be different colours, and then媒染ing the handkerchief to the action of the dye, and thus protecting them from it. Such as this process appears, British manufacturers were, owing to the difficulty of imparting a sufficiently durable ground-colour by the ordinary process of calico-printing in India, unable to imitate it. The following process, until a plan was contrived for dyeing the whole surface, and afterwards discharging the colour from the spots forming the pattern by the agency of chlorine; a plan which, according to the account in the 'Dyle' referred to below, was invented by M. Koechlin, of Mülheim, in 1802, has been carried into effect on a large scale at the Barrowfield Dye-works near Glasgow, by Messrs. Monteith and Co., with a degree of perfection far exceeding the original oriental bandana.

The object of this notice being simply to describe the peculiar method of discharging the colour from the spots, it

is unnecessary to detail the processes by which a uniform colour is imparted to the whole surface of the cloth, on both sides. A number of the half-workings, when they are taken to an apartment containing a range of powerful hydrochloric acid and discharging-presses, each of which has a roller at the back, to receive the cloth to be operated upon, and another in front, to receive it after the pattern has been discharged; the intermediate roller being raised to a height of two feet above the press, which is about a yard square, or equal in size to a single handkerchief. This bed-plate is formed of lead, perfectly smooth and even, and is perforated with holes corresponding with the white spots of the desired pattern; and a similar perforated bed of zinc or copper is fixed at a short distance above it. Fourteen pieces of dyed cloth being laid carefully upon one another, are rolled together upon the back roller of the press, and acted upon simultaneously; and, when discharging and washing are completed, the cloth is worked through the press, the cloth being sometimes facilitated by a powerful current of air. The extreme tightness with which the dyed cloth is compressed prevents the action of the bleaching-liquid from extending beyond the perforations; and as mechanical contrivances have been applied to the discharge of the perforations in the two leaden plates, the pattern produced by them is very accurately transferred to the cloth. After allowing a few minutes for the action of the bleaching-liquid, it is drawn off, the pressure is removed, and the portion of both which has been operated upon is placed on the front roller, a second portion being, by this operation, drawn forward upon the bed-plate, for a repetition of the process. By means which will be readily understood by those conversant with dyeing, the portions of the cloth, each with a perforation of fifteen into action, so that one discharger, with his assistants, can keep the whole in constant operation. The whole routine of operations occupies about ten minutes, so that the sixteen presses (each producing fourteen handkerchiefs at each operation) will discharge 2,564 handkerchiefs at each hour. After working, the whole being completed within the short space of time mentioned above, and, by the aid of powerful and ingenious machinery, requiring only the labour of four men to effect the various necessary changes and adjustments. A much fuller account of this process, with the details of the discharging press, is given in Dr. Urns Dictionnaire des Arts, art. 'Bandanna,' and a minute though popular description of the whole manufacture in Dods's Textile Manufactures of Great Britain, pp. 78-93, and the Penny Magazine, vol. xxii. pp. 591-593.

BANDON, River. [Cork, P. C.]

BANDON, or BANDON-BRIDGE, an Irish corporate, market, and post town, partly in the parish of Kilbrogan in the barony of Killmealy; and chiefly in the barony of Kilmore and East Carberry (East Division); all in the county of Cork: 20 miles south-west of Cork, and 146 south-west of Dublin. The town is situated on the main road of the 15,638 statute acres, with a population in 1841 of 14,702.

The town was founded by the English settlers on the forfeited estates of the Earl of Desmond, in the reign of Elizabeth, and takes its name from a bridge over the river Bandon, which flows through the parish of Kilbrogan into the still-name, the county of James I. or Charles I., a colony of Protestants from Bristol; and as the town was walled, it became, in the great civil war of 1641, the chief place of refuge for the Protestants of the neighbourhood, and several conflicts took place between the townsman and rebels and the revolted
Irish. On Cromwell’s approach, the inhabitants declared for the Parliament. In 1688 they expelled the garrison placed here by James II., but were obliged soon after to submit to a detachment of his army. At this time the walls were razed, and have never been rebuilt.

The area is more comprehended in the boundaries of the parliamentary borough, as determined by the Irish Boundary Act (2 & 3 Will. IV. c. 89), and consists of several streets on both sides the river Bandon, which has a course nearly due east, and over which there is a bridge. The streets are indifferently paved, and on every side the area of the parliamentary borough is 447 statute acres; it contained, in 1841, 1256 houses, namely, 1180 inhabited, 74 uninhabited, and 2 building; with a population of 1760 families, or 7791 persons; of which 730 were stated in 1807 families, or 9917 persons; the number of houses was 1650, namely, 1456 inhabited, 137 uninhabited, and 7 building.

As the present parliamentary limits embrace a larger portion of the town than those of 1831, the number both of houses and inhabitants must have materially decreased in the ten years 1831-41. Of the inhabited houses in 1841, 168 were of superior character; 665 smaller, of from five to nine rooms, but substantial; 274 were mud cottages of more than one story; and 373 were rooms of one story only. Of the houses of Ballymodan and Killaroben are both in the town; the latter on the north, the former on the south side of the river. There are a spacious Roman Catholic chapel, and a nunnery of the Order of the Presentation, with a conventual church; a Presbyterian meeting-house; a Freshfield Meeting-house, in connexion with the synod of Munster, and places of worship for the Primitive and Wesleyan Methodists.

Bandon was incorporated by charter of 11 James I. (a.d. 1614). The corporation, before its abolition by the Irish Municipal Reform Act (3 & 4 Vict. c. 108), consisted of a provost, 12 burgesses, and an unlimited number of freemen. The borough returned two members to the Irish Parliament; but by the Municipal Reform Act the right of election was limited to the mayor and burgesses. The boundary of the borough was enlarged by the Irish Boundary Act. The constituency in 1855-6 was 367; in 1840 it was 460, showing an increase in the interval of the only 33 persons.

The living of Ballymodan is a vicarage, of the yearly value of 414l. gross, or 367l. clear; that of Killaroben is a rectory and vicarage, of the yearly value of 719l. gross, or 650l. clear; both are in the diocese of Cork. There were in the two parishes, in 1854, 17 day-schools with 1555 children on the books, namely, 564 boys and 791 girls. Of these schools one was a classical school founded by the Earl of Burlington, and partly supported by a grant from the Duke of Devonshire; and in the other three, of very small number, not supported by endowment or subscription. One, of 350 to 400 girls, was taught by the nuns of the order of the Presentation. Three schools, for boys, girls, and infants respectively, were taught by the Duke of Devonshire, and supported by the Duke of Devonshire and schools for boys, girls, and infants were supported by the Wesleyans. Beside the day-schools there were, in two parishes, three Sunday-schools with 667 children.

Bankruptcy. Within the last twenty years (since 1836) there have been three important acts passed relating to the law and administration of bankruptcy—first the general Bankruptcy Act (5 & 6 Will. IV. c. 16), which consolidated, and simplified the law; secondly, the act 1 & 2 Will. VI. c. 56, which constituted the Court of Review and a local Court of Bankruptcy for London; and thirdly, the act 5 & 6 Vict. c. 123, which made some alterations in the law and also established county courts of bankruptcy. The last act has been passed since the article BANKRUPTCY, P.C., was written, and came into operation on the 11th of November, 1842.

By 5 & 6 Wm. IV. c. 29, the judges of the Court of Review were reduced from four to three; and by 5 & 6 Vict. c. 123, the court is formed of one judge (§ 64). One of the new vice-chancellors is now chief judge of the Court of Bankruptcy.

Before the passing of 5 & 6 Vict. c. 123, the mode of working bankruptcies in the country was as follows:—One hundred and forty separate lists of commissioners (each list containing the names of two barristers and three attorneys) were appointed by the Lord Chancellor, on the nomination of the judges, to act in one hundred and thirty-two different cities and towns throughout England and Wales (exclusive of London); and flats in bankruptcy were directed to the commission of the judges of the Court of Bankruptcy for that district.

Under 5 & 6 Vict. c. 122, the Privy Council is empowered to select towns for the establishment of district courts of bankruptcy, and to fix or alter the extent of their jurisdiction. The act limits the number of commissioners of district courts to twelve, who must be serjeants, or barristers of seven years' standing, and each of them is competent to exercise the jurisdiction of the court. Their salary is 2000l. a year. The number of commissioners appointed for each court is fixed by the Court of Bankruptcy, and is limited to one (with a sub-deputy), with two registrars, and from two to four official assignees. The district courts are auxiliary to each other for proof of debts and examination of witnesses. Fees are accommodated for to the chief registrar of the Court of Bankruptcy in London.

The district courts of bankruptcy already established are at Birmingham, Bristol, Exeter, Leeds, Liverpool, Manchester, and Newcastle. The district assigned to each court varies from the smallest to the largest county borough. The Court of Bankruptcy has an extensive local jurisdiction, and includes a city of so much importance and so far distant as Norwich. The affairs of a bankrupt who has carried on business in the southern part of the county of Nottingham are administered at the bankruptcy tribunal at Birmingham; but if the trader has resided in the northern part of the county, the flat is worked at the Leeds court. It is alleged that the present mode of administration occasioned loss of time and great expense to the estate, and the distance of the district courts, and some other objections are made, which may be removed without much difficulty. Thus the practice of the Leeds court might be made general. The Leeds commissioners, 'with a view to avoid the heavy charges of the petitioning creditor, solicitor, and others travelling a distance of from forty to seventy miles, and for their loss of time, have determined to receive the proofs of the petitioning creditor's debt, &c. upon deposittes made out of court, and have called upon the other commissioners to follow the example.' Before the district courts are established, a registrar of bankrupts, and has directed the messengers, instead of themselves travelling to secure the effects of the bankrupts, to employ deputies in the nearest towns. If the district courts are proved to be a better tribunal in bankruptcy than the old law, it is proposed to reorganize the commission of bankruptcies so as to divide the country into smaller jurisdictions. A court at Sheffield, for example, would be a great advantage to that town, and would bring Nottingham one-half nearer to a court than it is at present; and although the present number of seven or even a dozen courts might not be locally so convenient as the former large number of one hundred and thirty jurisdictions, it must be recollected that railways have diminished three- or more the distance in flats of bankruptcy in every place, and in some places the number of miles has become equal only to sixteen. Sufficient experience has scarcely yet been obtained of the advantages or disadvantages of the plan of district courts. The only official return which has been made is of the number of petitions received when the new courts had been only established about a year. It purports to show the amount of solicitors' and messengers' bills, up to the choice of assignees, in the first twenty flats removed into the district courts, and of the first twenty registers in each court.

This return, an abstract of which is subjoined, is not so complete as could be wished:

<table>
<thead>
<tr>
<th>Flats transferred.</th>
<th>New Flats</th>
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<tbody>
<tr>
<td>Leeds Court</td>
<td>272</td>
</tr>
<tr>
<td>Bristol</td>
<td>41</td>
</tr>
<tr>
<td>Newcastle</td>
<td>85</td>
</tr>
<tr>
<td>Exeter</td>
<td>98</td>
</tr>
</tbody>
</table>

In the return from the other three courts the solicitors' and in one or two instances the messengers' costs are stated:
The Bankruptcy Act, c. 122, &c., 1843, has added to the list of persons who may be declared bankrupts, such as -Liverty-stable-keepers, coach-proprietors, carriers, shipowners, auctioneers, apothecaries, market-gardeners, cow-keepers, brick-makers, slum-owners, lime-burners, and william-pit-manufacturers. 

The Bankruptcy Act of 16 Geo. IV., c. 16, [Bankrupt, P. C., p. 991] must be satisfied with the relief that they can obtain as insolvent debtors. By 7 & 8 Vict. c. 70, a person not being a trader within the meaning of the Bankruptcy Acts may present a petition to the Court of Bankruptcy, and on compliance with the terms of the act may effect a composition of his debts and debts protection from arrest; and by 7 & 8 Vict. c. 96, a trader who owes less than 300l. may obtain a similar advantage. By the same act, the court may order the executor, administrator, or assignee of the bankrupt to be examined as to the assets of the bankrupt, and the number of creditors who have proved debts above 20s., or after six calendar months from the last examination of the bankrupt, either by three-fifths in number and value of such creditors, or by nine-tenths in number of such creditors. But the recent statute of 5 & 6 Vict. c. 126, dispenses with the previous signatures of the creditors, and the court, which is authorized to exclude any person as a bankrupt, may order any person to be a discharge from the court, but the judge will judge for itself of the validity of such objections as are made, and either find the bankrupt entitled thereto and allow the same, or refuse or suspend it, or its terms. Such a certificate must be afterwards confirmed by the Court of Review, against which confirmation any of the creditors may be heard before the court. Gambling or misconduct on the part of the insolvent or concealment of property, fraudulent entries in his books, being privy to the proof of false debts, &c., disentitle a bankrupt to his certificate under the act 5 & 6 Vict. c. 122, much in the same way that it did under previous acts.

The salaries of the judge, commissioners, and other officers of the Court of Bankruptcy, amounted, in the year ending 1st of January, 1844, to 45,832l.; and 12,396l. were paid to the same officers in the year 1843. The court is empowered to order retiring annuities of 1500l. a-year to the judge, and of 1200l. to the commissioners; and also retiring annuities of different amounts to the accountant in bankruptcy, registrar, &c. The sums paid out of the fund entitled the 'secretary of bankrupts' account.'

The number of bankruptcies gazetted in England and Wales in 1842 was 1273, in 1843, and 1064 in 1844. About one-half of this number occurred in the metropolis and in Lancashire and the West Riding of Yorkshire.

The main features of distinction from the immediately previous act (54 Geo. III. c. 137) are these:—It enlarges the class of persons who may be subjected to the process; instead of being a process of which every step must be taken in the supreme court, the Bankruptcy Law Court is vested with original jurisdiction in bankruptcy, and the taking the process out of court require the sanction of the supreme judiciary. Sequestration reduces the interest of
which will qualify a creditor to sue for the application of the act and abbreviates the proceedings.

The claim of persons coming within the 2 & 3 Vict. c. 41, are enumerated as any debtor who is or has been a merchant, trader, manufacturer, banker, broker, warehouseman, warfinger, underwriter, artificer, workman, packer, builder, carpenter, wharf, inn-keeper, hotel-keeper, stable-keeper, coach-contractor, cattle-dealer, grain-dealer, coal-dealer, fish-dealer, lime-burner, printer, dyer, bleacher, fuller, calenderer, and generally any debtor who seeks or has sought his living or a maintaining himself, or any partner with another, or as agent or factor for others, by using the trade of merchandise, by way of hargains, exchange, barter, commission, or consignment, or by buying and selling, or by having and letting for hire, or by the ownership or control of any part of the business indicated above, (§ 5) unless the debtor consent to the sequestration, he must have been bankrupt, or must have been sixty days in sanctuary within the space of a year, and must have transacted business in Scotland, and must within the preceding year have resided or had a dwelling-house in Scotland. The estates of a deceased debtor may under certain restrictions be sequestrated though he was not bankrupt, and did not come within the above classification. The debt of the petitioning creditor must be 50l.; if two partners, 100l.; if three partners, 150l.; if four partners, 200l.


The Irish law of bankruptcy has been gradually assimilated to the English law by several recent acts (6 & 7 Will. IV. c. 14; amended by 1 Vict. c. 48, and 2 & 3 Vict. c. 86). There is no separate court of bankruptcy; but there are two commissioners who are empowered to act by a commission under the Great Seal. There are no official assignees with gold bullion, but under the 3 & 4 Vict. c. 84, an English Act, one-half of the amount of the notes of any private bank, limited to 2,500l. in debt, may be delivered to a commissioner of bankrupts.

In 1841 an act was passed by Congress to establish a uniform system of bankruptcy throughout the United States of North America. The act came into operation in 1842.

In June, 1853, the French law of 1850 on bankruptcy and insolvency was adopted, and an entirely new law was promulgated, which now forms Book III. of the Code de Commerce (Des Faillites et Banqueroutes).

BANKS. The object of this notice is to show the regulation and discipline which banking institutions in this country are now placed.

Bank of England.—The act 7 & 8 Vict. c. 32, passed 18th July, 1844, provides for the complete separation of the ordinary banking business by the establishment of a distinct department of the bank, called the 'Issue Department,' the sole business of which consists in the issuing of notes under regulations contained in the act. The directors were required, on the 31st of August, 1844, to place the credit of the Issue Department, consisting of 14,000,000l., in the form of the debt owing by the public to the bank, and 2,984,900l. of Exchequer Bills and other government securities; and also so much of the bullion and coin as is not required in the banking department. The amount of securities thus placed exceeds, however, the amount of the Issue Department, with one exception. The bullion consists of gold and silver bullion (the silver not exceeding one-fourth of the gold), constitute the basis for regulating the issue of notes. For example, in the week when this plan came into operation, the amount of notes in circulation were 28,251,025l., and the amount of securities and coin and bullion which the bank held was the same, consisting of the debt due to the bank by the government, 11,015,100l.; other securities 2,984,900l., making 14,000,000l.; gold coin and bullion 12,657,208l., and silver 5,999,500l. — the total amount of the securities may be diminished, but cannot be increased beyond the sum of 14,000,000l., except in a specified case, which will be presently noticed. The expansion or contraction of the note circulation depends therefore upon fluctuations in the stock of coin and bullion. Persons may demand notes of the Issue Department in exchange for gold bullion at the rate of 34. 17s. 6d. an ounce, but the cost of melting and assaying is at their expense. As bullion continues to be coined, a new set of notes is issued, and as bullion is withdrawn, the amount of notes is diminished. The amount of bullion will cause a contraction in the issue of notes. Thus the principle of convertibility is effectually applied to the circulation of the bank by rendering its issues dependent on the supply of the precious metals. The Issuing Department is not to be considered as having a monopoly of the right of coinage. The issue of notes is increased except in exchange for gold, without the express consent of three members of the ministry (the First Lord of the Treasury, the Chancellor of the Exchequer, and the Master of the Mint;), and the profits on the circulation of the bank beyond the sum of 14,000,000l. is issued on its own securities, are to be enjoyed by the public. The securities may also be increased beyond the sum of 14,000,000l. when any bank ceases to issue notes, and the Bank of England may then be authorised by Act of Parliament to assume the liabilities of the discontinuous bank, up to the sum of two-thirds of the sum to which the bank which ceases to issue was limited. On the 4th of January, 1845, nine country banks had ceased to avail themselves of the privilege of issue. Their aggregate circulation was 190,493l., a return, of which a copy in public in course of the next session, is required to be made weekly by the Bank to the Commissioners of Stamps for publication in the London Gazette.

By the act of 1844 a further claim has been made upon the bank by the public. The provisions of the 3 & 4 Vict. Wm. IV. c. 98) provided for the reduction of 190,000l. as the cost of managing the unfunded debt, but by the last act the sum of 180,000l. is in future to be deducted. The privileges of the bank may be abrogated or modified on giving twelve months' notice, after the 1st of August, 1855.

Private Banks.—Besides the enactments which relate to the Bank of England, the 7 & 8 Vict. c. 98, contains very important provisions for regulating other banks and their issues. No new bank of issue can henceforth be established in England, or in any part of the United Kingdom, if the said bank have issued notes who were issuers on the 6th of May, 1844; and should cease to issue, they cannot resume this branch of banking business. The privilege of issuing notes also if a bank which was issuing notes on the 5th of May, 1844; be in the hands of their present partners, will be debarred to be in the firm in above six. The issues of each bank are limited to its average circulation for twelve weeks preceding April 27, 1844; and after the 10th of October following, the amount of issues on an average of four weeks was not to exceed the average monthly balance of the bank's issues. All banks of issue are required to make a return to the Commissioners of Stamps for publication in the London Gazette, of the amount of their notes in circulation on every day during the week, and of the average of the week. A like average for every period of four weeks is returned monthly; and the average monthly balance of all the weeks, during which private from joint-stock banks, are also published in the London Gazette. The penalty for making a false return of issues is 100l.; and, with the consent of the 'Treasury, the Commissioners of Stamps may inspect bankers' books, under a penalty for refusal of 100l. By 3 & 4 Vict. c. 84, the return of circulation were only required quarterly; by 4 & 5 Vict. c. 50, monthly; and by 7 & 8 Vict. c. 98, they are to be made weekly; and an annual return is to be published of the weekly returns of each bank for the 11th April, for the year.

Joint-Stock Banks.—All banks which have more than six partners are termed joint-stock banks, and their establishment was first permitted by 7 Geo. IV. c. 46, passed in 1826; but they were not allowed to issue notes in London or within thirty miles of the metropolis, or on foreign exchange, or to make bills for any less period than six months. Beyond these limits joint-stock banks might issue their own notes, and in all essential points they were on the same footing as private banks. Joint-stock banks increased so rapidly, that in January, 1839, there were established in England and Wales 108 banks, with 648 branches, and 32,142 partners, and a large number of private banks were thrown open to a joint-stock proprietary. Through the fault of the legislature not providing for the regulation of joint-stock banks, a very high proportion of these banks were conducted with a reckless disregard to sound principles of banking, which not only involved the shareholders in ruin, but were injurious to the general interests of the country. In 1838 a select committee of the House of Commons reported on the defects of joint-stock banks. The law did not require a revision of the deed of settlement by any competent authority, and was not sufficiently stringent to secure the registration at the stamp-office of such deeds of settlement. The amount of the capital raised by joint-stock banks, or the amount of the townships, were responsible to the public. The amount of nominal capital varied in different banks from 100,000l. to 5,000,000l., and in one case an unlimited power was reserved of issuing shares to any extent, while at the same time any dividend was to be paid with the capital. Shares were frequently sold at a discount of 95 to 100l., and in some cases the amount of shares was subscribed for all. No rule was enforced with respect to the nominal amount of shares, which varied from 5s. to 1000l., nor with respect to the amount of paid-up capital.


England and Ireland. Persons whose names are in the memorial last delivered, are themselves or their representatives liable to legal proceedings, as existing shareholders. When joint-stock banks were first established, each shareholder was answerable to the whole extent of the property. By 1 Vict. c. 73, they were rendered liable only to the extent of their shares, but the liability did not extend to the shareholders as a body. By 7 & 8 Vict. c. 113, the liability of any shareholder extends equally to the whole body of shareholders as a company; but if execution upon any judgment against the company shall be ineffectual to obtain satisfaction, then any shareholder may be proceeded against. The acts of an individual partner were formerly binding on all the other shareholders, but it is only the acts of an individual director or other officer properly appointed which are now binding on the co-partnership.

The charter of the Bank of Ireland, which would have expired on the 1st of Jan., 1838, was renewed, but it may be withdrawn on twelve months’ notice after 1st August, 1845. The monopoly is far stricter than that of the Bank of England. No joint-stock bank can issue notes, or draw or accept bills, within sixty-three statute miles of Dublin, and beyond these limits they can neither draw nor accept bills for a less sum than 50L, nor for any sum upon demand. The district within 63 miles of Dublin contains a population of 1,500,000, and the Bank of Ireland has here only established six branches, while in the various towns of Ireland beyond the 63 miles limit there are above one hundred branches of joint-stock banks. The Bank of Ireland has altogether twenty-four branches.

In Scotland there are no joint-stock banks, but banking is enjoyed by any particular establishment, but both in Scotland and Ireland the currency of bank-notes under 5l. is allowed by law, and it is interference with this peculiarity of their banking systems that is most feared, especially in Scotland.

**Statistics of Banks and Banking**

1. The Bank of England made quarterly returns of its circulation, deposits, securities, and stock of bullion, to the end of 1842; after which these returns were made monthly, until August, 1844, when a return in the form given below began to be made weekly.

An account, pursuant to the Act 7th & 8th Vict., cap. 92, for the week ending on Saturday the 25th day of Jan., 1845:

**BAN**

<table>
<thead>
<tr>
<th>Notes issued</th>
<th>£28,128,310</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government debt</td>
<td>£11,015,100</td>
</tr>
<tr>
<td>Other securities</td>
<td>2,004,900</td>
</tr>
<tr>
<td>Gold coin &amp; bullion</td>
<td>12,463,197</td>
</tr>
<tr>
<td>Silver bullion</td>
<td>1,665,113</td>
</tr>
</tbody>
</table>

**BAN**

| Proprietors' capital | £14,550,000 |
| Barter | 3,200,000 |
| Public Deposit & including Exchequer Deposits | | |
| Bankers, Commissioners of National Debt & Dividend Accounts | 2,787,953 |
| Other deposits | 8,714,052 |
| Other bills | 1,058,727 |

**BAN**

| £30,325,729 |

The number of joint-stock banks in the United Kingdom on the 1st of January, 1844, was as follows: in England and Wales 114; Scotland 21; Ireland 13; besides 10 joint-stock colonial banks in London. Many of these banks are in a highly prosperous condition, and some have been well conducted from their first establishment. The London joint-stock banks are excluded by the private bankers from the clearing-house. Banks in Ireland and Scotland.—No alteration has taken place in the constitution of the banking institutions of Scotland since the act Banking, P. C., was written. In the speech of the Bank in the third session of 1845, Her Majesty adverted to the state of the law as it stands to the privileges of the Bank of Ireland, and to other banking establishments in that country and in Scotland, as likely to engage the attention of Parliament.

The act relating to joint-stock banks contains some other provisions which are deserving of notice as improvements. Every year, between the 20th of February and 20th of March, a return is required from the ministers of Stamps, setting forth, amongst other particulars, the name, style, and firm of the banking company, the names and places of abode of the several members thereof, and of the directors, treasurers, &c.; but not twenty years of such annual value as shall be expressed in each letters patent.

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The above bank accounts, if made out in the form used up to August 16, 1844, present the following result:—

<table>
<thead>
<tr>
<th>Liabilities</th>
<th>£</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circulation, inc.</td>
<td>31,660,091</td>
</tr>
<tr>
<td>Bank post bills</td>
<td>21,768,962</td>
</tr>
<tr>
<td>Deposits</td>
<td>11,501,385</td>
</tr>
</tbody>
</table>

The balance of assets over liabilities, being 3,209,696£, is stated in the above account under the head `Rest'.

The stock of bullion held by the Bank of England (both gold and silver coin being included in the term bullion) indicates various circumstances connected with the state of trade and with the general condition of the country; and the following table, which shows the stock of bullion in February and August in each year since 1829, is therefore given:

<table>
<thead>
<tr>
<th>February</th>
<th>August</th>
</tr>
</thead>
<tbody>
<tr>
<td>1829</td>
<td>13,810,050</td>
</tr>
<tr>
<td>1830</td>
<td>8,779,100</td>
</tr>
<tr>
<td>1831</td>
<td>2,459,510</td>
</tr>
<tr>
<td>1832</td>
<td>10,159,029</td>
</tr>
<tr>
<td>1833</td>
<td>10,347,290</td>
</tr>
<tr>
<td>1834</td>
<td>6,589,030</td>
</tr>
<tr>
<td>1835</td>
<td>9,171,000</td>
</tr>
<tr>
<td>1836</td>
<td>8,217,050</td>
</tr>
<tr>
<td>1837</td>
<td>7,514,150</td>
</tr>
<tr>
<td>1838</td>
<td>10,805,000</td>
</tr>
<tr>
<td>1839</td>
<td>9,325,000</td>
</tr>
<tr>
<td>1840</td>
<td>6,289,000</td>
</tr>
<tr>
<td>1841</td>
<td>7,785,000</td>
</tr>
<tr>
<td>1842</td>
<td>4,077,000</td>
</tr>
<tr>
<td>1843</td>
<td>10,471,000</td>
</tr>
<tr>
<td>1844</td>
<td>6,780,000</td>
</tr>
<tr>
<td>1845</td>
<td>4,311,000</td>
</tr>
<tr>
<td>1846</td>
<td>4,310,000</td>
</tr>
<tr>
<td>1847</td>
<td>5,082,000</td>
</tr>
<tr>
<td>1848</td>
<td>11,978,000</td>
</tr>
<tr>
<td>1849</td>
<td>16,322,000</td>
</tr>
<tr>
<td>1850</td>
<td>15,148,383</td>
</tr>
</tbody>
</table>

Sometimes the stock of bullion properly so called exceeds the amount of coin, and sometimes the proportion is the reverse. In the four weeks ending Dec. 14, 1841, the amount of gold coin was 4,270,000£; and of gold bullion 995,000£. In the four weeks ending Sept. 17, 1842, the amount of gold coin was 2,750,000£; and the stock of gold bullion, which had been gradually increasing since December, 1842, was 7,106,000£. In January, 1844, the proportion of each was nearly equal. On the 4th of November, 1843, the bullion held by the Bank amounted to 12,036,000£, and consisted of gold bullion 6,999,000£; gold coin 4,244,000£; silver bullion 1,737,000£; silver coin 63,000£.

2. The average circulation of 208 private banks and 72 joint-stock banks in England and Wales, for the twelve weeks ending April 27, 1844, was:—

| Private Banks | 5,153,407 |
| Joint-Stock Banks | 3,475,446 |

This return was obtained, as already mentioned, with a view of fixing limits to the issues of notes. They cannot be increased beyond the amount certified in April, 1844. This total aggregate circulation of 8,648,853£ was divided amongst 280 banks in the following proportions:—

<table>
<thead>
<tr>
<th>Banks</th>
<th>£</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circulating above 1,000 and under 2,000</td>
<td>2000</td>
</tr>
<tr>
<td>2,000</td>
<td>5,000</td>
</tr>
<tr>
<td>5,000</td>
<td>10,000</td>
</tr>
<tr>
<td>10,000</td>
<td>20,000</td>
</tr>
<tr>
<td>20,000</td>
<td>30,000</td>
</tr>
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<td>30,000</td>
<td>40,000</td>
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<tr>
<td>40,000</td>
<td>50,000</td>
</tr>
<tr>
<td>50,000</td>
<td>60,000</td>
</tr>
<tr>
<td>60,000</td>
<td>80,000</td>
</tr>
<tr>
<td>80,000</td>
<td>100,000</td>
</tr>
<tr>
<td>100,000</td>
<td>150,000</td>
</tr>
<tr>
<td>150,000</td>
<td>200,000</td>
</tr>
<tr>
<td>200,000</td>
<td>400,000</td>
</tr>
<tr>
<td>400,000</td>
<td>500,000</td>
</tr>
</tbody>
</table>

The aggregate circulation of private and joint-stock banks, in England and Wales, for the weeks ending Jan. 4, 1846, was:—

Barbara, a genus of plants belonging to the natural order Crucifereae. It has a terebinthine odor, the valves convex, and a prominent longitudinal nerve; the stigma capitate, the seeds in a single row. Barbarae belongs to the first sub-order of Crucifereae, Silicaceae, which possess a linear or linear-lanceolate pod opening by two valves. The species of Barbarae are perennial herbs, &c. Stereocarpus and erect stems. The
flowers are yellow, arranged in racemes; the pedicels without bracts.

*B. vulgaris*, common Yellow Rocket, common Winter Cress, Herb St. Barbara, has the lower leaves lyrate, upper pair of lobes as broad as the larger roundish subterminal lobe, the uppermost leaf undivided, toothed; young pods obliquely erect; seeds scarcely larger than broad. It is a native, in damp moist places, of Great Britain and throughout Europe; also cultivated in gardens for the fresh taste, and is sometimes cultivated as a spring salad. In Sweden the leaves are boiled and eaten. It is often cultivated in gardens, especially a double variety, which forms a handsome border-plant.

As in *B. vulgaris*, the Winter Cress, has the lower leaves lyrate, upper pair of lobes as broad as the roundish subterminal lobe, uppermost leaf pinnatifid, with linear oblong entire lobes. This plant is a native of France and Great Britain; it is found nowhere else in America. *B. sylvestris*; in French, *Creason d'Amérique*. It is also known in England as American Cress, Black American Cress, French Cress, and Belle-Isle Cress. It is used as a salad, and is more bitter than the common water-cress. It can be raised for eating all the year round. In cultivating it, should be grown from seeds, a quarter of an ounce of which will serve for sowing ten feet of drill. For winter and spring use they should be sown in the last fortnight of August or beginning of September, on a warm sheltered border. For summer use they may be sown from March to August, in a sunny or a shaded situation being chosen according to the season. They require water occasionally in dry and hot weather. In winter the plants should be sheltered, either by covering them with a layer of bracken, reeds, or straw. After the leaves are cut the stem should be allowed to remain for another gathering. The finest plants may be allowed to run to seed.

*B. arcuata* and *B. stricta* are two species described by Barclay, and lately introduced to the British Flora. A few others are found in the northern parts of Europe and America. With the exception of the double yellow rocket, none of the species are worth cultivating as ornamental. This plant may be propagated by cuttings, suckers, or dividing the plants at the root.


**BARCKHAUSIA**, the name of a genus of plants belonging to the natural order Compositae, the tribe Cichoroaceae, and the subtribe Lactuceae. It has many-flowered heads, a double involucre, the inner of one row, the outer of short fail scales; the fruits 4-angled, all (or the inner ones only) gradually contracted into a long beak. This genus has several European species, two of which only are natives of Great Britain. The flowers are yellow or pale purple. Some of the species are cultivated in gardens, where they form a pretty and easily cultivable border-plant. The British species are—

*B. tenuzascifolia*, with rough runcinate-pinnatifid leaves, erect heads, yellow flowers, and slender, hairy, tomentose, its outer scales ovate-lanceolate with a membraunig margin, herbaceous bracts, the fruits all equally beaked. *B. fistulosa*, with hairy runcinate-pinnatifid leaves, nodding unopened heads, hairy and downy involucre as long as the pappus, its outer scales lanceolate, acute, downy; the marginal fruits slightly beaked, shorter than the involucre, central ones with long beaks equaling it. The first species has a stem one or two feet high, yellow flowers, purplish beneath, and is found in uncommon places. The second is 3-4 feet high, its leaves 8-16 inches in height, with yellow flowers. It grows in chalky places in England, but is a rare plant.

*B. setosa*, a German species, has been lately found in several districts in Great Britain, but it appears most probably that this species has been introduced by means of ornamental and other seeds used for agricultural purposes.


**BARCLAY, Jane**, a Scottish lady, father of the author of *Argenvis,* was born in Aberdeenshire, in 1646. In early life he attached himself to the court of Mary Queen of Scots, but the misfortunes of that princess closing the path to preferment, he resolved to seek his fortune in the New World. In November of the period, he studied civil law under Cujas at Bourges. In 1718 he became professor of law in the then newly erected University of Pont à Mousson, of which his uncle Edmund Hay was the first rector. In 1706 he published a work in favour of despotic principles; *De Regno et Regali Potestate, adversus Buchananum, Brutum, Bou-
Rome; where Bayle says he enjoyed the patronage of Paul V. He there in 1617 published "Pararamis ad Scortas," a book more likely to be acceptable to the Holy See than his other works. In 1631 he published the "Lettres," by which his name has been best known, 'Argenis': this is a romance full of incident and description. The style has received the commendations of the greatest scholars, and Grotius, whose life of him runs to 50 folio pages, is of the opinion that by which his name has been best known, 'Argenis': this is a romance full of incident and description. The style has received the commendations of the greatest scholars, and Grotius, whose life of him runs to 50 folio pages, is of the opinion that

BARCLAY, JOHN, a Presbyterian clergyman, and founder of the small sect called Barers, whose peculiar standard of faith is contained in the 11th verse of the 17th chapter of the Acts of the Apostles, where it is said of the Jews of Berea: "They received the word with all readiness of mind, and searched the Scriptures daily, whether those things were so." He was born at Newtush in Forth, in 1734, and studied at the University of St. Andrews, where he took the degree of A.M. While attending the course of divinity at that university, he became conspicuous as a supporter of Archbishop Campbell, a promulgator of doctrines which his ecclesiastical charge with the Scotch Presbyterian Church. In 1759 he was licensed as a probationer by the Presbytery of Auchterarder, so renowned in the late discussions in the Church of Scotland. He was for some time assistant to Mr. Johnson, minister of the parish of Errol in Perthshire; but after some acrimonious discussion, arising apparently from Barclay's inculcating his own peculiar views from the pulpit, that connection was broken. In 1763 he became assistant of the Church in Ayr-shire. Here he became the great popular preacher and religious leader of the district, and attracted crowds of auditors from the neighbouring parishes. He appears to have carried to exceed the prevalent characteristic of the Evangelical Presbyterians in that part of the kingdom, and these are the sects which make the nearest approach to them. In 1766 he published a paraprase of the Book of Psalms, with a Dissertation on the best means of interpreting that portion of Scripture. Some of its doctrines and sentiments were so far taken up with the zeal of his presbytery, and proceedings were commenced against him, which however seem to have gone no farther than a reprimand. The spirit of theological disputation being raised, he published pamphlets from time to time calculated to throw contempt on the death of the clergyman to whom he was assistant, in 1772, the presbytery not only defeated his attempt to be appointed successor, but refused him the necessary testimonials for acceptance elsewhere, and expatriation to Scotland, and became the leader of a sect of which a few congregations still exist. He preached for some time in Edinburgh, and subsequently in London and Bristol. In London he kept open a debating society, where he supported his doctrines against all impugners. He died on the 29th of July, 1798. He published several works in which he expounded his own peculiar doctrines; above all, the "Preacher's Study," of which the first edition, in 1762, has been reprinted. Like most sect-founders, he was a man of ardent and restless temper and daring powers. A memoir of him was supplied to Chambers's 'Biographical Dictionary of Eminent Scotsmen.'

BARON, ERASMUS, the younger, as Batavia's greatest historian. His name remains conspicuous in the annals of Dutch literature, and the "Dichter van de Zee," he is called in the country of his nativity, which was situated favourite seat of his contemplations. As Batavia's greatest historian. His name remains conspicuous in the annals of Dutch literature, and the "Dichter van de Zee," he is called in the country of his nativity, which was situated favourite seat of his contemplations. As Batavia's greatest historian. His name remains conspicuous in the annals of Dutch literature, and the "Dichter van de Zee," he is called in the country of his nativity, which was situated favourite seat of his contemplations. As Batavia's greatest historian. His name remains conspicuous in the annals of Dutch literature, and the "Dichter van de Zee," he is called in the country of his nativity, which was situated favourite seat of his contemplations. As Batavia's greatest historian. His name remains conspicuous in the annals of Dutch literature, and the "Dichter van de Zee," he is called in the country of his nativity, which was situated favourite seat of his contemplations. As Batavia's greatest historian. His name remains conspicuous in the annals of Dutch literature, and the "Dichter van de Zee," he is called in the country of his nativity, which was situated favourite seat of his contemplations. As Batavia's greatest historian. His name remains conspicuous in the annals of Dutch literature, and the "Dichter van de Zee," he is called in the country of his nativity, which was situated favourite seat of his contemplations. As Batavia's greatest historian. His name remains conspicuous in the annals of Dutch literature, and the "Dichter van de Zee," he is called in the country of his nativity, which was situated favourite seat of his contemplations. As Batavia's greatest historian. His name remains conspicuous in the annals of Dutch literature, and the "Dichter van de Zee," he is called in the country of his nativity, which was situated favourite seat of his contemplations. As Batavia's greatest historian. His name remains conspicuous in the annals of Dutch literature, and the "Dichter van de Zee," he is called in the country of his nativity, which was situated favourite seat of his contemplations. As Batavia's greatest historian. His name remains conspicuous in the annals of Dutch literature, and the "Dichter van de Zee," he is called in the country of his nativity, which was situated favourite seat of his contemplations. As Batavia's greatest historian. His name remains conspicuous in the annals of Dutch literature, and the "Dichter van de Zee," he is called in the country of his nativity, which was situated favourite seat of his contemplations. As Batavia's great he eny 8
researches and compilations which were the business of his laborious life. Thetford was the scene for nearly twenty-five years: and the mysterious castles O. T. N., with which it was one of his winter descents, his name in the index, was merely intended to indicate the town and county of his residence. The last few years of his life were marked by painful reverses of fortune. They were spent chiefly in London, where he died, after a short illness, on the 23rd of March, 1778.

Mr. Barker's writings in classical philology and criticism were numerous. He was a constant and leading contributor to Mr. Valpy's Classical Journal, almost from its commencement; and his name is also to be found in connection with his to other periodical publications. He edited, with English notes, for the use of schools, portions of several of the classics, both Greek and Latin; among which were works of Æsop, Caesar, Tacitus, and Cicero, of Xenophon and Demosthenes. But his labours were not confined to the classics; for with foreign scholars engaged him also in the superintendence of several works of other men: the chief among which were, the English impression of Anthon's edition of Leman's Classical Dictionary, and of Noah Webster's English Dictionary.

But Mr. Barker's name has been known most widely, both for praise and censure, through his contributions to Greek lexicography. The latest work of this kind in which he engaged was the Greek and English Lexicon published in 1831, in which he was the coadulator of Professor Dunbar of Edinburgh. But an undertaking at once more laborious and more unlooked for was Mr. Valpy's spirited reprint of Henry Stutfville's 'Angel flying away after death', in 10 vols. fol. Although the editorship of this work was described as vested in more than one person, and still the names of the editors were never unequivocally announced, yet it was understood universally that the severe duties involved in the editorship were really performed by Mr. Barker almost without any assistance. The Index cost him three years' labour. In 1819, after the publication of a few parts, the work was most severely criticised in the forty-fourth number of the Edinburgh Review. Mr. Barker: no doubt, took it as a reflection on his character. But his mind had inherent defects which no schooling could have quite eradicated. It was eminently deficient both in comprehensiveness of thought and in logical closeness of argumentation; and his taste was as defective as his judgment. His merit consisted, as Dr. Coleridge observed, not of the philologist, or even the critic. But he earned faithfully, and deserves to obtain without reserve, such praise as may be challenged by unwaried and disinterested labour. No man worked more for the benefit of his country, and in no work was his mind more single-minded desire for disseminating that which he believed to be valuable knowledge. Those who knew him personally, or from correspondence, allow that he was a kind and benevolent man.

BARKER, ROBERT, born at Kells, in the county of Meath, Ireland, was the inventor and patentee of panoramas. He practised originally as a portrait painter in Dublin and in Edinburgh. The first picture of the kind which he painted was a view of Edinburgh, exhibited in Edinburgh in 1788, and in London in 1789, but with indifferent success. His second painting was a view of London from the Althoen Mills, and it was exhibited, with complete success, in London, at the Leicester Square, and afterwards in Germany. He built, and opened in 1793, with a panorama of Spithedam, the present panorama exhibition-rooms in Leicester Square, now the property of his son; and a second was erected in the description of painting. He was assisted in many of his panoramas by his son, and by R. R. Realage, R.A., from whose sketches most of his foreign views were painted: as Rome, the Bay of Naples, Gibraltar, and the Bay of Algeirs. Nelson's battles of Trafalgar and Copenhagen were also among his most popular panoramas. He died in London, in 1806.

BARLOW, FRANCIS, a native of Lincolnsire, in which county he was born, in the second part of the eighteenth century, about 1726. He was instructed by a portrait painter, but he preferred landscapes, birds, fishes, and animals, in which he excelled. He was particularly excellent in birds of prey, which he painted on the wing with great skill, particularly in drawing. As a colourist he was indifferent; on which account many of his works appear much better in engravings than as pictures. John Overton published 12 prints by Holms, after Barlow, representing various sports, of hunting, shooting, &c., and other field sports. Barlow was also engraved: he etched some of the plates of his own illustrations to Ogilby's translation of Æsop's Fables, and also part of the plates in the folio book of poems entitled Theopha, published 1737. There are many engravings of birds by Barlow, engraved by W. Fieldin: 'Diversa Sspecies studioissimae ad vitam delineatae per Fras. Barlow, ingeniosissimam Anglum Pictorem. Gull. Fieldin excedit, 165.'

Once, when sketching in Scotland, he saw an eagle endeavouring to fly away with a cat in its talons; but the cat struggled so much, that eagle and cat both fell to the ground together: this circumstance led him to engrave a plate of an eagle seizing a cat. There is a copious list of his prints in Heineken's Dictionary.

Barlow was employed by several noblemen and gentlemen to paint ceilings, with hawking subjects, or other scenes of birds on the wing: the birds were painted on the clear sky. He painted also a few portraits, among them a half-length of General Monk, first Duke of Albemarle. Though he was very much employed, and had a considerable sum of money left by him, a friend, he died poor in 1792.

(See Essay on John, 1706; Walpole, Anecdotcs of Painting; Strutt, Dictionary of Engravers; Heineken, Dictionnaire des Artistes, &c.)

BARRETT, GEORGE, an Irish landscape painter of great celebrity in his time. He was born at Dublin in 1732, and commenced his studies under the tuition of John Mack, of the name of Silcock. His first landscapes were painted from the estate of the Earl of Powerscourt near Dublin; and the Earl was his first patron. He gained a 60-guineas premium from the Society of Arts in London, for the fourth premium given by that Society for landscape. He was one of the original members of the Royal Academy, founded in 1768, and towards the close of his life he was Master Painter to Chelsea Hospital, an appointment which he procured through his friend Burke. He died at Playford in 1784.

Barrett's landscapes are bold and natural in design, but his colouring is somewhat peculiar and heavy. He painted also in water-colours, and executed a few etchings.

(Edwards, Anecdotes of Painting, &c; Pilkington, Dictionary of Painters.)

BARRY, LODOWICK, was the author of a comedy called 'Ram-Alley, or Merry Tricks,' which was first printed in 1611, again in 1636, and will be found in the successive editions of Dodsley's 'The Plays.' The character of Barry was that of the incident, and for spirit and humour in dialogue and in character, it is one of the best of our old English dramas. In regard to the author nothing is known with certainty. He is said however to have been an Irish gentleman; and the editors of the 'Biographia Britannica' have given his name a place in their work for the purpose of contradicting Anthony Wood, who insisted on making him a Lord Barry.

BARTAN, THOMAS, P.C., was born in 1655. As an engraver he obtained a great reputation, more however from the subject...
and the number of his prints than for any particular excellence of execution. He was the scholar of Nicholas Poussin, from whom he probably, in some degree, derived his great love of the antique in art. As a pupil he differed very much from his master beyond copying, in which he was so excellent, that even Poussin himself had difficulty in distinguishing between his own pictures and the copies made of them by Bartoli. Bartoli was a master of the art of etching, and though technically his prints have little excellence, they are in most cases true to their originals. His prints, mostly etchings, which amount to many hundreds, are chiefly from ancient basi-reliefs or paintings in the ruins in or about Roman and Etruscan cities. He is also a printer, and established a business in Rome, which was continued after his death by his son Francesco Bartoli. P. S. Bartoli died in 1700.

Geckelmann was a great admirer of his works, and recommends young artists to study them in order to acquire a proper appreciation of ancient art. They are free, but slightly executed, and all in the same style. The following are among the principal collections executed by Bartoli:—Admiranda Romanarum Antiquitatum ac Vetas. Sculpturae Vestigia, with remarks by Bellori; Romanae Magnitudinis Monumenta; Vetere Arcus Augustorum triumpha insignia, ex reliquis quae Romae adhuc superantur; Le Picturc Antiquae Urbis et Urbis Nova; Gli Antichi Sepolcri, overo Mauoeoli Romani ed Etruschi trovati in Roma; and Recueil de Peintures Antiques imitées fidèlement, for the colours and for the traits, d'après les dessins colorés fait au P. S. Bartoli, Paris, 3d vol., 1710, 1712, 1713. The first work of the third volume, published in 1752, contains an additional plate not found in the older editions.

In 1781 he was appointed keeper of the prints of the royal library. In 1791 he was appointed keeper of the prints of the royal library, which led eventually to the publication of his well known work Le Peintre-Graveur, in 21 vols., 1795-1805, the description of which was commenced in 1792, but not finished until 1801. This work contains 100 plates of Italian paintings, of which 50 are engraved by Bartoli himself, and 50 by his son. The work is completed in two volumes, the first published in 1782, and the second in 1790.

The plates of Bartoli's work were engraved by the principal engravers of Europe, and to which he now owes his reputation, though he be the author of several similar works on a smaller scale, but they are all more descriptive than critical. There is also a catalogue of Bartoli's engravings published in 1782, which contains 100 plates of Italian paintings, of which 50 are engraved by Bartoli himself, and 50 by his son. The work is completed in two volumes, the first published in 1782, and the second in 1790.

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car and Pars, resting on chalk; the coal-basin of South Wales, resting on old red-sandstone, and, in a larger sense, the European basins between the Ural, the Scandinavian chains, and the Pyrenees, Alpæ, &c. Some of these basins are due to the war of deposition; others have acquired their configuration from elevations and depressions of particular geographical areas.

BASSO DI CAMER'A, a double-bass, or contrabass, refers to c. 1824, and that may not in compass, and thus needed to small or private rooms. The dimensions of the body of this instrument are as follows:

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<table>
<thead>
<tr>
<th>Length</th>
<th>Width above</th>
<th>Width below</th>
<th>Depth under the bridge</th>
<th>Length of strings from bridge to nut</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 feet</td>
<td>16 inches</td>
<td>91 do</td>
<td>74 do</td>
<td>91 do</td>
</tr>
</tbody>
</table>

Hence, and by referring to the article DOUBLE-BASS, it will be seen that this new instrument has a great advantage, in respect to compass, over the other; and in quality of tone is it hardly inferior, in modern and powerful music, thought it is power not enough designed to supersede, or even to be used as a substitute for, the double-bass in the full orchestra.

The Basso di Camera, in its present perfect state, owes its birth to Mr. T. W. Hancock, of Coventry Street, Haymarket, and was first introduced November 14, 1844, in Queen Square, Bloomsbury, at the residence of an excellent dilettante, to whose active research and zealous encouragement modern chamber music is more indebted than to any individual of the present age. Indeed, it is but justice to say that the two eminent composers who first in mind are to call attention to Mozart's operas, by having, early in the present century, had two or three of them privately got up by a few musical friends; from which time the fame of those unrivalled works gradually expanded, till the greatest of them, the Don Giovanni, was in 1817 produced at the King's Theatre, when, and not till then, the reputation of its author may truly be said to have reached its scene.

BASTARDY. Under the act of Elizabeth and later acts of parliament, down to the passing of the Poor Law amendment act in 1834, the usual practice was for the mother to apply for relief to the parish officers, by whom she was examined before the magistrates in petty session to be interrogated respecting herself and the child. If a bastard was then made, and the reputed father was ordered to contribute a weekly payment, or was bound to indemnify the parish against the future expenses of maintenance. In form, the proceeding was against the putative father for the indemnification of the parish; but in substance it was a proceeding of the mother against the putative father, the benefit of which accrued to her, and to which the parish was little more than a nominal party, except when it made good the father's default. It was in truth an action on the part of the mother against the putative father, for a contribution towards the expenses of their child, in which by a fiction of law, the parish was plaintiff.

(On the law concerning the maintenance of bastards, by the Poor Law Commissioners. Earl, paper. No. 31, Session of 1831.)

In this state of things, the Commissioners of Poor Law Inquiry (1834) recommended that the mother of a bastard should be rendered liable for its maintenance, but that she should be exempted from the punishment under 30 Geo. III. c. 51, and that all men changing the putative father should be repealed. The Bill for amending the Poor Law, brought in in 1834, as it ultimately passed (4th and 5th Will. IV. c. 76, §§ 72-76), enacted that the parish might apply for an order upon the putative father, but this was to be done at the quarter sessions instead of the petty sessions; and corroborative evidence was required; and other difficulties and onerous conditions were thrown in the way, which showed that the object of the Legislature was to impede the application at the quarter sessions. The number of bastards affiliated in England and Wales, in the years ending respectively 25th of March, 1835 and 1836, was 12,381 and 9,686. The practice of affiliation was therefore rapidly diminishing under the Poor Law Amendment Act 1834; and was alleged to be an act of justice, as the putative father was not punished, while the consequences fell solely upon the woman. In 1839, therefore, an act was passed (2 & 3 Vict. c. 88) which transferred the power of making orders in bastardy from the quarter sessions to any two justices in quarter sessions, and that the same orders might be made at the petty sessions, and in cases of dispute, in the court of the proceeding, and a mere screen to the woman. (Report of the Poor Law Commissioners, Jan. 31st, 1844.) The law respecting bastardy has been still more recently the subject of legislation, and by 7 & 8 Vict. c. 101, the principle of charging the putative father with liability different in that of any previous law on the subject. Formerly the remedy was intended exclusively for the parish: now the mother alone can obtain it. Formerly the chargeability of the child, either in fact or in prospect, was the ground of the remedy: now the actual or probable chargeability of the child is made wholly immaterial. (Official Circular, No. 59, Oct. 1, 1844.) The officers of all parishes and unions are deprived of the power of applying for orders of affiliation with regard to illegitimate children, and the mother alone is entitled to apply, at the petty sessions, for such order; but in case of the death or incapacity of the mother, the guardians of unions, or if there are no guardians the overseers, may apply for the same purpose. Such orders cannot apply for petty sessions, and payments are to be made to some person appointed by the courts to have the custody of the child, and not to the parish officers; and such person is to receive the child on the condition that it is not to be chargeable. Parish officers are guilty of misapplication for endeavouring to promote the interest of a mother of a bastard, by threats or promises respecting any application to be made for maintenance. The mother of a bastard may summon the putative father before the petty sessions within twelve months after the birth of the child, for the purpose of obtaining the order of maintenance, or if the child has been put to her in respect of such child. The justices may then make an order on the putative father for maintenance of the child and other costs, and enforce the same by distress and commitment; but not more than thirteen weeks' arrears can be claimed. The sum paid for maintenance is to be paid to the mother, and if she neglect or desert her offspring she may be punished under the Vagrancy act (5 Geo. IV. c. 89). While unmarried or a widow, the mother is liable for the maintenance of the child until it is married; having the care of a bastard child under an order of maintenance, who maltreats it, or misapplies money paid by the putative father for its support, is liable to a penalty of 10l. on conviction before two justices in quarter sessions. The putative father is liable at the quarter sessions, as under the old law. All orders for the maintenance of a bastard cease after it has attained the age of thirteen, or on the marriage of the mother. Existing orders are to continue, but those made before August 14th, 1834, are to cease on the 1st January, 1849.

In the Savings Bank Act (7 & 8 Vict. c. 83) there is a clause under which the deposits of illegitimate persons who die intestate may be paid to their heirs, as if they had been legitimate; but in other respects the law relating to the succession and inheritance of bastards remains the same. By 6 Wm. IV. c. 22, the incapacity of bastards in England to dispose of their moveable estates by will was removed.

The late Mr. Rickman was the first who attempted to ascertain the number of illegitimate births in England. During the progress of the census of 1831, he obtained from the ministers of churches and chapels the number of bastards born in their parishes or chapels in 1830. The number returned was 20,096. To correct the Registration act (2 & 3 Will. IV. c. 86) no specific reference is made to illegitimate children, but the penalty for making a false statement, combined with the local knowledge of the registrars, in most cases prevents such children being registered as born in wedlock. Still there is no question that the registration *is* giving something less than the real number of illegitimate children born. Of the births which escape the vigilance of the registrars, it is most probable that the proportion of those which are illegitimate is greater than they are in proportion to the whole number of the births.
than for births in wedlock. In Saxony the proportion of stillborn children to 10,000 illegitimate births is 816, in 10,000 others 464; age however may be the number of illegitimate births as they appear on the face of the register, it may safely be assumed that they are below the actual number. In the Registrar-General's fifth report (p. 10), it was stated that in 1841, 248,000 registered births in England 15,830, or 1 in 16, were illegitimate. The Sixth Annual Report issued in February, 1845, gives the total number of illegitimate births registered in England and Wales in 1841 and 1842. In 1841 the number was 36,294, and 54,766 in 1842, 53,729 births, who in the returns on which reliance was formerly placed gave 1 in 20. In 1842 the number of illegitimate born boys was 17,810, and of females 16,986, or 21 boys to 20 girls: the proportion of other births. The number of illegitimate females in England and Wales, between the ages of 15 and 45, was about 3,811,654 in 1841. Of these it is estimated by the Registrar-General, that 1,738,576 were married and gave birth in the above year to 469,964 children, and 2,078,078 were unmarried and gave birth to 35,924. The children born in wedlock as 28 to 100 of the married women, and the illegitimate children were as 1 to 7 to 100 of the unmarried women.

Before any certain inference can be drawn as to the state of manners in different districts, the relative number of married and unmarried women should be ascertained; but there are no means of arriving at this fact. The average number of illegitimate and other births for the whole of England is 67; but in Cumberland it is 114 per cent., and in some districts 1 to 12 to 1 to 100, which latter is one of the several proportions that exist at Wigan, in Lancashire. Nearly all the English towns are below the average of England. In France, Sweden, and most parts of the continent, the towns are above the average of the country.

The tables in the Sixth Report of the Registrar-General show that the highest proportion of illegitimate births is in Cumberland, Nottingham, Lancashire, Herefordshire, Norfolk, Cheshire, and the lowest proportion is in Middlesex, Cornwall, Surrey, Devon, and Monmouth, and Westmorland.

The table showing the proportion for each county would occupy too much space; but grouping the counties into the following divisions, the results are as follows:

<table>
<thead>
<tr>
<th>Divisions</th>
<th>Illegitimate</th>
<th>Married</th>
<th>Illegitimate Illegitimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Northern Counties 6681</td>
<td>11,001</td>
<td>614</td>
<td>977</td>
</tr>
<tr>
<td>North Midlands 3809</td>
<td>11,001</td>
<td>614</td>
<td>977</td>
</tr>
<tr>
<td>York</td>
<td>11,001</td>
<td>614</td>
<td>977</td>
</tr>
<tr>
<td>Northern</td>
<td>11,001</td>
<td>614</td>
<td>977</td>
</tr>
<tr>
<td>Eastern</td>
<td>11,001</td>
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</tr>
<tr>
<td>South Midlands 3659</td>
<td>11,001</td>
<td>614</td>
<td>977</td>
</tr>
<tr>
<td>Western</td>
<td>11,001</td>
<td>614</td>
<td>977</td>
</tr>
<tr>
<td>South Eastern 3913</td>
<td>11,001</td>
<td>614</td>
<td>977</td>
</tr>
<tr>
<td>North Western</td>
<td>11,001</td>
<td>614</td>
<td>977</td>
</tr>
</tbody>
</table>

The proportion of illegitimate births in 100 births in parts of the metropolis and in towns, in 1841, was as follows:—In Rochester, St. Luke's (Middlesex), Hackney, the Strand (Westminster), it is under 20 per cent.; in Bethnal Green, Islington, St. Savour's and St. Olave's, Bermondsey, St. George's, Soho, it does not exceed 21; in St. George's, in the East, Clerkenwell, Shoreditch, Lambeth, Greenwich, and Holborn, it is under 3; in Newington, St. George's, Hanover Square, Kensington, Chelsea, Cumberwell, St. Pancras, it does not exceed 21; in Liverpool, it is 30; in Hull, 38; in Birmingham, and in the city of Westminster, and in Whitechapel, London, it is 4; in Plymouth, 4; in Winchester and Bristol, 4; in Oxford, 4; in Derby, 4; in Cheltenham, 4; in Sheffield, 5; in Northampton, 5; in Leeds, 5; in Chichester and Wakefield, it is 7; in Manchester, who he makes in the following chapter, speaking of the statue of the god himself, might have considerable weight in controverting the opinion of Heyne: in there says—Bathylcles did not make the statue itself; it is made by his nephew, and made with the ideas of Juno, and is clearly opposed to the period of Bathylcles. From his substantially agreeing with Heyne, places Bathylcles in the 23d Olympiad, contemporary with Archilochus. This was at the close of the second Messenian war, which has much in its favour in the ideas of Aristotle, the general of the Messenians, plundered Amyclae; the Spartans therefore, at the successful completion of the war, might naturally make some votive demonstration from the spoils, to conclude the god of Amyclae, and average the
outrage upon his shrine or temple. Yet why should Pausanias not mention such a circumstance; or why was there no allusion to such trophies in the designs upon the throne? These questions present difficulties, yet probably appears rather to favor the ideas of the column. For the earth wind is about 665 a.c., is not so early that it could not have been resent in the opinion of Pausanias when compared with the period of the statue of the god itself; Lydia was also familiar then with the peculiar name of the Lydian artists. But in the later period, about 665 a.c., Lacedaemon, as well as other towns of the Peloponnesus, had its own artists of name. On the top of the throne Bat- thycles represented himself and his assistants. Quaternary de Lyssicrates, a master, had given a view of the god and his throne, designed from the description of Pausanias.

The Batthycles who left a cup for the wisest man was a different person; he was of Arcadia, and lived certainly in the time of Solon, but it does not follow that he was an artist because he made a bequest of a cup. Voss and Sillig suppose that Batthycles the sculptor lived even after the time of Solon, and that the presence of himself and assistants in Lacedaemon is accounted for by the Persian conquest of Lydia. (Pausanias, iii. 18 and 19, iv. 18; Heyne, Antiquarische Aufsätze; Thiersch, Epochen der Bildenden-kunst unter den Griechen, 1829; Sillig, Catalogo Artificum.)

To the top of the cell, or kroie, was the most distinguished of the eighteenth century, was born at Lecce in 1708. His father was a goldsmith, and Pompeo had thus an early opportunity of displaying his ability for design. He established himself very early in Rome, where he was a pupil of Belzoni, is presented to us not by copying celebrated pictures, but in a few years he obtained the first name in Rome, and with the exception of Mengs, lived there until his death, for forty years, without a rival: he died in 1787.

Baton was equally excellent in portrait and history. His historical works are chiefly scriptural and from the lives of the saints; he painted also many single pictures of saints of both sexes. His portraits, which are admirably modelled, are known to be (1) the grandeur of the Roman Emperors, that set themselves off in full length. He excelled in drawing, in tone, and in colour; his execution was also often extremely elaborate; but in composition he was considered inferior to Mengs, though equal to him in expression.

He was less philosophical also in his subjects than Mengs. His manner is that of a Batoni; he was an academical, and Batoni has sometimes been honoured with a title bestowed more generally upon Maratta, that of the School of Batoni.

Several cities of Italy possess altar-pieces by Batoni, and there are also many of his works in Germany and other foreign countries; some of his best works are at Lisbon and at St. Petersburg. His principal works at Rome are the Fall of Simon Magnus, now in the church of Santa Maria degli Angeli at Rome, but painted originally to be copied in mosaic for one of the altars of St. Peter's; the mosaic has never been executed. Batoni was a Cavalier and a Ritter of the order of Maria Theresia. His friend Car. O. Boni wrote a eulogy upon him shortly after his death: 'Elogio di Pompeo Girolamo Batoni,' Rome, 1787.

(Batoni, Geschichte der Malerkunst, &c.; Lanz, Storia Pintori, &c.)

BATRACHIDA, FOSSIL. The number of fossil Reptilia referrible to this division is gradually enlarging, though still very small. To the anourous Batrachians we must, with Jüger and Professor Owen, refer the Labyrinthodonta of the new researches discovered in the Biederwermberg (including perhaps the Cheirotheria whose foot-prints ornament the red-sandstones of England and Germany); while the territory fossil of Oenningen (which Scheuchzer imagined to be a human foot) is determined by Cuvier to be analogous to the Neot of Europe. These, and the Reptiles which inhabit the earth period, Remains of frogs and salamanders occur in the tertiary brown coals of the Rhine Valley.

BATRACHUS, an architect and sculptor of Laconia, who lived in the time of Augustus, among the friends of that author. Batrachus tells a story of Batrachus and his fellow-countryman Saurus. He says—Being very rich, they built at their own cost two temples to Jupiter and Juno at Rome, enclosed by the porticoes of Octavia, hoping for an inscription; but this being refused them, they introduced their names in another manner, by carving a lizard (Saurus) and a frog (Batrachus) in the centre of the Ionic capitals in each volute of the column. The same is still at Rome, in the church of San Lorenzo, a column with an Ionic capital of this description, in which the reptiles are well executed. The story is improbable, and perhaps originated in the peculiar name of the architects derived their names from the reptiles, rather than the reptiles their imago from the names of the architects. (Pliny, Hist. Nat. xxxvi. 4. 11; Winkelsmann, Werke, i. 573; Thiersch, Epochen der Bildenden-kunst unter den Griechen, 1829.)

An electrical battery is a number of cylindrical vessels of glass, each precisely similar to the usual Leyden jar, the open top being covered by a plate of wood, into which is screwed the foot of a brass pillar which terminates at the top with a ball of the same metal, and at bottom with a chain which descends to the lower part of the jar inside; and both the inside and outside of each jar are lined with tin-foil to within two or three inches of the top. These are contained within a wooden box, whose interior is lined with tin-foil; a piece of wire passes through the foil and the side of the box, and carries on the exterior of the latter a ring, to which should be affixed a chain descending to the table or ground.

The parties to be electrified were perforated in order that it may receive the brass rod or system of bars by which the top of all the jars are to be connected together; the rods are terminated with brass balls, and one of these, or a ball at the upper extremity of a pillar forming part of the conductors, is brought to the inside of the battery when the battery is to be charged. This kind of battery was first proposed by Gralath, a German, in 1747; and the manner of charging and of discharging it differs in no respect from the manner of performing the like operations with a single jar.

The quantity of electricity in a jar or battery is directly proportional to the superficies of the coating and to the degree of intensity; and the latter is in the inverse ratio of the distance of the particles. The particles of the particular battery which receive electricity, by which, the machine are excited, in the conductor and, with that, on the interior surfaces of the jars, exert, through the glass, attractive powers upon the resinous or negative electricity which, by that attraction, are brought from the earth to the exterior surfaces of the jars: this accumulation within the jars continues till the repulsive powers of the particles are great enough to counteract the power of the machine to supply fluid through the conductor: the charge of electricity is then considered as complete. The quantity of electricity estimated by the quantity of metallic wire which it will ignite or melt. The battery consisting of 100 jars, which was made by Cutbush for the museum at Haarlem, and which contained 650 square inches of coating, ignited 656 inches of iron wire 40 inches in diameter.

The batteries in which electricity is excited by the chemical action of a fluid upon a metal, or of two metals upon one another, are called galvanic or voltaic, and are of various kinds: it is intended here to describe only those which are most frequently used.

The simplest combination which can be formed for the production of an electrical current by such means is that of a plate of zinc and a plate of copper placed generally, in vertical positions and parallel to one another in a vessel containing a dilute acid, the upper edges of the metals being connected by a copper wire. In this state a current of positive electricity passes from the zinc, through the acid, to the copper, and from the latter, along the wire to the zinc: at the same time a current of negative electricity passes from the zinc, along the wire, to the copper, and from thence, through the acid, to the zinc. It is evident that the quantity of fluid current of this kind in this apparatus is equal to the superficies on which the acid can act; and an apparatus designed a battery, which may be said to consist of two plates only, one of zinc and the other of copper, was executed for the London Institution. Each plate is 50 feet long and 6 feet wide, and the whole circuit is 300 square feet, or the equivalent of 5000 cubic feet of wood, so as to leave everywhere an interval between the two metals: in that interval rope-bands of horse-hair pass round with the coils so as to keep the metals asunder. A cylindrical vessel containing this battery, it is said, is fitted to use, the coils of metal are lowered by machinery into the vessel.
But it is more convenient, for the purpose of obtaining the electrical fluids in abundance, to combine together a considerable number of small plates of zinc and copper, alternately, with the acid between them; and such a pile is called the voltaic pile; it is a battery of this kind. Under Galvani and Volta (P. C.) are explanations of the electrical action, and we here merely describe the construction of the pile. A circular plate of zinc, z, usually about 1½ inch diameter and ⅛ inch thick, is laid upon and generally soldered to a very thin plate of copper, c, of equal diameter; and any convenient number of these are placed above one another, with the copper plates forming the anode, and the zinc plates forming the cathode, so that every two compound plates is a circular piece of paper, p, or cloth moistened with diluted sulphuric acid; and the whole column or pile is made to preserve a vertical position by being formed within three pillars of glass or baked wood, which are connected together by having their extremities inserted in boards, of which the lower one serves as a base for the column.

The paper or cloth should be rather less in diameter than the plates of metal; and no moisture should be allowed to escape over the edges of the plates.

The uppermost plate of zinc attracts the positive electricity from the copper below it, and this continually receives a supply from the earth through the table, or the base of the pile; the quantity thus attracted is conveyed to the copper plate immediately above, through the moistened cloth, and so on; the zinc in the second plate attracts electricity from the copper below it, and, at the same time, receives that which is transmitted from the latter to the zinc in the lowest plate. Thus the quantity of positive electricity in the zinc of the second plate becomes nearly twice as great as that which is in the lowest plate; and the process continuing, the quantity in the zinc of each plate above may be conceived to be such a multiple of that which is in the lowest plate as is expressed by the number of the compound plate from the bottom of the pile. There is consequently obtained a current of positive electricity passing upwards from the zinc, through the acid, to the copper; and if a copper wire be made to pass from the top of the uppermost zinc plate to the copper in the lowest plate, the same current will return downwards, so that a circulation of the fluid will continue till the energy of the pile is exhausted. At the same time there is a current of negative electricity passing down the plate from the copper, through the acid, to the zinc, and this current is directed upwards along the pile.

If a second pile be formed, the plates in it may be placed in a reverse order, the copper side above and the zinc side below; if a third pile be formed, the order may be the same as in the first; it is found that the same is the case with the second; and so on; under the same conditions; the zinc of the second; another metal wire passes from the copper at the top of the second to the zinc at the top of the third, and so on.

When a wire connects the opposite ends of one pile, or of a system of piles, the circuit is said to be complete: it is said to be broken if there are two separate wires, one proceeding from the copper at bottom, and the other from the zinc at the top. If an animal body is connected with the farther extremities of the wires it would complete the circuit, and experience shocks.

The opposite extremities of the pile, or of the wires which are in contact with them, are called the poles of the battery. As the current of positive electricity seems to issue from the zinc at the top of the pile, that extremity is called the positive pole of the battery; at the same time the negative electricity seems to issue from the copper at the bottom, and therefore the zinc in the bottom plate is called the negative pole. These designations are reversed when a single pair of plates separated by an acid is mentioned. In that case, since the positive electricity passes from the zinc plate, through the acid, to the copper plate, and that the wire passes through the zinc from the copper plate to that of the zinc plate; it is evident that the positive electricity will flow from the copper, and therefore the copper is the positive pole of the combination; the negative electricity flowing at the same time along the wire, from the zinc, the latter is the negative pole.

That which, till lately, was most generally used is called the trough-battery, because the acid is contained in cells formed in a rectangular trough, usually of glazed earthenware, by nine or more parallel partitions of the trough; and permit no communication between one cell and another.

As many pairs of plates, zinc and copper, of equal surface, as there are partitions, are provided; the two plates of each pair are soldered or fastened together at their upper extremities, so that they may be parallel to one another; and are united together by a rod of wood, so that they may be placed into or removed from the cells. The bridges of connections between the zinc and copper plates stand directly over the partitions, so that there is a copper and a zinc plate in each separate cell, except at one extremity of each trough, in which, till two troughs are connected together, the cell is only a zinc plate. When one trough is to be connected with another, it is first a rod of wood, the plate a, soldered at the top of a zinc plate, is bent and made to enter the cell B, containing only a zinc plate at one end of the preceding trough. In order to form the complete circuit, one extremity of a wire is made to enter the cell A, for example, and the other extremity of this wire is brought to the opposite end of the trough, or series of troughs, where it is placed in contact with the copper slip, as a: the positive current then flows along the wire from the extremity first mentioned to the other.

That which has been just described is designated Mr. Children's battery, and Dr. Wellaston proposed, as an improvement upon it, to have in each cell a zinc plate between two of copper, for thus both surfaces of each zinc plate would become conductors when in production of the current, and the power of the battery would be increased by one half. The battery at the Royal Institution is of Mr. Children's kind; it contains 2000 pairs of plates, each 8 inches long and 4 inches deep, and with it Sir Humphry Davy made his principal discoveries.

The battery invented by Professor Daniel consists of any number of cylindrical vessels of copper, open at the top, about 10 inches high and 3 inches in diameter, and containing a saturated solution of sulphiure of copper; the external surface of each may be painted, but the interior, which alone is efficient in producing electricity, is made bright. On the top of each cylinder is placed a hemispherical cover, a, in which is the direction of the axis of the cylinder, a is a perforation above an inch in diameter; and to its base is attached a short tube b of copper, less in diameter than the cylinder, and carrying at its lower extremity an annular plate c of copper, in which are pierced several small holes. When the wooden cover is placed on the cylinder, its base rests on the top of the latter; and the part of the cylinder between the short tube and the annular plate is filled with crystals or pieces of sulphate of copper, which, gradually dissolving, furnish the strength of the solution in the lower part of the cylinder.

To the interior of the short tube is affixed one end of a piece of ox gullet, d, about the same length as the copper cylinder, and having its lower extremity tied so that the whole forms a mercurial battery; this is to contain the diluted sulphuric acid (eight parts water to one of acid). A rod of zinc, z, about the same length as the cylinder, an inch in diameter, and terminating at the upper extremity with a ball, is passed through the part of the wood, down to the interior of the membrane, so that its shoulder rests on the top of the wood; the surface of the zinc being previously covered
with an amalgam of mercury. Instead of a membrane, a bag of paper or canvas, or a vessel of porous earthenware, may be used.

If now, a connection, by means of a wire or metallic rod, were made between the ball at the foot of the zinc rod and the top of a stem which rises from one side of the copper cylinder, the zinc will be corroded by the sulphuric acid and the electric fluid will pass to the copper through the acid, the membrane and the solution in the cylinder. [VOLTAIRE, P.C.]

The battery invented by Mr. Groves consists of several porous vessels containing strong nitric acid, and, in each, a rod or plate of platinum; each of these vessels is placed between two porous plates of copper and zinc, or of sulphuric or muriatic acid. The rod of platinum holds the place of the plate of copper in Children's battery and constitutes the negative pole of each combination; the zinc plate being the positive pole.

The battery used first by Professor Whatatstosko for his electrical telegraph was formed nearly on the same principle as that of Mr. Daniel. A small outer vessel contained a solution of sulphate of copper, together with the plate of copper which formed the negative pole; within this, a small porous cell contained dilute sulphuric acid, and at the bottom was an amalgam of zinc and mercury, which constituted the positive pole. An electro-magnetic apparatus is now employed for the telegraph.

BATTUS, the suggested title proposed by Dalman to replace the name Agnostus, which Brongniart gave to some minute trilobate Crustacea which occur in the Silurian limestones of Norway, Wales, etc.

BAUMANNSHOOLE, one of the bone-caverns in Frainomia (Buckland, Strigilus Tretracum.)

BAYSE. [GROUSE, P.C.]

BAZHENOV, VASSILI IVANOVIITCH, an architect distinguished among the native artists of Russia, and first vice-president of the Academy of Fine Arts at St. Petersburg, was born at Moscow, March 1 (18), 1737. While yet a boy, he is said to have manifested a decided taste for drawing houses and buildings, which was his favourite amusement, and in which he endeavoured to improve himself by studying the churches, monasteries, and other public buildings of that ancient capital, his earnestness in such task making him in lieu of practical method. In 1751 he began to attend the School of Architecture at Moscow, which was then under the direction of Prince Uchtomsky, who in 1778 placed him in the chair of a recently established Moscow University, in order that he might study modern languages. Three years afterwards, on the Academy of Fine Arts being opened at St. Petersburg, and youth who gave indications of superior talent being encouraged, Bazhenov was in March, 1773, awarded a travelling scholarship. After pursuing his studies there, under Tcherepanovski, with distinguished success, he was sent to Paris in 1781, where he became the pupil of Duval, and would have obtained the gold medal of the Institute of France, but for his belonging to the Greek Church, wherefore in lieu of it he was rewarded by a diploma of merit, signed by the three eminent architects, Leraldi, Buffon, and Gabriel. Proud of his having obtained such distinction as had never before been conferred on any Russian, the St. Petersburg Academy bestowed on him the degree of A'djunct, and sent him forthwith (October, 1782) to Rome. While in Italy he was elected member of the Academy of St. Luke, and of those of Florence and Bologna.

On his return to St. Petersburg, in 1785, he was taken into the immediate service of the Empress Catherine, who found him constant employment in various architectural projects and schemes which she had conceived, and among others that of entirely rebuilding the Kremlin at Moscow, clearing the whole site, and erecting upon it a palace that should surpass every monument of ancient or modern times. In magnitude it certainly would have done so, for the façade would have been upwards of four thousand feet in extent, and some idea may form of the pomp and magnificence con- sideyed by Catherine and her architect, from the estimate for the state staircase alone, which was to be entirely of Italian marbles, amounting to five million rubles. Even the model itself — which is still preserved in the Kremlin — cost no less than two hundred rubles. Never had such elaborate plans and preparations been had, and the first stone of the intended edifice was laid with great solemnity on the 15th of June, 1778, on which occasion Bazhenov delivered an oration, composed by Sumanov (Semianov, P.C.) — the works were shortly afterwards interrupted, and never resumed.

Still, if greatly diminished in consequence of his plans not being carried into execution, the fame attending so vast a project is not inconsiderable of itself; — as is evident from the renown which one great English architect has derived from what, but for circumstances, would have been his greatest work; — therefore, alike in fate, Inigo Jones' Whitehall and Bazhenov's Kremlin may be allowed to share alike in fame.

In 1770 he began for the Empress a summer palace, in the Gothic style, at Tsarskito, but Catherine, who in the meantime had withdrawn her favour from Bazhenov, was so far from being satisfied with the building, that she afterwards ordered it to be completely altered by Kozakov. Her successor, the Empress Catherine II., lavished many honours upon him, and employed him to erect the palace at Gatuchina, that at Pavlovsky, and several government buildings at Crossow. But the most magnificent structure which he executed for the Empress Paul was the St. Michael or Marlbo Palace at St. Petersburg, the vast and massive pile within whose walls the unfortunate Paul was assassinated, and which, judging from the very minute description given of it by Kotzebue, must originally have been most sumptuous; but all its internal splendour has now disappeared, having been converted into a military school for engineers. Bazhenov is also said to have been associated with Voronikin (Voronikis, P.C.) in building the halls at St. Petersburg. Bazhenov died of paralysis, at St. Petersburg, August 2 (4), 1798. He left a great number of architectural drawings and designs, which the emperor ordered to be published, but Paul's own death, shortly afterwards, frustrated that intention. A memoir of himself has been given by a Russian translation of Vitruvius, 1790-97, in four volumes 4to.

(Snegirev, Slovov Rashka Pisatel.)

BEACHES, RAISED, a term introduced into modern geology to characterize a very numerous class of gravelly, sandy, and shelly deposits, which have been dry land in very modern geological periods. It is scarcely possible to assign exactly the limits of these formations, even by the aid of the geological enumation of what are called the drift; for the present, the beaches contain only species now living in the adjoining sea, others include one or more extinct species, and thus conduct by insensible gradations from the almost modern shell-beds of the raised shores of the Firth and Clyde and the variously elevated shell accumulations of Uddewall in other points of Sweden, to the still richer and more antient (though still to be called Newer Pleistocene deposits of Sicily. The term Pleistocene (most recent), which has come into use, meets this difficulty but fails to place fixed feet only within the epochal line, instead of the soft gradations of long periods which really appear in nature. Nearly all the British, Irish, and European shores furnish examples in abundance: as the shores of the Firth and Clyde, the coast of Cornwall and Devon, of Yorkshire, Normandy, Sweden, and the Mediterranean.

BEALE, MARY, an English portrait painter of the seventeenth century, about whom Vertue collected some interesting details from some journals on pocket-books kept by her husband, of which she saw seven. She was the daughter of the Rev. Mr. Crudock, minister of Walton-upon-Thames, and was apparently taught painting by Sir Peter Lely. The first date then in these pocket-books is 1671; but Lely's visits to her, and his praises of her copies from Correggio and Vandyke, are noticed. In the same year she painted portraits of the Bishop of Chester, Lord and Lady Comyn, and Dr. Sydenham, besides others; and she received in that year, for painting the portrait of Sir Charles Sedley, 200l.

Sir Peter Lely painted for Mr. Beale portraits of Dr. Tillo-ton and Dr. Stillingfleet, in Mr. Beale's house, in the presence of his wife, in order, probably, that Mrs. Beale might see the method of painting. Sir Peter Lely's method is said to have been as follows: he made a speedy preparation of the ground, believing for the watercolours 30s., of which he took 281. 19s. in lakes and ultra-marine. In 1674 Mrs. Beale made 216l. 6s. by her paintings. It seems a Mr. Manby painted some landscape backgrounds in some of her portraits, for which he was paid 20l. 10s. In 1671 she was paid two ounces of lake, and one and a half of pink, for a landscape to the portrait of the Countess of Clare. In 1677 she received 450l. for picture; a very large amount. And among the portraits of this year were those of Ludwig, and many others of the nobility. She was paid 5l. for a head, and 10l. for a half-length in oil. In 1681 Dr.
Prince Doria. He executed also some of the designs of the foot-pavement of the cathedral of Siena; which work was commenced by Duccio di Buoninsegna, according to Vasari, but in which, as Vasari himself was not, he did not assist. The designs of the foot-pavement are a species of ancient outlines of the figures are cut into the stone, and filled in afterwards with a black cement. Those of Beccafumi have been engraved by Andreani and Cosati. Beccafumi cut the slab of marble, and the engravers completed the work.

BECCHERA, a genus of fossil plants proposed by Otto Sternberg. Bechersia charafornica occurs in the strata of Calabria, and in the possessor of this genus. It is a woodcut, with the prints after his designs by other masters, are enumerated by Heineken.

Vasari, Vita de' Pittori, etc.; Lanzi, Storia Pictoria, etc.; Huyghens, Discorsi sopra le Arti, etc.; Romani, Italianische Forschungen; Brulliot, Dictionnaire des Nouveaux, etc.,

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**BECKERFORD, WILLIAM,** celebrated for his great wealth, talents, and eccentricities, was the only legitimate child of Alderman Becket Ford, of London, who died on the 21st of June, 1770, in his second majority, within a month after his famous exhibition at court, when, after presenting the city address to George III., and having received his majesty's answer, he made the reply which may be read on his monument. He was also a most munificent donor to the British national collection of pictures. He was married in the establishment of the National Gallery; in furtherance of which he promised to contribute part of his own collection at Cocketon Hall: he accordingly presented to the National Gallery sixteen paintings, chiefly landscapes—a landscape and figures by N. Poussin; Hagar and the Angel, Nascius and Edojo, the Death of Procris, and a study of trees by Claude; a view of Venice by Canaletto; a large landscape and figures by Rubens; a landscape and figures by Both, called Morning; a landscape, called the Return of the Arms of the A. of Bourdon; the Villa of Mecenas, and the Niobe of Wilson; a portrait of a Jew, and a sketch of the Descent from the Cross, by Rembrandt; a profile of a man by Sir Joshua Reynolds; Pylaides and Orestes by West; and the Blind Fiddler by Wilkie. Sir George was one of Wilkie's earliest patrons and best friends. There are also two of his own landscapes in the National Gallery—a small piece on wood, and Jacques contemplation the Wounded Stag, from 'As you like it.' These two pictures were given by Lord Beaumont after the death of Sir George. He died in February, 1827, without issue. Lady Beaumont, who was the grand-daughter of Lord Chief Justice Will, survives Sir George little more than two years; she died in July, 1829. Sir George was one of the first men of fashion.

Burke, Dictionary of the Peerage, etc., Cunningham.

Books of the most eminent Painters, etc., and Life of Sir David Wilkie; Catalogue of the Pictures in the National Gallery.

**BECCAFUMI, DOMENICCO,** a very celebrated painter of Siena, of the sixteenth century. According to Vasari, he was born at Siena in 1484, and died there in 1549; others give the respective dates as 1470 and 1541. His real name was Meccherino; that of Beccafumi was derived from his patron, Lorenzo Beccafumi, who placed him as a boy with Capanna, an obscure painter, to learn painting. He occupied himself chiefly in copying, and he was especially attracted by some pictures in the Vatican, on which he worked with great accuracy, and which he never lost, notwithstanding a subsequent sojourn in Rome, and the opportunities he had of improving himself from the recent works of Michelangelo and Raphael in the Vatican. He was in Rome during the Pontificate of Julius II., but remained there only two years. He painted in distemper and in oil, better in the former style, and his small figures are superior to his larger ones. Latterly when the fame of Michelangelo in Tuscany attained its extreme height, Beccafumi seems to have felt for him a kind of envy or indignation, and accordingly forsook his original simplicity of design for a species of clumsy plumpness, and his heads became harsh and ugly. He was correct in perspective, was fond of reflections and foreshortenings, and excelled at all his figures in composition; in other respects he was surpassed by his great rival Razzi. His best works are in Siena; he executed some at Florence, at Pisa, and some at Genoa for

**BURNET** presented Mrs. Beale with a copy of his History of the Reformation; she appears to have been highly esteemed by the clergy; many distinguished members of that body sat to her. Mr. and Mrs. Beale attempted to have her every voluntary charge. Mrs. Beale's daughter, at the end of one of the pocket-books they gave two shillings in the pound to the poor. Her husband, Charles Beale, had an employment in the Board of Green Cloth; he was also a painter, and, according to his journal, a connoisseur of Greek and Roman pictures. Mary Beale, who died in London in 1697, aged 65, and was buried under the communion-table in St. James's Church. Her husband and two sons survived her. One son, Bartholomew, studied under Dr. Sydenham, and practised pharmacy; his brother, Charles Beale, who was born in 1660, was a painter, and died in London. Her pictures, says Walpole, have much nature, but are heavy in colour. Several of her portraits have been engraved by R. White, F. Vanderhane, and A. Blooteling. Archbishop Tillotson's has been engraved, and the latter engraved that of Archbishop Tenison. Walker painted Mrs. Beale's portrait; and several poems were addressed to her, under the name of Belesea, by Dr. Woodfall.

(Walpole, Anecdotes of Painting, etc.; Essay towards an English School.)

**BEAUMONT, SIR GEORGE HOWLAND,** was the seventh baronet of the ancient family of the Beaumonts of Stoughton Grange, Leicestershire. He was born in 1575, was a gifted man, a distinguished patron of the arts, a friend of artists, possessed himself considerable skill as a landscape painter, and is, hitherto, one of the most munificent donors to the British national collection of pictures. He was married in the establishment of the National Gallery; in furtherance of which he promised to contribute part of his own collection at Cocketon Hall: he accordingly presented to the National Gallery sixteen paintings, chiefly landscapes—a landscape and figures by N. Poussin; Hagar and the Angel, Nascius and Edojo, the Death of Procris, and a study of trees by Claude; a view of Venice by Canaletto; a large landscape and figures by Rubens; a landscape and figures by Both, called Morning; a landscape, called the Return of the Arms of the A. of Bourdon; the Villa of Mecenas, and the Niobe of Wilson; a portrait of a Jew, and a sketch of the Descent from the Cross, by Rembrandt; a profile of a man by Sir Joshua Reynolds; Pylaides and Orestes by West; and the Blind Fiddler by Wilkie. Sir George was one of Wilkie's earliest patrons and best friends. There are also two of his own landscapes in the National Gallery—a small piece on wood, and Jacques contemplation the Wounded Stag, from 'As you like it.' These two pictures were given by Lord Beaumont after the death of Sir George. He died in February, 1827, without issue. Lady Beaumont, who was the grand-daughter of Lord Chief Justice Will, survives Sir George little more than two years; she died in July, 1829. Sir George was one of the first men of fashion.

Burke, Dictionary of the Peerage, etc.; Cunningham.

**BECCAFUMI, DOMENICCO,** a very celebrated painter of Siena, of the sixteenth century. According to Vasari, he was born at Siena in 1484, and died there in 1549; others give the respective dates as 1470 and 1541. His real name was Meccherino; that of Beccafumi was derived from his patron, Lorenzo Beccafumi, who placed him as a boy with Capanna, an obscure painter, to learn painting. He occupied himself chiefly in copying, and he was especially attracted by some pictures in the Vatican, on which he worked with great accuracy, and which he never lost, notwithstanding a subsequent sojourn in Rome, and the opportunities he had of improving himself from the recent works of Michelangelo and Raphael in the Vatican. He was in Rome during the Pontificate of Julius II., but remained there only two years. He painted in distemper and in oil, better in the former style, and his small figures are superior to his larger ones. Latterly when the fame of Michelangelo in Tuscany attained its extreme height, Beccafumi seems to have felt for him a kind of envy or indignation, and accordingly forsook his original simplicity of design for a species of clumsy plumpness, and his heads became harsh and ugly. He was correct in perspective, was fond of reflections and foreshortenings, and excelled at all his figures in composition; in other respects he was surpassed by his great rival Razzi. His best works are in Siena; he executed some at Florence, at Pisa, and some at Genoa for
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preliminary to the commencement of a much more magnificent collection of books, pictures, curiosities, rarities, bijouterie, and other products of art or ingenuity, and the erection of a new building on Fonthill, the most conspicuous feature of which was a tower of great height. Mr. Beckford sat again for Hindon in the short parliament of 1806, and also in that which met in 1807; and he continued to reside chiefly at Fonthill till 1822, when he sold his estate and house there, with all the extensive improvements which had been made in it ever since he had purchased it, for the sum of 350,000L. His outlay upon the property had been, according to his own account, about 279,000L, scattered over sixteen or eighteen years. The reason he assigned for the great expense of building was that it was the reduction of his income by a decree of the court of Chancery, which had deprived him of two of his Jamaica estates. 'You may imagine their importance,' he added, 'when I tell you that there were 1500 slaves upon them.' Soon after this he sold his tower, which had been very slightly constructed, and not long finished, fell to the ground. It was about 260 feet high. Mr. Beckford now retired to Bath, where he erected another lofty building on the eminence called Lansdowne, to the north of that city. Till now his literary reputation with the general public had rested on his early tale of 'Vathek'; but in 1834, after an interval of fifty years, he again appeared as an author by the publication of an account of his first continental tour (in 1780), in a series of letters. He had left no manuscript for his travels in Portugal, 2 vols. 8vo. Lond. He told the writer of the 'Recollections' that these 'Sketches' were drawn up from notes very insufficient in themselves,' but that his memory supplied what was wanting. He was told that they were written many years before their publication: indeed in his Preface he observes that the letters had 'remained dormant many years,' and that most of them 'were written in the bloom and heyday of youthful spirits and youthful confidences, at a period when the old order of things existed.' No. 'Perhaps,' he adds, 'as they happen to contain passages which persons of acknowledged taste have honoured with their notice, they may possibly be less unworthy of emerging from the hides of their original manuscripts. These, with the dispossession of them, will, perhaps, have been, to all intents and purposes, the same as the last. The essay and graphic power of these letters were instantly and keenly felt;' and their appearance from the press was followed the same year by the republication of the 'Memoirs of Extraordinary Painters,' and the next by another volume entitled 'Recollections of an Excursion to the Monasteries of Alcobaca and Batalha' (in Portugal), made in June, 1794. It is distinguished by the same qualities with the previous volumes on Italy. From this time Mr. Beckford continued to live in retirement on his estate, which he did not sate with. He left two daughters, the eldest of whom, Susan Euphemia, was married to the Marquis of Clydesdale in 1810, and is the present Duchess of Hamilton. Of the tale of 'Vathek,' which has been oftentimes reprinted, Byron, a good judge on such a subject, says: 'It would be a great pity, in the event of this şikay, contented, complete, beautiful, of the same, beauty, description, and power of imagination,' it far surpasses all other European imitations of the Eastern style.

REDSTEAD. Bedsteads for domestic use, of whatever form, are most commonly made of wood, and of somewhat massive construction; but the much smaller space occupied by light bedsteads of iron and brass, their consequent superiority in favouring that free ventilation which is so important to health, and the great advantages which they possess in not having to be bowed, have led to their very extensive introduction in late years in the dormitories of barracks, hospitals, and other public establishments; while the elegant lightness of some of them, and the combination which they exhibit of beauty and utility, have given them a place in the great public and private establishments where they are used. In many cases, for articles of household furniture. Another class of bedsteads is claimed for bedsteads which possess those ingenious contrivances which have been devised for the comfort of invalids, and to facilitate the necessary surgical operations upon patients with fractured limbs, or such as have been subjected to amputation. In these cases, the bedstead is constructed in such a way as to allow the bed to be raised or lowered at pleasure, or even to be entirely removed, when the injuries incidental to even the most careful removal of the body. By means of such inventions, several of which, having been and are in use, have been proved by experience to be efficient, have been rewarded by the Society for the Encouragement of Arts, Manufactures, and Commerce. And in some cases, as those of the bed-riden patient may be varied in every conceivable way with little or no effort on his part, and the offices of the attendant and the surgeon may be performed with the greatest possible facility. Even these however have failed in one important point; for however perfect their mechanical arrangements may be, they cannot prevent the distressing consequences which arise from the unequal pressure of a body reduced to a state of extreme deformity upon a bed which, however soft, cannot supply a uniform support to every portion of its surface. In many of the cases where the patient has been left on the bed, to destroy life, mortification and death have ensued from this unequal pressure, notwithstanding the utmost care and the use of air-cushions and down-pillows to mitigate the evil. A great step forward has been taken by Dr. Arnott in his 'Invention of the Hydrosomatic or Water Bed,' which consists of a trough lined with thin sheets of metal, and partially filled with water, upon which surface that floats a sheet of waterproof India-rubber cloth, of sufficient size to completely fit the trough when emptied and secured to its upper edge in such a way as to prevent the escape of the water by capillary action. Upon this sheet is laid an ordinary soft feather-bed or mattress, which, floating on the yielding surface of the water, affords a support to the patient comparable only to that afforded by the water of a bath. Every point of the uneven surface of the body having, as it were, its separate column of support, the pressure is so equally distributed as to afford the patient comfortable support and effectual relief. And this is the case for all the most prominent points. The depth to which the body will sink in such a bed may be regulated by the thickness and buoyancy of the mattress, and any unusual position of the body is prevented by the light and buoyant nature of the mattress. In the case of a patient unable to leave the bed daily, either to lay a waterproof cloth above the mattress to receive the moisture which would, without it, descend through the mattress, and become condensed on the floating sheet below it, would render the bed damp and unwholesome; to lay a blanket, which should be frequently changed, to collect the perspiration which descends from the bed; or to place a layer of small pieces of cork, the interstices of which may afford a degree of ventilation between the mattress and the floating sheet. The perfect adaptability of the surface of such a bed to whatever may be laid upon it, allows the dressing of wounds, the application of poultices, and the performance of other offices of the sick chamber, without disturbing the patient. A full account of this invention is given in the 'Penman Magazine (Old Series), from the fifth edition of Dr. Arnott's Elements of Physics.'

REDSTRAW, Sir William, R.A., one of the most successful of the recent English portrait-painters, was born at Burford in Oxfordshire, in December, 1753, and was originally articled to a conveyancer at Stowe. But having a strong desire for painting, he determined to pursue it as a profession, and he obtained admission into the Royal Academy in 1772. Though with many able rivals, some of whom were the most eminent painters of the English school, Mr. Beechey early established himself, and in 1782 he was elected Associate of the Royal Academy in 1793, and was appointed in the same year portrait painter to the queen, of whom he painted a whole-

In 1780 he executed his principal work, a large equestrian picture of George III., the Prince of Wales, and the Duke of York, attended by Generals Dundas, Sir W. Fawcett, and Goldsworthy, representing the Third and Tenth Dragoons; for which he was elected a Royal Academician and knighted by the king, being the second artist upon whom that honour was conferred: the first was Sir Joshua Reynolds. West however had declined the honour. This picture is now at Hampton Court.

From this time Sir William was much occupied, and he painted the majority of all the persons of distinction, rank, and fashion of his time, including several portraits of nearly all the members of the royal family. Among his portraits are those P. C. S., No. 20.

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of Lord Nelson, Lord St. Vincent, Sir W. Hamilton, Lord Cornwallis, Mr. Addington, afterwards Lord Sidmouth, John Kemble, &c. His portraits generally gave satisfaction, especially in their attitudes and expression, which are the difficult departments of portraiture. His colouring was gay and light, and his earlier pictures were well modelled; but his latest works are negligently executed. There is a portrait of Nollekens by Sir William Beechey in the National Gallery. He died at Hampstead in the month of January, 1859, at the age of 86. He was twice married, and left a numerous family, Captain Beechey, R.N., who was one of Sir E. Parry's lieutenants in his second polar expedition, is the son of Sir William Beechey.

(Art-Union Journal, February, 1859.)

BEGARELLI, ANTONIO, a celebrated modeller of Modena, where he was born about 1498. Who his master was is not known, but he was probably Guido Mazzoni, or Gropelli, who was born at Modena in 1443. He was the friend of Correggio, and is said not only to have instructed that celebrated painter in modelling, but to have even modelled many figures for him to facilitate his labour in the painting of the cupola of Parma, of which the numerous and strong fore-shortenings rendered models necessary. There are few of the works of Begarelly left; the principal is the Descent from the Cross in the church of Santa Margherita, containing many figures in the round rather larger than life, and of which, sometimes one looks upon them, says Vasari, 'le masori d'Forlì divenisar marmo, guai ale statue antiche.'—'If this clay were to become marble, woe to the ancient statues: an extravagant compliment, which the figures do not warrant, in the opinion of Florio, and no doubt truly. There is a traditional story that the figure of this Descent was modelled by Correggio, but probably without foundation. He died in 1565.

(Vedrani, Vite di Pittori, fc. Moderni; Traboschi, Vite, fc. Moderni; Fiorio, Geschichte der Malerey, &c.; Lanzi, Storia Pittorica, &c.)

BEHAMI, HANS SEBALD, a very celebrated German painter and engraver of the sixteenth century, whose name has been corrupted into all shapes by many foreign and some German writers. He was born at Nuremberg in 1532; was one of the best of Albert Dürer's scholars, and was a man of great ability; but his proficiency was, according to tradition, equal to his ability. He was forced, through his bad character, to leave Nuremberg, and he settled in Frankfort, but not to reform, for he here set up a wine-shop and brothel, and is reported to have been drowned by the authorities about 1550, on account of his extreme depravity. This is the account of Hugen, who says that it was the practice to condemn various kinds of vice, and among them those, to whom he refers to Lersner's 'Chronik.' Doppeimay says he went to Frankfort in 1540, and died there in 1560. The particular nature of Beham's depravity is not mentioned further than that he published obscene prints at Nuremberg, and kept a whoredom in Frankfort. He, however, had no very industrious from the number of his works; and his depravity must have been such as were not inconsistent with industry in his art. As a painter he is scarcely known. His name is written Beham and Beham by good authorities, and some maintain that his name was Sebald only; but most of his prints, or those attributed to him, are marked with a monogram of H. F. and H. B. in upright capitals intermingled.

His prints consist of woodcuts, and of etchings and engravings on copper. Those marked with the P. were, according to Sandrart, his earlier works; and those with the B. from about the time that he went to Frankfort. His first instructor was his cousin Bartholomew Beham, likewise a pupil of Albert Dürer, and also of Marcantonio in Italy. Heineken enumerates 392 prints by Beham, including 56 woodcuts, and 21 done after his designs by other engravers. Bartsch describes even 450, of which 171 are woodcuts. He is reckoned among the best of the Nuremberg school of woodcutters, and many admire their prints. His prints are much in the style of those of Aldegrever; occasionally correct in drawing, but generally, especially in the draperies, in the Gothic taste. His engravings were derived to his use of many of his master's designs. His cousin, Bartholomäus Beham, was an excellent painter for his period. He was a pupil of Albert Dürer, and was sent by the duke of Bavaria to study in Italy, where he died, says Sandrart, in the prime of life, and, according to Doppeimay, in 1540, which is also the last date upon his works: he was born about 1496.

Barthel Beham was extremely laborious and careful in his paintings; but if it be true that he studied in Rome in the later years of Raphael's life, his taste at design is no less exquisite, which is the chief requisite of a master. His reincarnation of a woman by touching her with the cross is one of the masterpieces of the old German school. The set takes place in the presence of the empress Helenas and a crowd of spectators; and the picture has the following inscription: 'Oliverio Del Corno...Pintor (Vedriani, his great works of art, was, according to Sandrart, assisted Marcantonio in executing the prints of Raphael. There is a print of Charles V. by Barthel Beham, which Vasari seems to have attributed to Marcantonio. His prints are better drawn than Hans Sebald's, but they are not nearly so numerous: they probably do not exceed 70. Many of them were sold for the benefit of the son of the painter. Samuel Terlinden says that some of the prints which bear the name of Antonio were executed entirely by Beham.

(Sandrart, Teutsche Academie, &c.; Doppelmay, Historische Nachricht von den Nürnberger Künstlern, &c.; Hugen, Artistisches Magazin, 1790; Heineken, Dictionnaire des Monogrammes, &c.)

BELEMNITE. The group of Belemmites was first distinguished by Mr. Hutton as a separate order, in his 'Exposition of the Kinds of the Animal Kingdom,' 1795. It is characterized by a ventral and anterior face by a long narrow fissure, is the named generally by D'Oibriryg. To this group belong B. macrourus, B. grandifrons, B. mannamarticus, &c., in Europe and B. Americanus in the United States, if this last be really distinct from the others. It is said by Mr. Gmelin to be divided into two genera, B. mesoleucus, B. planiscopus of Sclater, &c., in the United States, if this last be really distinct from the others. It is said by Mr. Gmelin to be divided into two genera, B. mesoleucus, B. planiscopus of Sclater, &c., in Europe.

BELEMNITES. To the history of this singular group of cephalopodous fossils the progress of careful research has lately added very important facts. In addition to the circumstances attending the discovery of some traces of the general form of the animal at Selenis, and of the ink-bag and horny lamiae at Lyme and Whitby, we have record of almost complete restoration of the Belemnite animal from fragments laid upon in the cutting of the Great Western railway, near Lane in Oxfordshire, and excavated according to Mr. Pratt and the Marquis of Northampton admirable specimens of the phragmaceous and laminar plates, outlines of some of the soft parts of the body and arm, and the form and arrangement of the hooked appendages of the arm. Indeed one of Mr. Pratt's specimens reveals the place and size of the eyes, the funnel of breathing-tube, the tendinous parts of the mantle, and the lateral fins, the inhaler, and ink-duct. (Owen, H. V. Lectures, 1847.)

For this purpose the plates and fragments of the animals were submitted, has found a strong resemblance between the fossil animal and the group of recent Sepidid animals called Oxycheuthoids, on whose arms are not the usual orange patches, but slender horny hooks. The animal, eighteen inches long, lived in the Cretaceous, and the plates and hooks almost all the length, alternating in a double row. The fins appear round, and a little behind the middle of the body, as in Sepia; the caudal extremity pointed, enclosing the fibrous guard, the anterior extremity of the laminar plate, which is the ink-bag placed, nearly transverse, and not arched so as from analogy with the sepioide might have been expected. The_Cephalopod animal—a dichotomate eight-armed mammal, in some instances, to judge from sections of the fibrous extremity of the arm (arms included) four or more feet in length, and its figure appears favorable for swift motion. In the base deposits shales of some of the species appear to have persisted together, and we have found about the comes many indications of the presence of animal substances.

The geological distribution of the Belemmites has been largely examined. In 1856 Professor Phillips presented to the British Association at Dublin a full account of the strata in which they are met with, and of the various names and characters to the principal groups which occur in the cretaceous, upper oolite, lower oolite, and liasias strata. M. d'Orbigny has lately published results perfectly accurate. The species derived to this group, which are next occurring in France. It thus appears that in the first place Belemmites are confined as a group to the mosasian strata: that many species allied to the B. compressus of Volz, B. papillosus of Blainville, and B. paullus of Schlemmer, belong to the line; that others allied to E. filifera of Miller, B. quinqueloculatus of Blainville, B. Aanela of Volz, B. ooliticus, subproter, Anno cellus. There is in the museum a collection of a picture in a similar style of Marcus Curtius leaping into the Gulf. Barthel was also an engraver, and, according to Sandrart, assisted Marcantonio in the prints of Raphael. There is a print of Charles V. by Barthel Beham, which Vasari seems to have attributed to Marcantonio. His prints are better drawn than Hans Sebald's, but they are as nearly so numerous: they probably do not exceed 70. Many of them were sold for the benefit of the son of the painter. Samuel Terlinden says that some of the prints which bear the name of Antonio were executed entirely by Beham.
to a lower cuticle series; that others allied to B. subcutis of Miller, B. altidorsensis of Schlotheim, abound in the period of the Oxford clay; while B. macronus, B. quadratus, B. Listeri, B. attenuatus, and others now ranked as Blemnites by D'Orbigny, characterise the cretaceous strata. The investigations entered into on the subject have not been wholly fruitless; but the reader may refer with advantage to the Treatises of Blainville and Volzi, to Buckland's Bridgewater Treatise, D'Orbigny's Palaeontologie Francaise, and to Darwin's Origin of Species. Several points occur in Mantell's 'Medals of Creation,' vol. ii.

BELL, DR. ANDREW. (Schools, Primary, P. C.)

BELL, GEORGE JOSEPH, a writer on law and jurisprudence, was born at Fountainbridge near Edinburgh, on the 30th of July, 1775, the second son of Patrick Bell, and became a member of the faculty of Advocates in 1791. In 1804 he published, in two volumes 8vo, 'A Treatise on the Laws of Bankruptcy in Scotland.' In 1810 he published an enlarged edition of the same work in 4to, with the title 'Commentaries on the Laws of Scotland, and on the Principles of Mercantile Jurisprudence considered in relation to Bankruptcy, Competitions of Creditors, and Imprisonment for Debt.' A fifth edition of this work was published in 1826, together with seven volumes, with the title 'Commentaries on the Laws of Scotland, and on the Principles of Mercantile Jurisprudence.' 'Bell's Commentaries' is perhaps, next to Erskine's 'Institute,' the best known and most quoted treatises in the law. At the same time the late alterations in the bankruptcy law there [Bankruptcy, P. C. S.], it was the leading authority in that department of the law, and it continues to afford light on so much of the practical side of this act as has not been superseded; while in the other departments, that if it be not pre-eminently the best, is at least incomparably the best. A commentary on mercantile law necessarily involved not only a statement of the results of decisions in Scotland, but also a view of those generic principles in which decisions have been made on like questions in commercial law in England and Scotland so different from each other. One of the useful results of Mr. Bell's labours has been an assimilation, without any violent distortion of principle, of the practices of the commercial law of Scotland to that which has long existed in England. Of the Commentaries, Sir Samuel Romilly said: 'I consider it as one of the best, if not the very best law-book that has been published in my memory.' On the 27th of May, 1819, after the publication of the third edition of his work, the legislature granted to him a pension of £1,400 a year. Mr. Bell wrote 'Principles of the Law of Scotland,' which has gone through several editions; 'Illustrations of the Principles of the Law of Scotland;' and several minor works. He was at the head of a commission of inquiry appointed in 1817 to inquire into the condition of the public service. He had active exertions, very important organic changes were made in the administration of civil justice in Scotland. In 1821 he was appointed Professor of Scots Law in the University of Edinburgh; and in 1831 a principal clerk of session. He had married, in 1806, Barbara, daughter of Charles Shaw, Esq., of Ayre. He died on the 23rd of September, 1848.

BELL, SIR CHARLES, was born at Edinburgh in 1774. He was the son of a clergyman of the Scottish Episcopal Church, and born in a small parsonage in the county of Perth. The three elder sons, Robert Bell, John Bell, and George Joseph Bell, all attained eminent positions in life; the first was a distinguished writer to the signet in Edinburgh; the second attained the highest rank in his day as a surgeon; and the third long occupied the chair of Scots Law in the Edinburgh University. The youngest brother, Charles, did not receive quite so much academical advantages of education as his brothers, in consequence of the death of his father when he was quite young; but he received a good education, well in after-life, 'My education was the example set me by my brothers,' and most gratefully he always acknowledged the lessons which his mother bestowed on him, her favourite child. At the High School of Edinburgh he was distinguished for the eye of his brother John, whose profession he had adopted, that he first gave evidence of his great talents. He became a first-rate anatomist, and lectured to some hundred pupils on that science while comparatively a boy. His internal consciousness of ability, however, and the ambition inseparable from it, led him to long for increased opportunities of exertion, and in the year 1804, at the age of thirty, he removed to London. Perhaps the bitter dimensions then raging in the Edinburgh Medical School, in which his brother John was deeply involved, had some effect in persuading him to this change.

At the outset, the prejudices against Scotsmen which Johnson, Churchill, Wilkes, and others had so illiberally fostered, seem to have stood in the way of Charles Bell in his early days. In 1811 he married Miss Shaw, a daughter of Sir Astley Cooper, Abernethy, and other great surgeons of the day. His work on the 'Anatomy Expression,' published in 1806, did much to give him a name in London; and most deservedly so, that treatise being acknowledged by the learned as the most comprehensive, the most scientific, and the most complete treatise ever published on the subject of the human face; and the signers of the human face; and the signers of the type of the human face. Nevertheless, though advancing by slow yet sure degrees as an operative practitioner, Bell was forced to begin lecturing in a very humble way, having yet obtained no aid from association nor any connection with the chief medical schools. In the same year (1807) in which he entered on this course, he published his first edition of his 'System of Operative Surgery,' a work which was rendered valuable by its practical character: no single operation was described theoretically, but all from full personal experience. At this period, in some beautiful letters to his brother George Joseph Bell, he describes the dawning upon his mind of those discoveries, which, in after years, were monuments in the judgment of posterity. But he also grieves most bitterly in this correspondence, over the neglect with which the public, generally, treated those early speculations.

We may once for all observe, regarding this series of fraternal letters, that if the elder Bell did not live to see the arts which they would form in themselves satisfactory testimony to his abilities. His frequent aspirations 'to be chief of his profession in character' indicate a man of no common stamp.

In 1811 he married Miss Shaw, and brought happiness to his heart, and several of whose relatives have become eminent in their various departments. John and Alexander Shaw (the latter only now living) obtained high reputation as surgeons and anatomists under the eye of their brother-in-law; Patrick, another of the family, is now a distinguished member of the Scottish bar. To Alexander Shaw we owe an able vindication of the just claims of Bell in the field of anatomical and physiological discovery. In the same year (1811) Bell became connected with the Hunterian School in Windmill Street; and in 1814 he was appointed surgeon to the Middlesex Hospital, an institution which he subsequently raised to the highest repute, and which he justly boasts, in 1836, of leaving 'with full powers, and 120,000l. in our pockets.' It was at the Middlesex Hospital that Bell's name became familiar to the public; and from his chair as operator, and from his style of lecturing—which, though not especially eloquent, was striking and suggestive—that his labours were crowned with success, both as regards the patients, the University, the public.
bers in which they were there distributed. Bell discovered and showed, that the nerves were naturally distinguished among themselves and clearly classified into two classes: (1st that the nerves of sensation, or the ear of the mind), and (2nd), and those of motion, were totally distinct in their character and origin. As regards the brain, he exemplified this fact strikingly by his experiments on the nerves of the senses, so specially called. A peculiar characteristic of the sinews or nerves of the muscles was reduced, as he demonstrated; a similar touch on the optic nerve gave no pain, but an impression of a flash of light. He found the difference between the peculiar and primary nerves of hearing and taste, as between the two organs of the eyes, and all the nerves of the other primary senses. He meditated on the sensations of the organs of the sense of touch, and to their muscles the power of motion or contraction. He, in fact, laid bare, for the first time, the great fact of a distinction existing in the nature and quality of the nervous energy, which before his discoveries had been all buddled together under one interpretation. As respects the body and spinal marrow, Bell discovered a division of the nerves, perfectly analogous to that detected by him in relation to the brain. The common nerves distributed over the animal trunk fulfil the two grand functions of giving sensation and motion. On cutting a spinal nerve, the older anatomists found both feeling and motion to be lost by the part which is thence supplied with nervous energy, and they concluded that the nerve carried both qualities. But Bell found no other superincumbent power, and he was rewarded by the discovery, that the two roots, by which the spinal nerves are connected with the vertebral medulla, derivate and bear from them different qualities—the anterior root conveying the tactile power, and the posterior root the motor power, that is the sensation power. Following up his inquiries, he discovered, likewise, the special nerve of respiration, and others with particular qualities, as to which before his time not even a conjecture had been made. It is impossible in a brief sketch to advert to all the great practical results consequent on these discoveries. The puzzling cases which often occurred, where sensation or motion were singly or severally lost, became clear to the eyes of competent practitioners; and operators received a warming and guidance which may have already saved the lives of many persons. Before quittting this subject—in which Bell may be named as a discoverer equal even with Harvey—we ought to point to one of his practical inferences from his own views, which establishes the existence of a sixth sense—that by which we attain our knowledge of distance, size, weight, form, texture, and resistance of objects. Two of his Essays, 'On the Nervous Circle,' and 'On the Eye,' have reference to this theory. The basis of it is, that the nerves of sensation play the part of reporters on the motor nerves, and indicate to the central seats of perception the condition of things in the influence of those nerves, thus forming the sixth or muscular sense. But I must seize the hints which the genius of Bell threw out to the profession about this time, in lectures and short essays. The operation for the cure of squinting, for example, by division of the contracted muscle of the orbit, had occurred to him. It was thought of Bell that he had the credit of the discovery, as letters before us fully prove. The existence of a vital attraction between the solids and fluids of the body was also an idea of Bell, now propounded by others as new. But his discoveries on the nerves certainly established his reputation. In 1824 the London College of Surgeons offered to him their senior chair of anatomy and surgery, which he accepted; and his lectures, which were received with great applause, formed the basis of a work on the 'Animal Mechanism,' published in 1839, 1839, by the Society for the Diffusion of Useful Knowledge. Two other works, which combine high scientific knowledge with such a popularisation of the subjects as fitted them to ordinary capacities, followed soon afterwards; the one is the 'Lectures on the Hand,' and the other, 'Illustrations of Paley's Natural Theology,' an accomplishment to Lord Brougham's work on that subject. In the mean time Bell was in the first rank of his profession, and had an ample attendance of pupils, not only of the juniors in practice. On the Continent he was even more highly estimated. Cuvier, Larrey, and other illustrious men of science, vied with one another in testifying their admiration of his talents and his labours. On the accession of Wellington to the throne, one of those selected for the high honours of knighthood with Herschel, Brewster, and others. When the London University (now University College) was established, he was offered the chair of Physiology.
also on the latter, before the outer coating, or shell, is laid on. When all is well dried, the 'shell' is lifted off from the 'model,' and the model is picked or cut off from the core piecemeal. If we suppose the core, the model, and the shell to be represented by a round cup placed over another, and the middle one to be removed, we shall see that a vacant space comes to be formed between the core and the shell; and when we further bear in mind that the exterior of the core gives the internal form to the bell, and the interior of that to the shell, then, the object of the whole arrangement will be clearly seen.

This internal cavity of the mould, between the core and the shell, is that into which the metal is to be poured. The cushion on which it is laid is filled up with loam or earth, to the level of the top of the mould; and in it a faint impression, on the lower part of the furnace is knocked or dug away, a narrow jet instantly pours out from the opening, and a stream of liquid fire (for so it seems to the eye) runs along the channel in the loam, and flows out through the two openings made in the shell, and greenish sparks. When the mould is full, the metal is allowed to remain till perfectly cool; the loam is then removed, the external 'shell' lifted or cut from the bell, the bell lifted off the core, and the core pulled down. If the bell be very large, it is even worked at the theatre St. George, and the bell, with three or four to ten or twelve hundredweights, six or eight may be cast in one pit at one time.

The tone of a bell depends conjunctly on the diameter and the thickness; a small bell or a thick bell giving, relatively, a more acute tone than one which is either larger or thinner. Hence the founder regulates the diameter and thickness according to the musical pitch of the tone which the bell is to yield; but as this cannot be rigidly attained by casting only, the bays (say a set to form chimbs) are smaller, and some part of the metal with a sharp-pointed hammer; reducing the diameter at the lower edge when the tone is too low, and reducing the thickness at the part where the hammer strikes when the tone is too acute.

While these sheets are passing through the press, the public journals announce the completion, by Messrs. Mears of Whitechapel, of a bell intended for the south tower of York Minster. It is larger than any other in the United Kingdom. The bell has been advertised as weighing between seven inches in height, with a diameter of eight feet four inches. It is seven tons heavier than the 'Great Tom' of Lincoln, and five tons heavier than the 'Old Tom' of Oxford. The metal took twelve days to cool. The clapper weighs between three and four hundredweight. The cost is about 2000l.

BELL-METAL. [Bell-Casting, P. C. S.]

BELLA, STEFANO DELLA, a celebrated Italian etcher on copper, born at Florence in 1610. He worked until his thirteenth year in the shop of Orizo Vanni, a goldsmith, when his own inclination, and some instruction he received in painting from his master's son, Gio. Battista Vanni, and in engraving from Crespi, induced him to give up the intention of following the business of a goldsmith, and to follow the arts. He accordingly applied himself to painting under Cesare Dandini, but he eventually adopted etching as his profession, being attracted by the prints of J. Callot, a distinguished pupil of Cantagallina. Some of Della Bella's works having attracted the notice of Lorenzo de' Medici, the brother of the grand-duke Cosimo II, that prince sent him to complete his studies in Rome, where he remained without scales, his drawings, his reputation, and views of the city. After his return from Rome, he went in the suite of the Tuscan ambassador to Paris, and remained there eleven years, and executed many of his best etchings, by which he obtained a great reputation. His subjects are battles, military, naval, historical, and imaginary. They are executed with freedom, with great delicacy, and are also well drawn, and he had a fertile and happy invention. Cardinal Massarin wished to retain him at Paris, and offered him the situation of drawing-master to Louis XIV., then a minor and a child. But he returned to Florence about 1647, and undertook that office to the prince Cosimo, afterwards grand-duke Cosimo III., a post which he held until his death in 1664. He was one of the best masters of the etchingneedle, and has been surpassed by few in the number of his works; their number is given differently by different writers, but probably they probably number about one hundred thousand. He died in so much, what he did he did well. Before his death he grew melancholy: his last works were six etchings of the Havoc of Death, which however he did not quite complete. There is a portrait by D. Belli in the Pitti palace of the grand-duke Cosimo III. His own portrait by Stoccalo has been engraved by Hollar.

One of his most valued etchings is a large view of PontNeuf, Paris, which, as originally issued in 1646, is very scarce.

Gandellini, Notizie Istoriche degli Intagliatori, &c.; Heineken, Dizionario dei Artiste, &c.; Huber, Manuel des Amateurs, &c.;

BELLEFROPHON, a genus of fossil shells, rich in species, which occur exclusively in the Palaesoclone formations, is in the Silurian strata, Devonian rocks, and mountain limestone. It has been generally referred to Cephalopoda, and considered analogous to Argonauta; but D'Orybony has given reasons for placing it with the Heteropod Molusca, and comparing it with Carinaria.

BELLIN, VINCENZO, a modern composer, of considerable celebrity, was born in 1806, at Catania, in Sicily.

In the harvest of the years 1837 and 1838 the Maestro di Capella rathér distinguished in his own country Bellini was educated in the Conservatorio at Naples, under Zingarelli, and in that city, before he had completed his twentieth year, he produced an opera, 'Bianca e Furnando,' at the theatre S. Filippo. Bellini, in the Scala at Milan ' Il Pirata,' and this was succeeded by ' La Straniera ' at the same, ' La Sonnambula ' at Naples, ' I Capuoliti ed i Montecchi ' at Venice, ' Norma ' at Milan, ' Puritani ' for the Teatro Argentina, and in 1838 undertook to compose a grand opera for the Accademia Royale de Musique, he retired to Pateau near Paris, under the hope of increasing his strength for the task; but pulmonary disease had made too great progress in his frame to be arrested, and he died the 2nd of April, 1839. Within a fortnight after he had quitted the French metropolis.

Bellini's moral character stood high, and his manners and compositions were in strict accordance,—agreeable, tender, and elegant. He rarely attempted the brist, and never aspired to the sublime, or even the lofty. A sweetness of melody, a fitness of harmony, and an adaptation of the sound to the sense, characterise all those of his works which have come under our notice. His constitutional tendencies seem to have been adverse to his in the Prussian portion of the Scala at Milan ' Il Pirata,' and this was succeeded by ' La Straniera ' at the same, ' La Sonnambula ' at Naples, ' I Capuoliti ed i Montecchi ' at Venice, ' Norma ' at Milan, ' Puritani ' for the Teatro Argentina, and in 1838 undertook to compose a grand opera for the Accademia Royale de Musique, he retired to Pateau near Paris, under the hope of increasing his strength for the task; but pulmonary disease had made too great progress in his frame to be arrested, and he died the 2nd of April, 1839. Within a fortnight after he had quitted the French metropolis.

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wild state to varieties, sometimes all the flowers are found lieuate, more rarely they are all tubular. There are several varieties of the common daisy cultivated in gardens. There is a double variety called large-double, another double-quilled, and a single variety known by the name of hen and chickens. These varieties assume various colours from deep red to pink and white. They are easily cultivated, and form pretty plants for edges and borders, and continue in blossom a long time.

*B. syriacu* and *B. annua* are natives of Europe, but are not cultivated. The genus *Belium* closely resembles *Belis*, it differs however in possessing a pappus surrounding its fruits. The species are found in the south of Europe, and appear like *Belis vulgaris*.

(Bathe's, Manual: London, Cyclopedia of Plants.)

BELLOWS. [Blowing-Machines.]

BeloNostomus, a genus of fossil fishes established by the present writer; the species were found in 1778, 1779, 1780, 1781, 1782, 1783, and 1784, in the lagoon, colite, and chalk: the foreign in the oilite of Pappenheim.

BELOPTERA (Blainville), the shelly portion of a fossil cephalopod, intermediate between Belminites and Sepia. It occurs in the French tertiary strata, and includes B. Cuvieri, B. compressa, and B. belemniotides (Blainv.). Mr. Morris adds B. anomala and B. longirostrum, from the English tertiary.

BELOSEPIA (Volz). In this genus M. Volz ranks two species, the species B. Cuvieri and B. compressa) which form part of the Belopetora of Blainville.

BEOWULF. [Saxon Language and Literature, p. 490.]

BERBURRUP, or BURBERRA, is a commercial place in Africa, situated on the southern shores of the Gulf of Aden, and nearly opposite the British settlement of that name, in 10° 27' N. lat. and 45° 5' E. long. It is built at the head of a small inlet, which affords excellent shelter from all the prevailing winds throughout the year. The town consists of an assemblage of rude huts of various sizes, square, circular, and elongated, generally about six or seven feet in height, built with sticks covered with mats or skins. These huts are erected in November, or as soon as the first caravan arrives, and are dismantled at the end of the first month of April, when the greater part of the materials are taken away. Very few persons remain on this part of the coast during the eastern monsoon, owing to the soughing hot winds, which in June, July, and part of August, blow with great violence. The permanent inhabitants are a few Baram and some chiefs of the neighbouring tribes, who have houses of a larger size, which are divided into apartments.

The trading season commences about the end of October or the beginning of November, when the first caravan or ten from the interior arrive on the coast, and bring with them materials for constructing the huts, and immense droves of sheep, which are immediately embarked for the Mocha market before they have time to fall in sheep, as there is no pastureage for them about Berbera. After the beginning of the rains arrives very daily, and also vessels from all the neighbouring countries. The March califa however is the principal, and frequently consists of two thousand camels. These caravans bring ghee, coffee, sheep, myrrh, benoin, gum Arali, elephants' tusks, gold-dust, slaves, ostrich feathers, dry hides, and also an article called urra in Arabia, which is described as something like saffron in appearance, and is used in that country as an intostart for cooling the body; it is also mixed with flour and made up into cakes, in which slaves are said to be very palatable. Among the slaves are many Christians from the neighbourhood of Shoa in Abyssinia. The vessels which visit this place come from Busrosor, Muscat, Cutch, Bombay, Mangalore, Masul, Aden, Mozambique, Zanzibar, the import of blue and white cotton-cloth, Indian pieces-goods, European prints, silks, silk thread, shawls, red cotton-yarn called tannah, beads, sugar, rice, iron, copper, wire, zinc, dates, and a few smaller articles.

The coast opposite the back of Berbera is inhabited by the Somalis, and affords neither pasture nor cultivation to a distance of ten miles, the soil consisting of a coarse sand or gravel. Berbera is the harbour of Harrar, a large town in the interior; immediately upon which accounts is twenty days journey from Berbera, whilst otherwise the distance is from five to six days journey. It is also visited by six or seven tribes inhabiting these parts of Africa.


BERENICE, a celery-like coriandrum, of which B. chien known as an example, fossil in the oilite of Wilts.

BERGKALK, in Geology, the German term for our limestone.

BERGLER, JOSEPH, a distinguished recent historical painter, was born at Salzburg, in 1721, and was educated by his father, and gave such early evidence of talent, that he was sent, in 1776, to complete his studies in Italy, by the prince-bishop Cardinal Friman of Passau. In Italy he studied 6 and a few years with Martin Knoller at Milan: in Rome he was occupied with Mengo, Canova, and Giovanni Battista Cammacini, Tischen, and Volpato were his contemporary students there, where he remained altogether six years: he left the interval he went to Parma, and obtained the first ward of a great, and after this died from a violent fever, and was buried by Dalliah to the Philistines. He returned to Germany and settled in Passau in 1786, where he was appointed painter to the prince-bishop Cardinal Auperger. During this stay at Passau until 1800, he painted several excellent pictures for the churches of neighbouring towns, some of which have since been burnt. In 1800 Bergler was made director of the Academy of Prague, and his ability and activity enabled him to teach several very able scholars, who have all fallen under the spell of Bohemian art, and himself furnished altar-piece for many of the churches of Prague, and its vicinity: one of his principal works at this time was a large picture of Hermann and Thesmola, for Klopoost's 'Hermannsleid'. He died at Prague in 1848, aged 83. He commenced by executing some great facilities executed at least a century ago; and excellence consisted in his colouring, not so much in the compositions, as in a general effective composition of colour. He also etched many of his original designs with great ability.

(Blaschke, Künstler-Lexicon für Böhmen; Nägele, Allgemeines Künstler-Lexicon, 1826, 1827: Archiv. for 1823; Göthe, Winckelmann and sein Jahrh.-dort.)

BERGMEHL, [mountain-meal, Norwegian, pert, stild in mining, or a month of February in France, Fossor: P. C. S.]

BERNADOTTE, JOSEPH, KING OF SWEDEN, P. C. S.

BERNARD, FRANCOIS. This 'most curious traveler' as he is styled by our historian Gibbon, was born at Argos, then the capital of the province of Arcos. The year of his birth has not been ascertained, but it is very little appears to be known about him, until after his return from the East, and the publication of his travels. Voltaire supposes that he was born in the year 1625. But it seems quite probable that he was born a few years earlier, and that he cultivated his fancy as a profession, and after taking his degree of doctor at Montpellier, being, as he tells us himself in the first page of his book of travels, excited by the desire of seeing the world, he went over to Palestine and thence into Egypt. This was in the year 1643. He lived merely for the instruction of the French, and the rare good fortune of recovering from that fearful disease. Being in Egypt, he became very desirous of visiting and examining the Red Sea; and, while on the shores of the Red Sea, a favourable opportunity presented itself for going into the East Indies. In all the countries of the East, a medical practitioner may travel very well, and live as well as the best, without any money. Bernard's pupil seems always to have been very light. He lived twelve years in India, and he was said of them years he lived by Dr. Doli as physician to the great Mogul Emperor of Hindostan. Auriungebe. [Auriungebe, P. C. S.] The favourite and prime minister of that prince, the Emir or Onah Daulatmohed, who is described as the greatest and most efficient of all of the ingenious and no doubt very useful Frenchman, and took him along with him when he marched with an immense army to the conquest of Cashmer. Bernard has left us the best accounts of that war, of the march of this immense force, and with the people of that country while they were like an immense moving city. The guard of cavalry consisted of 35,000 men, and the guard of infantry of 10,000; we were computed that the camp contained 150,000 horses, men, and elephants; 60,000 camels, 60,000 camels, and between 300,000 and 400,000 persons. The correctness of Bernard's description of the country has been recognised and praised by every European traveller that has visited Cashmer since his time, Mr. George Forster, who was there in 1783 or 1784, says in a letter that 'his description of Cashmer is as lively as it is just,' that 'Messieurs Bernard enjoyed advantages which have
fallen to the lot of few Asiantic travellers, and, happily for the learned world, his talents amply improved them.'

Returning to France, his native country, Bernier began to publish. His first work, entitled 'History of the last Revolution of the States of the Great Mogul,' appeared in 1670, and was followed by 'Continuation of Memoirs of the Empire of the Great Mogul,' which was published at Paris in the year 1671 as 'Le Joli.'

In 1674-5 Bernier published an abridgment of the philosophy of Gassendi. In the second part of this abridgment he treats of the systems of Ptolemy, Copernicus, and Tycho Brahe, and gives a refutation of judiciously. (In the Lyen edition, which is the only one we have seen, the whole of this abridgment of Gassendi fills 8 vols. 12mo.)

This work was much read or very much praised at the time. He wrote a memoir on the quietism of the Jesuits. His 'Dictionnaire Historique' was published in 1690. Bernier's 'Doubts of Bernier on some of the principal chapters of his Abridgment of the Philosophy of Gassendi' (Parts, I vol. 12mo., 1683). The copy of this volume in the Library of the British Museum has at the bottom of the title-page, in Bernier's handwriting, 'à Monsieur Bayle.'

In 1695-6 Bernier made a second journey to Africa. He wrote a letter to the Berner, giving an account of the journey and the discoveries he made. Bernier's 'Dictionnaire Historique' was published in 1690. Bernier's 'Doubts of Bernier on some of the principal chapters of his Abridgment of the Philosophy of Gassendi' (Parts, I vol. 12mo., 1683). The copy of this volume in the Library of the British Museum has at the bottom of the title-page, in Bernier's handwriting, 'à Monsieur Bayle.'

Bayle had good-humouredly exposed a somewhat laughable mistake which Bernier had committed in translating from Gassendi's Latin; but he had also cited Bernier as a traveller with commendation. (Bayle, Dictionaries Historiques, &c.)

Bernier also wrote a treatise on Free-will, 'Traité du Libre et du Volontaire,' which was published at Amsterdam, in 1685. In his 'Études de Grammaire,' he declared that in the French language, the narrative is the more valuable and trustworthy. Major Rennell (Memoir for illustrating the Map of Hindostan) calls Bernier 'the most instructive of all East Indies travellers.'

He did not begin to write in a vain of September, 1685, and died in the month of September, 1686, in his 50th year, his death was caused by a stroke of cutting Malaya, made at a dinner party by the president D'Harlay, and that the old epicurean died of a broken heart. But these stories are very doubtful.

(Biographie Universelle; Bernier's own Works and Prefaces; J. Wille; and the other authors cited in the article.)

BERVIC, CHARLES CLEMENT BALVAY, the most distinguished engraver of France during the French Revolution, was born at Paris on the 1st of September, 1765, the son of J. G. Wille, and in 1784 was elected a member of the French academy of painting. A large full-length portrait of Louis XVI. which he engraved in 1780, from the picture by Callet, is one of the finest examples of his art. It is distinguished for excellent drawing, extreme softness of tone, and a true effect of colour, but is rather defective in force. It is entitled 'Louis XVI., Roi des François, Résident de la liberté, présenté au Roi et à l'Assemblée Nationale.' After the execution of the king, Bervic, wishing to escape suspicion, and at the same time preserve the plate, cut it in half, thus attaining both objects. The half plates were reunited after the restoration, and beautiful impressions were again taken from them, but the earlier impressions are much more valuable, and command very high prices. Muller of Stuttgart engraved the same picture.

Other masterpieces of Bervic's graver are the Rape of Delilah, and the Education of Achilles, after Guido and Beganul; La Mandragora, A. C. Lepicé; and the ancient group of the Lacocon, an admirable production.

Through a weakness he was some years before his death forced to give up engraving, and he employed himself to teaching engraving. He died in 1822. He was a member of the French Institute, and Chevalier of the Order of St. Michel, of the Legion of Honour, and of the Réunion. (Huber, Manuel des Amateurs, &c.; Bartisch, Peintre-Graveur; and the Amateurs d'Estampes; Gabet, Dictionnaire des Artistes, &c.)

BERYX, a genus of fossil fishes of the family Percoideae (Agassiz). B. crassus occurs in the chalk of Sussex. Man...
BEVEL, or BEVIL is, according to Nicholson's 'Architectural Dictionary,' the name applied both to the oblique angle formed by two surfaces which meet at either less than a right angle, and to the instrument employed by carpenters and joiners for marking and transferring such angles. The common carpenter's bevel consists of a straight wooden stock, mortised at one end to receive a thin blade, which is usually formed of steel, and attached to the stock by a pin in such a way that it may be turned to any required angle, and secured by a tightening screw. This kind of bevel may be described as an adjustable T-rule, the transom of which may be placed at any required angle with the stock. The bevel is divided into two parts, a and b, pivoted together at c, and capable of being set to any angle by means of the brasses d, which is attached firmly to the ruler b, and passes through a mortise or slit e, in which it may be secured at any point by means of a binding screw.

The adaptation of the instrument to a curved surface is provided for by a flexible blade or riband of steel, secured to the ruler a at one end, but capable of being made to assume and retain any simple curve by means of the series of screws marked f, which pass through nuts or mortisae attached to the ruler a, and press against the steel riband by a kind of swivel joint which provides for the various angles of contact formed by the riband and the screws.

Where many articles have to be worked to the same angle, it is desirable to use a fixed bevel, made to the required angle, especially where one or both of the limbs are curved. When the interior angle of the bevel is that used by the workman, such an instrument is sometimes called a joint-hook: a familiar instance of its use in this way is in working the intradoses and radiating beds of arch-stones, which, for circular arches, will be alike in every part of the arch.

BEWICK, THOMAS, justly called the revivaler of wood-engraving, was born at Cherryburn, near Newcastle-upon-Tyne, in 1753. He acquired an ability to draw from his infancy, and was accordingly, at the usual age, apprenticed to Ralph Beilby, an engraver of Newcastle, who had some reputation in that city. Dr. (then Mr.) Hutton consulted Beilby upon the best method of engraving the diagrams to his treatise on Monerrash; the engraver strongly advised him to return from abroad, and said he should be cut in wood, for various reasons, and by Thomas Bewick. Accordingly, in 1770, the work appeared, with complete success; and was followed by several other mathematical works.

Bewick now attempted works of much higher pretensions. He designed a set of illustrations to Gay's Fables, and for one of the cuts, the 'Old Hound,' he obtained, in 1775, a premium for the best wood engraving offered by the Society of Arts. This work was published in 1779. In 1784 Mr. Saint published a set of 'Select Fables,' with cuts by Bewick. After these works he commenced, in partnership with his old master Mr. Beilby, to prepare a 'General History of Quadrupeds,' which was completed in 1790, went through several editions, and obtained Bewick a great reputation. The designs in this work are by Bewick and his brother John, who was his pupil; and they are all executed with great natural truth, and in a free correct manner. The cuts themselves are superior to anything that was ever done in the same style before, and are inferior only to the best cuts of the present day in clearness and delicacy of line, and the same advantage they still have the advantage. His History of Quadrupeds was followed, in 1795, by Goldsmith's 'Traveler' and 'Deserted Village,' Farnell's 'Hermit,' and Somerville's 'Chase.'

Bewick had a numerous school, and was latterly much occupied in teaching; and in his last works was greatly assisted by his son Robert and other able pupils, of whom Harvey and Chennel have since particularly distinguished themselves in the same line of art.

The most considerable of Bewick's latest works are 'The Fables of Aesop and others,' and his 'British Fishes.' His last work was a cut of an old horse, for the head of a paper against cruelty to animals. He died in 1828, aged 75; and is said to have left a very full autobiography of himself, which he had written in a very careful handwriting. It was considered a large cut of a bull of the ancient Caedonian breed, from Chillingham Park; a proof of this cut on vellum is worth about 20 guineas. Bewick's services are fully discussed in 'The History of Wood Engraving,' with illustrations by J. Jacob, and there is a short but considerable detail, in the 'Gentleman's Magazine' of 1820.

BIDENS, a genus of plants belonging to the natural order Composite, the sub-order Corymblifere, tribe Senecionideae, subtribe Helianthemine, division Bcaptivae. It is a familiar name applied to many species of handsome shrubs, with numerous discoidal heads sometimes radiant; the flowers of the ray neuter ligulate, of the disk, bexamphrodite, tubular; the receptacle flat; the involucres of two rows, the outer row spreading; the branches of the style surmountt by short discoidal heads, with peltate; the seeds; angular, or ovate; the petals terminating in 2-5 stili retroflexly hispid bristles. The genus has been named Bidens from the two bristles which most frequently surmount the teeth. A great number of species belonging to this genus have been described, but they are generally inconspicuous woods. They have been found in Europe and North and South America. Two are natives of Great Britain in marshy and watery places, B. bipartita and B. cernua. The latter is the Crepe-b Qioof Bidiens of Linnaeus. (Balclutha Syme; Lindley, External System.)

BIGBONE LICK, a place in Kentucky (U.S.), where great numbers of fossil mammals occur in a dark-coloured marly soil, covered by gravel and resting on blue clay. The bones of four species of mammoths have been found, very numerous. With them lie bones of Megalonyx Jeffersoni, Bos caminesis, Bos Pallitania, and Cervus Americanus. (Rogers, On American Geology; Brit. Assoc. Reports for 1843.)

BIGNIONIA, a genus of plants named by Tournefort after the Abbé Bignon, librarian to Louis XIV. It forms the type of the monopetalous order of Exogonia, Bignioneae. It has a campanulate 5-toothed rarely entire calyx; the corolla with a small tube, a campanulate throat, and a 5-lobed bilabiate limb; the stamens four, diadynamous, with the rudiments of a fifth; the anther discariate; stigma bilamellated; capsule siliqua-formed, 2-celled, with the dissimper parallel with the valves; the seeds in two rows, imbricate, transverse, with membraneous wings, and nearly one hundred. Many of the elegant plants have been described. They are usually climbing shrubs furnished with tendrils, with opposite, single, compound, ternate, pinnate, or digitate leaves. The flowers are mostly in terminal or axillary panicles. The calyx is trumpet-shaped, and are coloured variously white, yellow, orange, purple, violet, or rose.

All the species of this genus are splendid plants while in blossom, and deserve a place in every collection. Most of them flower in July and August. B. Millii, however, will bloom in November, but they only grow freely in stoves. A mixture of loam and peat is best adapted for their growth, and cuttings will strike readily under a hand-glass in best, either in mould or sand. The species which are most abundant in our gardens is the Bignonia radicosa. This ibis and some other species of Bignonia are now referred to the genera Spadithaea [Spatheodra (Spatheodra, P. C. S.)] and Tecoma. (Inca.)
P. C. S.] It is one of the few species capable of living in the open air against a wall in this country.

B. speciosissima, has square glabrous branches, glabrous conjunct leaflets, oblong lanceolate leaflets, simple axillary tendrils, and terminal exstipulate, racemose inflorescences with biclinous ligneous stems. It is a native of Guiana and the island of Arrowsmith. It is applied by the negroes to swellings of the feet, with which they are troubled.

The African species, B. fastigiata, has a terminal cluster of leaves; ovate-lanceolate, acuminate, glabrous leaflets; terminal, solitary, or twin flowers. This plant is a native of Jamaica, on the banks of rivers. It has white flowers, not unlike those of Datura stramonium, which come out before the leaves. The wood is of no value, but yielding itself properly, it might be a market under the name of ebony. It is said to be an antidote to the poison of manchineel.

B. Chica is a climbing plant, and has abruptly bipinnate leaves,uguiculate-ovate, acuminata, deeply cordate, glabrous leaflets; axillary pendulous panicules. It grows on the banks of the Orinoco. A red matter is extracted from its wood by the Indians, with which they paint their bodies. It is called Chica, and so it has been used in this country as a dye.

B. Allotropia has tetragonal branches, conjunct leaves, coriaceous elliptic leaflets, simple tendrilia, axillary 5-flowered pedunculata, 5-toothed calyx. It is a native of Guiana and the West Indies. It has large white flowers, and is distinguished from all other species of B. by its peculiar garlic colour; hence the French name liane à l'ail.

(Don, Gardener's Dictionary; De Candolle, Prodromus; Bentham's Outlines; Systema Plantarum.)

Bill del. The subject of the present volume, and so in his countrymen among the first—by some as the very first modern poet and writer of Holland, and also distinguished by his varied erudition, was born at Amsterdam in 1755. His studies at Leyden took a very extensive range, for besides philosophy and languages—most of the modern languages included—he applied himself to history, archaeology, jurisprudence, divinity, medicine; and geology; and appears, in short, to have left scarcely any branch of science untouched. If there seems to be some-what of a poem, I am of opinion that he will have suffered more in the latter part of his life than in the former. Genius usually breaks forth on inspiration of a different kind from that produced by the hope of obtaining premiums and prize-medals; and if Billerdiky's did not, it was perhaps in some degree a foreboding of his future career, which he was destined to follow. But his appearance, in the midst of the first volume of his poems, in the collection of the Leyden Society of Kunst door Arbeid, was an event of more importance than the poetical enthusiasm. It was the character of poet however that made his début in 1775, when his 'Invlok der Dichtkunst,' &c. ('The Influence of Poetry on States and Governments'), obtained the prize from the Leyden Society of Kunst door Arbeid.

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against the parties liable, by 'summary diligence,' as if it were the
\textit{BILL IN EQUITY.} \textbf{[PARADIGM. P. C.]} 
\textit{BILL IN PARLIAMENT.} \textbf{[PARLIAMENT. P. C.]} 
\textit{BILLARDIER,} a genus of plants named after Jean Jacques L. Lahillardière, a French botanist, who visited South America in 1815. New Zealand is the center of an expedition, and wrote the '\textit{Novae Hollandiae Plantarum Specimen,}' in two volumes, 4to. The genus belongs to the natural order Pittosporaceae, and has a calyx of 8 scuminate sepals, 6 petals with approximate claws, which are convoluted at the base, and a fruit or berry terminated by a style. The species are called Appleberries, and according Do George Don enumerates eight. They are climbing shrubs, natives of New Holland and Van Diemen's Land. The flowers are showy, and Prof. Binck has proved that \textit{B. longiflora} has climbing branches, the younger ones scarcely pubescent; the leaves lanceolate, entire; the pedicles 1-flowered, glabrous, one half shorter than the flower; the berries almost globose, to roose, glabrous. This plant is a fast grower to abundant flowerer; and when in fruit its fine blue berries make a handsome appearance.' (London.)

The other species are desirable shrubs for the conservatory. They thrive well when planted in an equal mixture of loam and peat. Cutting will readily root in sandy loam. They may also be raised from seed, which they produce in abundance.  
\textit{(Cyclopedia of Plants; G. Don, Gardener's Dictionary.)}

\textbf{BILOCULINA.} \textbf{[FORAMINIFER, Fossil, P. C. S.]} 

BIRBI, a celebrated Venetian goldsmith, watchmaker, and painter, and one of the so-called little masters, was born about 1500, in Cologne; some authorities make him, incorrectly, a native of Nürnberg. He at all events lived some time in Nürnberg, and was probably the pupil of Albert Dürer. Sandrart says he studied with Marcantonio at Rome; all the accounts of him, however, are little better than conjectures. In 1546 Binck appears to have been living at Copenhagen as portrait painter to Christian VIII. of Denmark. Later he was living at Königsberg in the service of Duke Albert of Prussia, who sent him in 1549 on a commission to the Netherlands. In 1550 he was employed again by Christian VIII., to select a fit spot for the erection of a fortress in Holstein. He probably died at Königsberg, in the service of Albert of Prussia, about 1569.

Bartsch describes ninety-eight prints by Binck, including one woodcut. There are many other prints attributed to him, which are marked J. B., but these according to Bartsch belong to some other artist, who probably is the same who studied, according to Sandrart's account, at Rome. Binck's monogram is made of J. C. and B. interlining, the C signifying Colonians, 'of Cologne,' in one print the word Coloniales is written in full. Many of his prints have been considerably improved to profit by the deception, as is the case with the works of other celebrated masters. Binck's drawing is superior to that of the little masters generally, but his style is very similar to that of Barthel Beham.  

The initials B. answer to several of Binck's contemporaries, as Johann Bergmair, Joseph Brechter, Jacob Beutler, Johann Brosamer, and Julio Bonason. His monogram is also very like that of Hans Baldung, the difference being only that between a G. and a C, both generally indistinguishably expressed. Binck's marks according to the collection of Mariette, amount to 200; their subjects are various.  

\textbf{BINOMIAL EQUATION.} \textbf{[Equation, Binomial, P. C. S.]} 

BIRD, JOHN, a celebrated mathematical instrument maker in the last century, died March 31, 1776, aged sixty-seven years. He ' was brought up a cloth-weaver in the county of Durham. What first occasioned him to turn his thoughts to the art, in which he afterwards so much excelled, was his accidental observing, in a clockmaker's shop, the course and intrinsic divisions of the minutes and seconds on a clock dial-plate. Those offended him much. He divided another plate with great neatness and accuracy, and amused himself for some time with dividing and engraving dial-plates for the clockmakers. He observed all the figures upon his own instruments. He came to London in the year 1740, and certainly was in business for himself in the year 1745.' (Ludlam, in work presently cited, Preface.)

Bird began his career in London by dividing astronomical instruments both for Graham and Gardner, and afterwards carried on business in the Strand. His celebrated Greenwich quadrant, of eight feet radius, was mounted February 16, 1742, and was used by both Bradley and Maskelyne. Another instrument was erected at Oxford Observatory. His last work was the instrument with which D'Agllct and the two La Landes determined the obliterations of 50,000 stars. The Greenwich Quadrant was described by Lemonnier in his \textit{Description et Usage,} 
\textit{Paris, 1716.} In 1747 he received 600l. from the commissioners of longitude, on completion of a globe bearing the meridian of Greenwich. 'The method of determining the meridians,' &c., 1716; 'The method of constructing mural quadrants, exemplified by a description of the brass mural quadrant at the Royal Observatory at Greenwich,' &c., 1768.

In 1756, Mr. Ludlam, of St. John's, Cambridge, who was one of the persons appointed by the commissioners to inspect Bird's methods, published his 'Introduction and Notes on Bird's Method of Dividing, &c.' This treatise had been sent to Bird, and bore his certified attestation of its correctness. The method is a model of what is called the better. All I can say is, that he has nowhere misused my meaning; and if he can (by what he has written) can those understand my method of dividing who otherwise seek not, he will not lose his labor.—John Bird.

The explanation of the improvements on Graham's method of dividing, which has made the name of Bird celebrated throughout the astronomical world, has been given in \textit{Gra-}

\textit{duation, P. C.}

EDWARD, R.A., an excellent English figure painter, was born at Wolverhampton in 1772. As he evinced a strong inclination for drawing, his father, who was a clothier, apprenticed him to a tea-board manufacturer of Birmingham, with whom it was Bird's business to paint the boards. His labours in this way were highly profitable to his employer, who wished to retain Bird in his service after the expiry of the term of his indentures, but Bird preferred trying his fortunes in the world as an artist, and he accordingly set up as a drawing-master at Bristol. In 1807, when he was thirty-five years old, he exhibited some paintings at Bath, which were much admired, and sold for thirty guineas each. These were succeeded by a piece called Good News, which established his reputation. Other good works succeeded, among which the most celebrated was the representation of the Death of Eli, for 500 guineas, which was purchased by William IV., the second by the Marquis of Hastings, and the Royal Academy elected Bird an Academician. He now exhibited his masterpiece, the Field of Closutton, after the Battle, which was purchased by the Marquis of Stafford for 500 guineas. The most celebrated picture purchased his next picture, the Death of Eli, for 500 guineas, and he obtained it also a prize of 500 guineas awarded by the British Institution. The picture however was not at first a success: it was the joint work of three of the greatest of Bristol, who had commissioned Bird to paint it for 500 guineas, and the 500 for which the picture sold at the exhibition was divided among them. The profitable result of their speculation led them to give Bird a second commission, but his health was too exhausted for further labours.

In 1817 Bird was in London, and was introduced to the Princess Charlotte, at Greenwich House, by her friend Mr. Murphy, to whom the Princess said—'Mr. Bird is a very well-bred man—he has a very pretty way of talking.' He appointed him her painter, and he presented the princess with the Surrender of Calais, one of his favourite pictures. The visit to London produced a great change in his taste; he was no longer satisfied with the humble character of his usual subjects. The life of Sir Walter Scott, his friend, and his books, impressed him with the grandeur and domestic life, in pursuit of the imaginary greatness of religious and historical subjects—the Fortitude of Job, the Death of Sapphira, the Crucifixion, and the Burning of Balaam's Ass, were the fruits of these designs. In 1807, for France, which at the time was engaged to a Spanish show. This last undertaking was a great misfortune to Bird; he required the portraits of many persons of rank, natural
foreigh: the prevailing upon these persons to sit was a trouble and a difficulty which Bird had never contemplated. He completely failed in his attempt, and this disappointment proved to have done incalculable mischief, during his dying hour. He died in 1819, in his forty-eighth year, leaving his pages unfinished. His fate may serve as a warning to future artists who leave the paths of nature, simplicity, and truth, to picture the empty pages of state ceremonies.

The body, it is said, of the lyre by which he gained his popularity, he executed several which have not been mentioned—as the Blacksmith's Shop, the Country Auction, the Gipsy Boy, the Young Recruit, Meg Merrilies, the Game at Put, and some of his earlier works, as the Village Politicians, and the Pickleburgh.

'Towards the close of his life,' says Allan Cunningham, 'Bird's looks grew dark and melancholy; but this was less the fault of his mind than of his fortune; he felt that the world of fashion which he had worshipped was making its own return—neglecting while it praised, and spurning while it cursed.'

He was buried with all the honours of the city in the cloisters of Bristol Cathedral. Three hundred gentlemen followed his body to the grave; his son, a child of seven years of age, was the chief mourner. The expense of the funeral was borne by his widow, a singular instance of liberality on the part of the mourners, if, as reported, the funeral was made public by their express desire, and against the inclination of Mrs. Bird. Dr. Birkbeck voluntarily took upon herself the expense, and declined the offered assistance of the gentlemen who attended the funeral. (Cunningham, Lives of the most eminent British Painters, vol. i.)

BIRDE (or BREDE, or BIRD), WILLIAM, who is numbered among the most celebrated of our ecclesiastical composers, was born about the year 1840, and educated as one of the 'children' in the chapel of Edward VI., probably under the famous Thomas Tallis, whom he certainly was in all probability at an early period of his life. In 1860 he was chosen organist of Lincoln Cathedral, and in 1875, conjointly with Tallis, became organist to Queen Elizabeth, as well as gentleman of her chapel. It is said that the music of Bird was so much admired that he was released, both in his private and professional capacity. Peacham, in his 'Complete Gentleman,' speaks of him with great reverence, as does his pupil Morley, in his 'Introduction.' (Burney's Hist. iii. 83.) That he was great in his art, at a time however when that art exhibited more of study than genius, his compositions afford indubitable evidence. His complete Service, together with three Full Anthems, published in Boyce's 'Collection,' prove his musical learning, which is further evinced in his 'Caniones Sacrae,' or sacred songs, published in 1617, and in his 'Musicae Antiqua.' In 1623 he was admitted a freeman of the corporation of the 'Society of Musicians in Antiqua,' at London, and in 1625 a freeman of the corporation of 'Singers and Musicians of St. Paul's.'

Among these are 'The Carman's Whistle,' an air with variations by Bird, which, if actually and well executed by 'the virgin queen,' shows that her majesty was as completely mistress of her instrument as of her bishops. Indeed to perform this, even in the present day, puts the skill of a good player to a somewhat severe test. He also published other works, chief among which is his 'Musicae Antiqua,' in which he represents himself as not only a very sincere adherent to the Reformed religion—all of them displaying deep study, and a profound knowledge of musical counterpoint. But he is now generally known—for, in well known everywhere—by his canon 'Yea nobis, Domine,' a unique composition, which has rather gained than lost by the operation of time, formed as it is of materials so enduring, that in spite of the love of novelty, which in music is so influential, it has maintained its ground during nearly two centuries and a half. Some attempts have been for some time made to reduce it to a canonic form, and as a valuable leaf from Bird's laurels, he is still left in full possession of this, his richest, never-fading ornament.

BIRKBECK, GEORGE, M.D., was born January 10, 1778, the son of James Birkbeck, a banker, and later a merchant and banker. At the age of eight he was sent to school at the village of Newton, Lancashire, where he remained till fourteen, when he was placed with Mr. Dawson of Sedbergh, a man of considerable mathematical attainments, who had once been a shepherd; and he read the classics with a relative, Mr. Robert Foster. He displayed an early predilection for mechanism, and scientific subjects, which led him to select the medical profession as his pursuit. He commenced his medical studies in 1797, and at the age of eighteen repaired to Edinburgh, where he remained for more than ten years. In 1807 he became a pupil of Dr. Baillie in London; but at its close he again went to Edinburgh, and at the termination of his fourth session took his degree. His reputation in the university was established, and by the formation of a friendship with Brougham, Jeffrey, Sidney Smith, F. Horner and others, he afterwards attained eminence. While at Edinburgh he was put in nomination for the professorship of the Andersonian Institution at Glasgow, and his election was carried by a considerable majority. In 1808 he opened his first course of lectures at Glasgow on Natural and Experimental Philosophy. There was at that time no maker of philosophical instruments at Glasgow, and he was obliged to make his philosophical apparatus made by ordinary workmen. He had employed a timman to construct a model of centrifugal pump; and it was in the cellar which formed the workshop, while surrounded by the workmen who had made it, but were ignorant of its use, that he was first struck with the idea of giving a gratuitous course of lectures for the scientific instruction of the mechanics of Glasgow. In March, 1800, he communicated his wishes on this subject to the trustees of the Andersonian Institution, who regarded the proposal as visionary, and nothing was done during the session. At its opening in 1800, Dr. Birkbeck, taking advantage of the prospectus of his courses for the ensuing session, announced his intention of establishing a class 'solely for persons engaged in the practical exercise of the mechanical arts, men of the education he wished to impart,' in order to enable them of acquiring the smallest portion of scientific knowledge. In the style of these lectures he promised that he would study 'simplicity of expression and familiarity of illustration.' On his return to Glasgow a printed invitation was circulated in the different manufactories, while tickets for the admission of the most intelligent workmen in each manufactury into the mechanics class at the Andersonian Institution. The number who accepted this offer was not large, as the first lecture was attended by only seventy-five persons; but it gave so much satisfaction, and excited such general interest, that at the second lecture the number was increased to two hundred; at the third lecture above three hundred mechanics were present; and at the fourth above five hundred; and as the theatre was not sufficient to accommodate many more persons, it became necessary to limit the number of tickets. At the close of the course his mechanics presented him with a silver cup. Dr. Birkbeck continued his lectures to them for the two succeeding sessions; in 1804 he relinquished the professorship, and was succeeded by Dr. Ure.

In May, 1806, Dr. Birkbeck married a lady named Lloyd, the daughter of Samuel Lloyd, Esq., of The Farm, near Birkbeck, in Lancashire, who taught him the art of medicine and good practice as a physician. In March, 1807, his wife died, and he did not marry again until 1817, when he was united to the youngest daughter of Henry Gardner, Esq., of Liverpool.

While in active practice in London as a physician, Dr. Birkbeck had few opportunities of following up the labours which he had commenced at Glasgow for the advancement of scientific knowledge amongst artisans; but it was a subject which he had always at heart. In 1820, he executed for the London Institution a gratifying course of seventeen lectures at the London Institution. In February, 1823, the mechanics of Glasgow who attended the lectures at the Andersonian Institution, as a mark of respect for his character, and in gratitude to him as the 'liberal-minded projector and founder' of the mechanics' class, asked his consent to allow his portrait to be taken. In July of the same year they resolved to establish a school for their own instruction, to be called the Glasgow Mechanics Institution. By circumstances now tendered a general development of Dr. Birkbeck's speculations. In 1821 a School of Science had been established at Edinburgh, through the exclusive principally of Mr. Leonard Horner. In the 'Mechanics Magazine' for October 11, 1823, a paper appeared, entitled 'Proposal for the Establishment of a School for the Advancement of Mechanics,' and Birkbeck was at this time engaged in preparing an Essay on the Scientific Education of the Working Classes, and he wrote to the 'Mechanics Magazine' (of October 18th), offering information and every assistance in his power in the formation of the projected institution. He was soon active in the pursuit of
this object, and on the 11th of November, 1823, presided at a public meeting at the Crown and Anchor, which was attended, amongst others, by Dr. Lushington, Jeremy Bentham, David Vivian, Lord Brougham, who had attended the preliminary meetings, was absent from other engagements.

The question of enabling persons engaged in the mechanical arts to acquire scientific knowledge was now fully brought before the public in London; and after another meeting, on the 2nd of December, the first officers of the "London Mechanics' Institution" were appointed on the 15th of December.

Dr. Birkbeck was elected president, which office he filled till his death; and his son has since been annually elected. At the opening meeting, Dr. Birkbeck generously lent the sum of 3700L., for the purpose of building a lecture-room, &c. On the 20th of February, 1824, he delivered an inaugural address on the opening of the institution, which was followed by a lecture by Professor Millington.

Dr. Birkbeck's professional and scientific pursuits, and his services in various ways, in connection with objects of public utility, were continued to the last. He died December 1, 1825, at his residence in Finsbury Square, London, of a severe internal disease which occasioned great suffering. He left a son by his first wife, and two sons and two daughters by his second wife, who survived him. His funeral was attended by a large procession of the working classes, the members of the London Mechanics Institute and the committee of the Polish refugees and a number of Poles; and among the private carriages was that of the Turkish ambassador. Altogether about a thousand persons were present, and a notice of it appears in "Mr. Birkbeck's "Mechanics' Magazine," February, 1842, has the following remarks on his character and personal appearance.—"He was mild and equable in his temper and disposition, benevolent in spirit, and possessing great suavity of manners. He spoke with singular neatness and fluency; and his ideas were as clear as his language. Whenever he appeared among the mechanics he was welcomed as a father and a friend; he was highly appreciated by a very large circle of private friends, and was held in great esteem by the most eminent public men of the day. As he was one of the most eminent physicians of the metropolis, he belonged to the Whig school. He possessed a beneficial, benevolent countenance, a venerable and unprejudiced aspect."

(Mechanics' Magazine, vol. i., 1823; London Mechanics' Register, vol. i., 1825.)

In April, 1842, a meeting of the friends and admirers of Dr. Birkbeck was held at the Freemasons' Tavern, London, for the purpose of adopting some plan of testifying the public approbation which is due to him for his valuable services to his country. Dr. Brougham took the chair; the Bishop of Ripon, Lord John Russell, and many other eminent friends of the diffusion of mechanical knowledge were present, and a resolution was passed in favour of the proposed action. In Uniting Birkbeck professorship of machinery and manufactures, including the application of chemistry and other branches of natural philosophy to the arts; and that it should be incumbent on the professor to lecture in the country in vacation. This professorship has not yet been established.

BIRKENHEAD, a town on the Cheshire side of the river Mersey, which is rapidly rising into importance. It is opposite Liverpool, and the distance from one bank of the river to the other is 1400 yards. Birkenhead owes its origin to the foundation of a Benedictine priory in the reign of Henry II. The prior enjoyed the right of ferry across the river. Birkenhead was extra-parochial and a chapelry in the parish of Bidston; but by a local act it is constituted a township under the government of commissioners. In 1843 an act was obtained for including the township of Chagport-on-Grange, and part of the township of Oxton, within the jurisdiction of the commissioners, which now extends over an area of about 1300 acres. In 1833 an act was passed for paving, lighting, watch- ing, and otherwise improving Birkenhead, for regulating its police, and for establishing a market; and in 1841 another act was obtained for supplying the town with water and for lighting it with gas. In 1842 the town commissioners were empowered to purchase the manorial rights, &c., pertaining to the ancient ferry at Woodside, which is the nearest ferry to Liverpool; and in 1844, under another act, they purchased Monk's Ferry. In 1844 they obtained an act of still wider extent, under which a large number of extensive accommodations for trade and shipping are now in progress. The magnitude of these works may be inferred from the following abstract, which is taken from the estimates:

New market, 20,000L.; tollhall, 10,000L.; park, 25,000L.; docks in Wallasey Pool, 400,000L.; dock warehouses (by subletting), 500,000L.; ironworks in Wallasey Pool, on which Birkenhead is situated, into docks, as entertained several years ago, and originated with the late Mr. Laird, but it was not until 1844 that an act, as already mentioned, was obtained for effecting this object. The first dock of the new line of docks was commenced in 1844, and the area of the principal or floating dock will be 15 acres, a space exceeding that of all the docks in Liverpool, and it will have 10 feet depth of water. It will be surrounded by walls 20 feet high with sliding gates for shipping and discharging cargoes. There will also be a tidal basin of about 40 acres, accessible at all times by the large steamers employed in the coasting trade, and by all vessels whose draught does not exceed 15 feet; a harbour of which area 10 acres; a free use of the river-craft. In February, 1845, the commissioners purchased the Herelesemine dock at Liverpool, in order to accommodate vessels which require to unload or take on their cargo at Liverpool, by which means they will be saved the necessity of paying full dock charges. Besides these advantages a port, Birkenhead possesses a communication by railway with the populous midland counties, by means of a railway which joins the Grand Junction Railway at Crowe, 5 miles from Birmingham. A line of railway from Manchester into Cheshire will also closely connect Birkenhead with that town.

In 1839 the commissioners purchased the town of Monk's Ferry, which is reached by means of a tunnel, of about 500 yards in length, which cost 20,000L., and was opened October 17, 1844; and the other terminus is intended to be at the docks, which will also be reached by a tunnel. By these means the London and Birmingham and Grand Junction Railways may possess a water-side terminus for the Irish traffic.

The commissioners for the improvement of Birkenhead are in possession of all the necessary powers by which they may enable them to carry into practice all those sanitary regulations which have hitherto been so much neglected in large towns. One of the bad acts provides for the appointment of a Board of Health. The width of courts is regulated, and the streets already in progress are wider than in the best parts of most towns. In the north-west part of the township, on rising ground, a park containing 226 acres has been laid out, which will be drained, planted, and ornamented with two lakes. The whole will be divided into pleasure grounds and open spaces or gardens for the public. The elevation and design for villas and terraces are in the park are to be subject to the approval of the commissioners. On the western side of the park there will be a number of perambulations, or walks across, London. Birkenhead consists of about 3000 houses, and has a population of about 120,000, and an area of 3 acres, four of which are enclosed and planted as a shrubbery. The houses are handsomely built, and the townhall forms the centre of the southern side of the park. A market-hall is erected, which will be 430 feet long by 40 feet broad, with six entrances; and it is intended that there shall be 42 shops and 50 stalls, which will be pleasantly supplied with water from the roof. It is expected that the sale of surplus land in the immediate vicinity of the market will defray the cost of its erection. Slaughter-houses are also to be built in a suitable situation. The commissioners are also empowered to erect public baths. The number of churches is at present two; St. Mary's, built in 1817, and one recently completed. The church-yard of St. Mary's is proposed to be the burial-ground of the ancient priory. Preparations are now (March, 1842) making for the erection of a third church with a parsonage-house. There are quarries of good building-stone in the township. There is a well-known Independent and one Wesleyan chapel. Birkenhead has several good hotels, a news-room, a savings-bank, and several other useful institutions. The communication with Liverpool is kept up by small steam-boats which ply from Monk's Ferry three times a week. In 1843 the number of passengers by the ferries exceeded two millions. It is intended that the boats shall soon commence running every quarter of an hour at one penny, and for carrying goods, 6d. per cwt. They ply both night and day. A number of the ferry are a source of revenue to the town commissioners. In November, 1844, the receipts were 1844,
which was 48.2% more than in the corresponding month of 1843. Another source of municipal income consists of ground-rents; and when the docks are opened, there will be a

Several points and stalls.

The population of the chapelry of Birkenhead was under 16,000 in 1821; in 1841, it exceeded 50,000 at the present time, and is.

BERKSHIRE.

The statistics of BERKSHIRE, P.C., having been greater with less completeness and accuracy than those of other large towns in England, the present opportunity is taken for supplying omissions, and also of noticing various other matters not necessarily included in the returns of the other boroughs.

The parliamentary borough of Berkshire consists of the parishes of Berkshire and Edgborough, and the two hamlets of Derrington and Bordenley and Duffield-cum-Necklins.

Rhode Island is composed of the town of Providence, the parishes of Glocester, Middletown, Newport, and Warwick, each of which returns one representative to the.

The following particulars, abstracted from the census returns of 1841, show the population, &c. of the Berkshire and also of the borough:

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Berkshire</td>
<td>6,670</td>
<td>18,780</td>
<td>Berkshire</td>
</tr>
<tr>
<td>Edgborough</td>
<td>2,790</td>
<td>6,609</td>
<td>Edgborough</td>
</tr>
</tbody>
</table>
| Derrington    | 13,330              | 20,079       | Duffield-cum-
| Neckles       |                     |              |                     |
| Total         | 18,780              | 18,992       | Total               |

Of the 128,922 persons born in the county of Warwick and residing in the borough on the 6th of June, 1841, there were 61,315 males and 66,887 females; born in other English counties, 22,950 males and 24,438 females; born in Scotland, 463 males and 257 females; born in Ireland, 2277 males and 2065 females; foreigner or British subjects born in foreign parts, 378 males and 179 females; and the place of birth of 839 males and 831 females was not ascertained.

The number of births in 1842 was 6094, which was 156 more than those of the preceding year. The number of illegitimate births was 207, or 4.1% per cent. In the same year the number of marriages was 1018, and 924 were solemnized according to the rites of the Established Church; 750 took place at registrar's courts, and the remaining 129 at parochial courts.

The number of men married under age was 25, or only 2-4% per cent., and the number of women married under age was 99, or 6-9% per cent. for England the proportions are respectively 4-5 and 13-5 per cent. of persons married under age.

Out of 3578 deaths (1839 males and 1749 females) there were 914 of children under one year, and 1667 of children under the age of five. In the previous year above one-half the deaths of children under one year were to be charged to small pox, and one-fifth to scarlet fever. There are only three towns, Manchester, Leeds, and Liverpool, where the infant mortality is higher. The annual proportion of deaths to the population is 2-7% per cent., and in the whole of England 2-2% per cent. but the mortality is higher in Liverpool, Manchester, Sheffield, and Bristol, than at Birmingham.

The number of inquests held in the borough was 263 in 1844; and the average of the five years, from 1840 to 1844 inclusive, was 256. In 1844 the ratio of inquests to the total deaths was 8 to every 1000 deaths. The highest rate of mortality was 20.1 per 1000 at the age of 1620, and the lowest at the age of 40-60.

1. A coroner for the borough was first appointed in 1839. The cost of the coroner's court in 1844 was 926L.

The density of population is greater in Birmingham than in several of the largest towns in which the mortality is higher. In the parish of Birmingham there are 33,250 persons to a square mile; but in the metropolis of London, the population is 3500 people to a square mile. There are no cell-dwellings; but there are about 30,000 courts, containing 12,254 houses, which, at four persons to each house, would give a population of about 35,000. The sanitary condition of the city is good, and typhus is rare. There are no cell-dwellings; but there are about 30,000 courts, containing 12,254 houses, which, at four persons to each house, would give a population of about 35,000. The sanitary condition of the city is good, and typhus is rare. There are no cell-dwellings; but there are about 30,000 courts, containing 12,254 houses, which, at four persons to each house, would give a population of about 35,000. The sanitary condition of the city is good, and typhus is rare.
facturers (all branches), 564; gold-beaters, 131; gun and pistol makers (all branches), 1781; gun-barrel makers (all branches), 2; hinge-makers, 132; iron manufacturers (all branches), 499; ironmongers, 87; ivory turners and workers, 7; japanners and japanners' furnaces, 2; jewellers, goldsmiths, and silversmiths, 1539; lamp-makers, 244; lacemakers, 90; lock and key smiths, and bell-hangers, 314; mill-makers, 34; moulders (mouth not specified), 83; masons and nail-makers, 486; opticians, 47; ornament-makers, 37; patten and clog makers, 81; pen-makers (designers, 35; pen (steel) makers, 306; pin-makers (all branches), 120; plane-makers, 82; plated ware manufacturers, 34; platers, 780; platers, silver, 170; polishers, 227; pump-makers, 47; ring makers and turners, 40; rule-makers, 174; saddle-tree makers, 53; saw-makers, 36; screw-makers, 438; snuffer-makers, 146; spoon-makers, 348; spur-makers, 33; stampers and piercers, 312; steel-yard-makers, 25; stirrup-makers, 33; sword cutlers and makers, 86; thimble-makers, 87; tin-plate workers and tinnmen, 295; tool-makers, 350; tool (edge) makers, 54; toy-makers (in bone, gilt, glass, silver, steel, and tin), 924; tray-makers, 112; tube-makers, 27; umbrella and parasol makers, 159; urn-makers, 27; vice-makers, 23; whistlesmiths, 193; wire-drawers, 277; wire-workers, 284.

In 1838 the average weekly wages of 791 persons engaged in about one hundred different branches of manufacture and handicraft in Birmingham were as follows:—

<table>
<thead>
<tr>
<th>Age</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>14 to 18</td>
<td>4716d</td>
<td>19s. 6d.</td>
</tr>
<tr>
<td>14 to 50</td>
<td>24s. 6d.</td>
<td>19s. 6d.</td>
</tr>
<tr>
<td>Adults</td>
<td>24s. 6d.</td>
<td>8s. 6d.</td>
</tr>
</tbody>
</table>

Of the above 791 persons, 33 per cent. were workers in braze and copper; 11 per cent. in iron; 5 per cent. in guns and pistols; 4 per cent. in gold and silver; 14 per cent. were glass-cutters; and the remainder were employed in a variety of other occupations. The average wages of adults are not high, but the income of families is often considerable when the wages of women and persons under 20 are added to the earnings of the head of the family. The occupation returns show that out of a population of 182,000, the number engaged in some kind of occupation which was specified, was—males above 20, 43,688; males under 20, 8,083; females above 20, 12,335; females under 20, 5,945; and 1224 cases the branch of employment was not specified. The number of persons of independent means was 3908; number of alms-people, pensioners, paupers, and beggars, 1075; number of ‘other persons’ (in persons in bagnes, prisoners, &c.), 499; and the resin of the population consists of the males under 20; 1621, above 20; 56,789, females above 20, 36,074 females under 20.

Steam-power was first employed in manufactures at Birmingham in 1780. From 1780 to 1815 only 42 engines were set to work; from 1815 to 1830 there were 175; and from 1830 to 1838 there were 129; the number in January, 1839, the number of steam-engines at work was 240, of 346 horses power. The total quantity of coal consumed per day was estimated at 340 tons; and the number of persons employed in connection with steam-power was 896 and 1762 females.

In the metal trades of the town 2156 horses' steam was employed, and the following is given as an estimate of the amount of power consumed in different branches:—

<table>
<thead>
<tr>
<th>Trade</th>
<th>Power (horses)</th>
</tr>
</thead>
<tbody>
<tr>
<td>210 horses' power</td>
<td>Employed by iron-founders, engineers, and smiths; and steam first applied to the purposes in</td>
</tr>
<tr>
<td>650 in rolling metals</td>
<td>and first applied</td>
</tr>
<tr>
<td>170 in drawing wire</td>
<td>and first applied</td>
</tr>
<tr>
<td>201 in iron forges</td>
<td>and wrought-iron mills; and first applied</td>
</tr>
<tr>
<td>78 in nail-cutting</td>
<td>and first applied</td>
</tr>
<tr>
<td>122 in wood-screw making</td>
<td>and first applied</td>
</tr>
</tbody>
</table>

The remainder of the steam-power was employed as follows:—grinding flour, 257 horses' power; glass-works, 95; wood-saving, 129; paper-making, 60; colours and chemical preparations, 128; steam-grinding, 38; pumping, 444; sundries, 107; and engines of 169 horses power were not at work.

An office for assaying and making silver was established at Birmingham in 1773; and in 1825 for gold. From 1773 to 1839 there had been an assayed and marked 4,014,907 ozs. of silver. The quantity in the following years was:

<table>
<thead>
<tr>
<th>Year</th>
<th>Quantity (ozs.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1773-4</td>
<td>16,883</td>
</tr>
<tr>
<td>1800-1</td>
<td>37,473</td>
</tr>
<tr>
<td>1820-1</td>
<td>55,399</td>
</tr>
<tr>
<td>1838-9</td>
<td>114,500</td>
</tr>
</tbody>
</table>

The duty on gold and silver marked and assayed declined in each successive year from 4877l. in 1839, to 3344l. in 1842; and this falling off marks a period of general depression through the country. The quantity of gold assayed in 1839 was 2125 ozs.

The increase of wealth is indicated to some extent by the number of carriages which paid duty at different periods. In 1816 there were 404; in 1820, 897; and in 1838, 917; and in 1839 the duty was less than one-half of the amount charged in 1816. In 1838 a very elaborate investigation was made, under the direction of the Birmingham Statistical Society, into the state of the population of Birmingham; and the following are the results of this inquiry:—

**Description of Schools.**

<table>
<thead>
<tr>
<th>Type of School</th>
<th>Number of Schools</th>
<th>Total Number of Scholars</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sunday Schools</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Church of England</td>
<td>15</td>
<td>4,565</td>
</tr>
<tr>
<td>Roman Catholic</td>
<td>3</td>
<td>322</td>
</tr>
<tr>
<td>Dissenters</td>
<td>49</td>
<td>11,824</td>
</tr>
<tr>
<td>Total</td>
<td>65</td>
<td>16,757</td>
</tr>
<tr>
<td>Returned also as day or evening scholars</td>
<td></td>
<td>4,141</td>
</tr>
<tr>
<td>Sunday-school scholars only</td>
<td>305</td>
<td>12,611</td>
</tr>
<tr>
<td>Infant-schools (private)</td>
<td>3</td>
<td>68</td>
</tr>
<tr>
<td>Dame schools</td>
<td>267</td>
<td>2,890</td>
</tr>
<tr>
<td>Common-day schools</td>
<td>187</td>
<td>1,972</td>
</tr>
<tr>
<td>Superior private and boarding schools</td>
<td>97</td>
<td>2,196</td>
</tr>
<tr>
<td>Total</td>
<td>657</td>
<td>14,480</td>
</tr>
<tr>
<td>Evening schools supported by the scholars</td>
<td>36</td>
<td>555</td>
</tr>
<tr>
<td>Total number of schools and scholars</td>
<td>699</td>
<td>7,529</td>
</tr>
<tr>
<td>Evening schools attended by day-schools</td>
<td>91</td>
<td>1,490</td>
</tr>
</tbody>
</table>

At the time the inquiry was made the population was estimated at 180,000, and the number of children in the borough at 45,000. Of the children 48.5 per cent. were receiving instruction in day and Sunday schools, and 51.5 per cent. were not receiving instruction in either. From similar inquiries it has been ascertained that the number of children between 1 and 15 years of age who were not receiving instruction in any school was 17.8 per cent. in the borough of Bury, Lancashire, in 1839; 30.7 per cent. in the London parish in 1834 and 1835; 34.7 per cent. at York in 1838; 52.7 per cent. at Liverpool in 1835 and 1836; and 65.9 per cent. in four parishes in the city of Westminster in 1837. The number of children attending schools was less in Birmingham than in any of the above-mentioned places, except in Liverpool and in the four Westminster parishes. So far as the ability to write may be taken as a proof of education, the borough of Birmingham is below Cumberland, Westmorland, Northumberland, the North and East Ridings of Yorkshire, Durham, and Derbyshire, for out of 1018 cartages in 1842 there were 283 men (27 per cent.) and 448 women (44 per cent.) who signed the register with their names. The proportion for England and Wales in the same year was respectively 47 and 47 per cent.

The want of public places of recreation and of innocent amusement is much felt at Birmingham. Many years ago, when the town was far less populous, the artisan had a small garden in the suburbs, which he cultivated in his leisure time; but ground for such a purpose now and by has been taken up for other uses. Consequently, at the close of 1844 it was resolved that there should be public performances on the fine grass at the townhall once a-week, with the especial object of furnishing an agreeable and wholesome enjoyment to the working classes; and the plan is said to have succeeded. Quarterly tickets are issued at a small charge, and each performance is attended by a thousand or thirteen hundred persons. A subscription, amounting at present (March, 1845) to nearly 6000l., has also been raised for erecting baths for the working
In 1843 the police reported that there were 314 houses in the borough to which prostitutes resorted, in addition to 187 in which the trade was carried on. In about 4000 aye streets, weekly ending February 17, 1846, the number charged with felony was 23; misdemeanour 24; drunkenness 26; vagrancy 2. On an average of ten years ending Lady-day, 1842, the annual sum expended for the relief of the poor was $12,936. In the Municipal Er of out-door paupers 629; out-door cases 3290, which, assuming each person to represent 24 persons, would make 8126, and the total of in and out door paupers would therefore average weekly $819: in 1836 the number was 11,893. To this number must be added 286 persons employed in stone-breaking, and who may be supposed to represent 902 persons, and there were besides 4531 vagrants relieved weekly. The rates for the relief of the poor are collected and expended under a Board of Guar- dians appointed by act of 1834, and for the conduct of which there is now governed by an act of 1 & 2 Wm. IV. The number of guardians is one hundred and eight, who are elected triennially, and the overseers and churchwardens for the time being form part of the board. The rules and orders of the Guardians are fixed by the act, and the revenues are derived from the rate, and from the sale of the goods of vagrants, and from the revenues of the testaments, and from the proceeds of the sale of the land in the hamlet of Duddleston-cum-Nechells are under separate commisioners, and on the same day a bill was also introduced for effecting improvements in the local administration, cleansing, paving, surfacing, and cleansing public offices in the borough.


**BIRTH (INFANTICIDE, P. C.)**

**BISHOP, BISHOPRIC.**

Since the articles under these heads (P. C.) were written (in 1835) there have been several important changes in relation to the dioceses and revenues of the Church of England. The Act of 1834 (5 & 6 Will. IV. c. 77) removed the inequality in the extent of dioceses which has been in part remedied, first by the creation of the new sees of Ripon and Manchester, by 6 & 7 Wm. IV. c. 77, and next by remodelling the old dioceses. The newly created see of Man- chester will not be filled up until a vacancy occurs in thesee of Bangor or St. Asaph; and whenever such vacancy occurs the above two Welsh bishoprics will be unitcd, so that no addition will be made to the episcopal bench by the erection of Manchester into a bishopric. The see of Ripon was ap- pointed to the new see of Ripon soon after the passing of 6 & 7 Wm. IV. c. 77; and as the same act made provision for the union of the sees of Gloucester and Bristol on a vacancy occurring in either of them, the number of bishoprics in Eng- land will be reduced, but there will be no longer exist as separate sees, as their union has taken place.

The bishop is styled Bishop of Gloucester and Bristol, and the congé d’ésir for his election will be addressed to the chapters of Gloucester and Bristol alternately. The diocese of Ripon is formed of detached parts of the dioceses of York and Chester. The diocese of Manchester will consist of the whole county of Lancaster, except the deanery of Furness and Cartmel. The act 6 & 7 Wm. IV. made provision for uniting the see of Sodor and Man to that of Carlisle in 1834, but the see of Carlisle c. 30, its existence as a separate bishopric was preserved. The act 6 & 7 Wm. IV. c. 77, not only remodelled dioceses, but provided for a more equal distribution of episcopal revenues, according to the following scale:

<table>
<thead>
<tr>
<th>Archbishops</th>
<th>£15,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canterbury</td>
<td>£10,000</td>
</tr>
<tr>
<td>York</td>
<td>£10,000</td>
</tr>
<tr>
<td>London</td>
<td>£8,000</td>
</tr>
<tr>
<td>Winchester</td>
<td>£7,000</td>
</tr>
<tr>
<td>Ely</td>
<td>£5,500</td>
</tr>
<tr>
<td>St. Asaph and Bangor</td>
<td>£5,000</td>
</tr>
<tr>
<td>Worcester</td>
<td>£5,000</td>
</tr>
<tr>
<td>Bath and Wells</td>
<td>£5,000</td>
</tr>
</tbody>
</table>

The other bishoprics are augmented by fixed contributions out of the revenues of the richer sees, so as to increase their average annual incomes to not less than 4000l. nor more than 6000l. Thus under an Order in Council, dated 21st June, 1837, on the next vacation of the following sees, they will annually contribute to the Episcopal Fund as follows: See of Canterbury 7300l. a-year; York 1100l.; London 5000l.; Manchester 3600l.; Bath and Wells 1000l.; and Carlisle 2300l. a-year. The surplus revenues are paid into the hands of the Ecclesiastical Commissioners, and constitute what is called the Episcopal Fund; and every seven years, from Jan. 1, 1837, a new return is to be made by them of the revenues of all the bishoprics, and the scale of episcopal payments is to be revised, so as to preserve the scale fixed upon by the act. Provision was also made in this act for a more equal distribution of patronage among the several bishoprics, proportionate to the relative magnitude and importance of their respective dioceses.
B I S 200 B I S

Under the Act 3 & 4 Wm. IV. c. 37, and 4 & 5 Wm. IV. c. 90, which reduced prospecitively the number of archbishops in Ireland from four to two, and the number of bishoprics from eighteen to ten, the alterations which it was intended to effect have already by lapse of time been nearly completed. In the number of archbishops created in 1759, and when the articles Branor and Bishopric, P. C. were written, there were also the bishoprics of Quebec, Jamaica, Barbadoes, and Calcutta. To these have been recently added the bishoprics of Toronto, Newfoundland, British Guiana, Antigua, Madras, Bombay, Australia, Tasmania, New Zealand, Gibraltar, and New Brunswick. Some of these bishoprics have been created by letters patent, and their revenues and jurisdiction are regulated by acts of parliament; but others, as those of New Zealand, Tasmania, Antigua, Gibraltar, &c., are not of royal or parliamentary creation, but have been established by the archbishops and bishops, in concert with or by consent of the ministers of the crown. In 1841 a meeting was appointed by the bishops and bishoprics of England and Ireland at Lambeth Palace, when it was agreed to undertake the charge of funds then raising for the endowment of bishoprics in the colonies, and to become responsible for their application. In no case do they proceed without the concurrence of the British government. In 1841, in pursuance of this resolution, the bishopric of New Zealand was created; in 1842, the four bishoprics of Guiana, Antigua, Gibraltar, and Tasmania; in 1844, Newfoundland and New Brunswick, and in 1845 Ceylon.

As funds for endowments are collected, these bishoprics will be consecrated for the Cape of Good Hope, and next for Sierra Leone, South Australia, Western Australia, Port Phillip, and for Northern and Southern India. British colonies or dependencies which are not within any diocese are considered to be under the Bishop of the Diocese of the United Church.

There are thirty-two Roman Catholic archbishoprics, bishops, coadjutor bishops, and vicars-apostolic in the British colonies. At Sidney, Quebec, and in Bengal, the Roman Catholic prelates are of the rank of archbishops.

In 1840 a very important act (3 & 4 Vict. c. 86) was passed 'for better enforcing Church Discipline,' which repealed the old statute (1 Hen. VII. c. 4) under which bishops were enabled to proceed against their clergy, and subjects of the colony. This act has not provided in every case of any clerk in holy orders of the United Church of England and Ireland who may be charged with any offence against the laws ecclesiastical, or concerning whom there may be any complaint of having offended against the said laws, it shall be lawful for the bishop or the archbishop, of which offence is alleged or reported to have been committed, on the application of any party complaining thereof, or if he shall think fit, of his mere motion, to issue a commission under his hand or seal to five persons, of whom one shall be his visé-general, or an archdeacon or rural dean within the diocese, for the purpose of making inquiry as to the grounds of such charge or report: provided always that notice of the intention to issue such commission under the hand of the bishop or the archbishop must be given to the offended, together with the names, addition, and residence of the party upon whose application or motion such commission shall be issued to issue, shall be sent by the bishop to the party accused fourteen days at least before such commission shall issue.' The bishop may at once pronounce sentence, by consent of the clerk; and such sentence is good and effectual in law. If he refuse or neglect to appear and make answer to the articles alleged against him, or if there be any doubt of his truth thereof, 'the bishop shall proceed to hear the cause, with the assistance of three assessors, to be nominated by the bishop, one of whom shall be an advocate who shall have practised for at least five years in the bishopric of the province, or a sergeant-at-law, or a barrister of not less than seven years' standing, and another shall be the dean of his cathedral church, or of one of his archdeaconies, or his chancellor; and upon the hearing of such cause the bishop shall determine the same, and pronounce sentence thereupon according to the ecclesiastical law.' While the charge is under investigation the bishop may inhibit the party accused from performing any services of the church within his diocese until sentence has been passed; but if the person accused be the incumbent of a benefice, he may nominate any person or person or persons to perform such services during his inhibition, and such person or persons be licensed by the bishop if they are approved of by him.

Appeals under the act are to the archbishop, and they are to be determined by him, in the absence of any criticism or advice of the Judicial Committee of Privy Council, and at least one archbishop must be present.

In matters of dispute between a diocesan and his clergy an appeal lies to the archbishop of the province in all cases excepting curates' stipends (1 & 2 Vict. c. 106).

Rolle, an old authority, contended that the archbishop might appoint a coadjutor to one of his suffragans who is firm or incapable. This power is now established by 6 & 7 Vict. c. 62, entitled 'An act to provide for the performance of the episcopal functions in case of the incapacity of my bishop or archbishop.'

In 1841 a bishop of the United Church of England and Ireland was appointed for Jerusalem. The King of Prussia first suggested the appointment to Queen Victoria, and it was arranged that the representative should be chosen from the crowns of Prussia and England; but the Archbishop of Canterbury has a veto on the selection by Prussia. The Bishop of Jerusalem is a suffragan of the Archbishop of Canterbury; but he cannot exercise episcopal functions in the diocese of Jerusalem excepting in the presence of the archbishop.

The Protestant Church of Jerusalem will comprehend persons using different liturgies and subscribing different articles of faith, who will be on terms of equality as members. The bishop may ordain Prussian clergymen, and give them the Augsburg Confession and the Prussian Liturgy and Englishmen, on their subscribing to their articles and liturgy. He is the legal protector of all Protantists of every denomination against the Turkish government.

The Act 1 & 2 Vict. c. 85 passed 'to establish a separate and distinct Church within the limits of the Diocese of New York,' and York, and such bishops as they might select, to consecrate a foreign bishop. The instructions given by the King of Prussia to his envoy with respect to the establishment of the episcopate of Jerusalem, are copied in the 'Ecclesiastical Gazette,' March 11, 1845.

At the present time there are twenty-four bishops of the Protestant Episcopal Church of the United States of America. In this church the superior powers of church government are vested in a General Convention, which makes the constitution of the Church. The Convention consists of two houses. The bishops sit as a body in their own right and form a separate House. The lower House is composed of lay and clerical delegates. Each diocese is represented by forty laymen and four of the clergy, who belong to the House. The members of the Diocesan Conventions are elected by the respective congregations or vestries. The General Convention, amongst other things, has the power of revising old and making new canons. It hears and determines charges against bishops: receives and examinons testimonials from Diocesan Conventions recommending new bishops, and decides upon their appointment: without the certificate of the General Convention a bishop cannot be consecrated. At the General Convention held and assembled at Philadelphia in October, 1844, 'sentence of suspension' was passed on a bishop by the House of Bishops. They adjourned him to be 'suspended from all public exercise of the office and functions of the sacred ministry, and in particular from all exercise whatever of the office and work of a bishop of the church of God.' The title assumed by a bishop in the United States is 'Right Reverend.'

The Bishop of the Methodist Episcopal Church of the United States has no particular province or district. Their time is chiefly spent in attending the different annual conferences of the church.

The Roman Catholic hierarchy in the United States is composed of five archbishops, six bishops, and four vicars-apostolic. The first Roman Catholic bishop in the United States was consecrated in 1790. England and Wales are divided by the Roman Catholic Church into 'Dioceses,' over each of which a bishop has been placed, who is a bishop in suffrage. The London District a
superseded by a bishop who is styled the Bishop of Olena; the Eastern District by the Bishop of Arhipol; the Western District by the Bishop of Pella; the Central District by the Bishop of Cambysopolis; the Lancashire District by the Bishop of York; the Irish by the Bishop of Cashel; the Northern District by the Bishop of Abydos; and the Welsh District is under a vicar-apostolic, the Bishop of Apollonia. Scotland is divided in a similar manner. Each Bishop of Cashel was empanelled in the province.

The Roman Catholic hierarchy in Ireland consists of four archbishops and twenty-two bishops. In the Charitable Donations (Ireland) Act (7 & 8 Vict. c. 97) the Roman Catholic prelates are designated for the first time since the Reformation by their episcopal titles. The first line of the Act begins, "And, in the name of Our Lord Jesus Christ, whose authority and influence is world-wide, to the Bishop of Cashel, but gathered together in the name of Charles the tiger, under the sanction of those "and one He breathed when his name was written and engraved on the page of Eternity," when first brought in, as 'any person in the said church of Rome' of any higher rank or order, &c.; and, on the proposition of the government, this was altered to 'any archbishop or bishop, or other person in holy orders, of the Church of Rome.' In December, 1844, a royal commission was issued constituting the Board of Charitable Bequests in Ireland, and the two Roman Catholic archbishops and bishop who are appointed members of the Board are styled 'Most Reverend' and 'Right Reverend,' and are given precedence according to their episcopal rank.

It is stated in a recent authority, that the number of Roman Catholic archbishops in Europe is 108, and of bishops 489; and that of the two bishops in other parts of the world, making a total of 731 bishops. In France there are 14 archbishops and 86 bishops.

BISTORTA. [POLYGONUM BISTORTA, P. C.] BLACK ROUD, USHER OF THE, is an officer of the House of Commons, the Clerk of the Black Rod, and is appointed by letters-patent from the crown. His deputy is styled the Yeoman Usher. They are the official messengers of the Lords; and either the Gentleman or the Yeoman Usher summons the Commons to the House of Lords, when the royal assent is given to bills. 'He executes orders for the commitment of parties guilty of breaches of privilege and contempt, and assists at the introduction of peers and other ceremonies,' (May's Parliament, p. 156.) Only one, and the most ancient, council of Nova Scotia is styled Gentleman Usher of the Black Rod.

BLACKBERRY. [Rubus, P. C.] BLAKE, WILLIAM. This extraordinary artist was the son of a London hosier, and was born in London in 1757. At the age of fourteen, his father was induced by his son's passion for drawing to apprentice him to an engraver of the name of Baisre. He was a diligent and enthusiastic student; the day he devoted to the graver, and the night to poetry, for the art of poetry was the only amusement of his life, and utterly indifferent to the goods of this life: he used to say—"My business is not to gather gold, but to make glorious shapes, expressing god-like sentiments." When he was twenty-six years of age, he married Catherine Baisre, who survived him, and was most devoted and attentive wife, and fully appreciated the peculiarity of his mind. They lived at 29, Poland Street, and there Blake, with his wife always by his side, produced a series of designs and poems, which are quite unique in the peculiar spirit of their conception, but notwithstanding their peculiarity, are replete with beauties of the highest order. The spirit of universal benevolence and just appreciation of the greatness of life, animate and inanimate, breathed in his poems, and cannot easily be surpassed; but the mere serialization is often very inharmonious. When Blake was only thirty years of age, Flaxman and another gentleman published a collection of his poems, and presented the printed sheets to the poet, under the hope that he might derive some profit from it, a belief which he absurdly entertained of the works of art. Several of these poems are remarkable for their true paths.

The first of his own publications were the 'Songs of Innocence and of Experience,' showing the contrary states of the Human Soul,' which appeared with about sixty-five etched illustrations. Blake is very peculiar and original manner; the designs are drawn and the poems written upon the same copper, with a secret composition (discovered to him by the spirit of Inspiration) for the engraving. When the uncovered parts of the plate were eaten away by aquafortis, the rest remained as if in stereotype. His wife worked off the plates in the press, and Blake tinted the impressions, designs, and letter-press, with a variety of pleasing colours.

His next work was 'The Gates of Paradise,' in sixteen small designs, of a very mystical character. This was followed by a series, dated Lambeth, 1794, of twenty-seven designs, four inches by six, under the title 'Urizen,' in which he seems to have attempted to represent hell and its mysteries; this extraneous work was afterwards destroyed by Allan Cunningham, 'is a little fearful to look upon; a powerful, dark, terrible, though unde- fined and indescribable, impression is left on the mind, and it is no hospit to be gone.' After the completion of this work, Blake 'endeavoured to write a larger and a more curious, to illustrate Young's 'Night Thoughts,' which he filled with many marginal designs; so much to the satisfaction of Flaxman in many parts, that he introduced Blake to Hayley, the poet, who wished him to make some illustrations to the Life of Cowper, and persuaded him to remove in 1800, to Felpham in Sussex. Flaxman was a constant friend to Blake, and the latter in his correspondence with him usually addressed him 'Dear Sculptor of Eternity,' and in the first letter he wrote to him from Felpham he called him 'Sublime Archangel.'

At this time Blake's mind was confirmed in that extraordinary state which many suppose to have been a species of chronic insanity. He was so exclusively occupied with his own ideas, that he at last persuaded himself that his imaginings were spiritual realities. He thought that he was conversed with the spirits of the long departed—of Homer, Moses, Findar, Virgil, Dante, Milton, and many others: some of these spirits sat to him for their portraits. He remained at Felpham three years, and then returned to London. His first work after his return was his Jerusalem, comprising one hundred designs, of figures of men, spirits, gods, and angels; and for which, united, he charged twenty-five guineas. His next work were twelve designs to Blair's 'Grave;' for Cromek he was to have received twenty-one guineas; but Blake was not allowed to engrave them himself; they were intrusted to Schiavonetti. These were followed by his 'Canterbury Pilgrimage,' a picture in water-colours or dis-tinct paper, exhibited in his brother's house in Soho, with some of his paintings in the same manner, of which he printed a 'descriptive catalogue,' containing many critical heresies, some sense, and much that is wild and absurd. The following extract from p. 37, though extreme, is founded in truth:—'As there is a class of artists who have entirely与时 cosa. men, so there is a class of artists whose whole art and science is fabricated for the purpose of destroying art: who these men are is soon known: 'by their works ye shall know them.' All who endeavour to raise up a style against Raphael, Michael Angelo, and the antique; those who separate Painting from Drawing; who look if a picture is well drawn; and if it is, immediately cry out, that it cannot be well coloured—those are the men.' Charles Lamb speaks of the 'Canterbury Pilgrims' in a letter of his friend as a very god-like spirit, and power and spirit, but hard and dry, yet with grace. In the same letter he says, 'I have heard of his poems, but never seen them. There is one to a tiger, which I have heard recited, beginning—'

'Tigers, tiger, burning bright—
Through the deserts of the night—'

which is glorious. But alas! I have not the book, and the man is blown, whether I know not—to Hades or a madhouse—but I must look on him as one of the most extraordinary persons of the age.'

In the descriptive catalogue of his exhibition, he makes some excellent remarks upon the character of Chaucer's Prologues; and some excessively severe remarks upon the 'Canterbury Pilgrimage' of Stothard. He seems to have injured himself very much in the opinion of the world by the extremities he went to in this catalogue; he was comparatively neglected after its publication, and the demand for his works very much declined. He became extremely poor, but continued to produce new works, as Twenty-one Illustrations to the Book of Job, which are among his best productions; two works of prophecies, one on Americas, in eighteen plates, the other on Great Britain, in seven plates; and many small engravings of Dante, of which however he engraved only seven. His last performance was a likeness of his faithful wife, who, through his eccentricities reduced to the extreme of poverty, was never even inquired to complain. Blake himself never regretted his extravagance; he could not help being a Tristram Shandy, and he pitied his fortunate contemporaries for their inordinate love of gain. He died on the 12th of August, 1828.

Blake lays a great stress upon drawing in his criticisms, yet there are few of his works which are true in this respect the test of criticism—his figures are heavy and ill proportioned, his outline is sharp and cutting, and the anatom-
marks of his figures are exaggerated and coarse—his happiest efforts are in his conceptions, and his designs are often best with least taste. As to the peculiarities of his poetic fancies, there may be various opinions; his Songs of Innocence and of Experience are more poetical than his designs, the characteristic extravagancies of which are much more the symptoms of disorder in the imagination of the visionary than of any an utterly controlled and undisabled imagination, which is the secret of their supposed originality; and this want of mental discipline is the extent of Blake’s madness; his reason was unimpaired, but he devoted all the other faculties of his mind to the inventions of fancy he made many of, and wrote many poems which have not been published. He wrought much and slept little,” says his biographer, and has left

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which tested the power of the method to the fullest extent was the one about to be noticed. It was in January, 1849, that Mr. Cubitt made the first of his attacks on the Seven Dials. For low hills was the area—The six or seven miles intervening between Folkestone and Dover exhibit a continued series of bold cliffs connected with the South-Eastern Railway; and it was as part of this course that the necessity occurred for a process of clifftopping to be adopted. The line from Folkestone, there is first a viaduct of great height and length; then the Martello tunnel, about a third of a mile in length; then the Warren cutting, a very deep excavation, twelve miles in length; then the cliff-cuttings, which are a mile long; next a sea-wall, built up against the scarped face of the cliffs for a distance of two miles; then the double tunnel through the Shakespere Cliff; and, lastly, a timber viaduct along the face of the cliffs to the Dover terminus. Now in drawing a straight line from the Abbot's Cliff tunnel to the Shakespere tunnel for the sea-wall, it was found that a bulky promontory, called the Round Down Cliff, stood directly in the way. It was first attempted to tunnel through this cliff, but the soil being unfavourable, the idea of removing the cliff at one blast by gunpowder occurred to Mr. Cubitt the engineer; and there have been few examples in which a first attempt, on a vast scale, has so fully succeeded.

The arrangements for the explosion were thus made:—A horizontal trench was made, with broaching and wire, extending for about one hundred yards parallel with the intended line of railway, in a direction nearly east and west. Cross-galleries were driven from the centre and extremes of this main gallery. At the end of each cross-gallery shaft, which was about twelve feet in diameter, were connected, by a horizontal passage eleven feet long, five feet high, and four and a half wide. In the eastern chamber were deposited about 6000 lbs. of gunpowder, in the western 6000 lbs., and in the central 7600 lbs., making in all, or more than eight tons. The gunpowder was packed in bags; these bags were placed in boxes; loose powder was sprinkled over the open mouths of the bags; and the bursting charges were placed in the centre of the main charges. The distance of the charges was the same as that previously used on the cliff. The depth of the cliff was about seventy feet. These being the underground arrangements, those for firing the charge were as follow:—On the surface of the ground, behind the cliff, was a wooden shed for containing three galvanic batteries; each battery consisting of eighteen of Professor Danieli's cylinders, and two common batteries of twenty plates each. The wires from these batteries communicated at the other end by means of a very fine wire of platinum, the red-heating of which by the passage of the electric current caused the wire, coated with wax, were extended on the grass to the top of the cliff, and then falling over the edge, were carried to the three excavated chambers, and placed in connexion with the charges. The wires from the passages and entrances to the powder-chambers were 'tamped,' or stopped up with dry mud, rammed down hard.

At two o'clock in the afternoon of the 26th of January, all the preparations being ready, three engineers worked the three batteries simultaneously; the three wires conducted the electric current to the three chambers, and the mighty explosion took place. Many had expected that noise, smoke, and fragments hurled to a vast distance, would have accompanied the explosion; but such did not occur. The rock seemed almost as if it had exchanged its solid for a fluid nature, for it glided downwards into the sea in one body. Sir John Herschel, in a communication to the 'Athenaeum' immediately afterwards, says, 'Of the noise accompanying the immediate explosion, I can only describe it as a low murmur, lasting hardly more than half a second, and so faint, that had a companion at my elbow been speaking in an ordinary tone of voice, I doubt not it would have passed unheeded. Nor was the fall of the cliff (accompanying the explosion) in no less than 400 cubic yards were, within an interval of time hardly exceeding ten seconds, distributed over the beach on an area of eighteen acres, covered to an average depth of fourteen feet, and in many parts from thirty to fifty) accompanied with any considerable noise or shock. In the absence of an attention, or that of several others similarly stationed, with whom I afterwards compared notes.'

The complete success of such an experiment (by which it is said that the stone has been reduced to powder in about a natural led to the adoption of similar means in other like cases. On March 2, in the same year, a second blast took place, a little beyond the Round Down Cliff, on a smaller scale than the former, as the mass requiring removal was not so bulky; there were 7000 lbs. of powder used, and 60,000 cubic yards of chalk dislodged. On April 18 a third blast took place, which consisted of 10,000 lbs. of powder. Later in the same year, in October, a fourth blast took place, in which the powder was distributed in twenty-eight distinct parts, deposited in as many separate excavations, and all were exploded simultaneously. The arrangement of the wires, dis-
nities is found for their growth. We find that as soon as a fruit becomes ripe its constituents commence union with the oxygen of the air, forming carbonic acid gas, and it is during this state of their elements that the fungus finds a soil ready for its development.

This idea of the taking of the rotting of fruits, their preservation must be conducted on the same principle, for what will exclude oxygen will exclude the spores of fungi. As a simple process it has been recommended to place at the bottom of a bottle a paste formed of lime sulphate of iron, and thus to introduce the fruit, which has been pulled a few days before ripening. The fruits should be kept from the bottom of the bottle and as much as possible from each other, and the bottle should be closed by a cork such as those made by peachmen, which may be kept from twenty days to a month; peaches and apricots for three months. Mr. Hassall recommends that fruits should be washed over with a composition consisting of water one pound, shell-lime and borax two ounces.

(Lindley, _Institutional Botany_; Hassall, _Transactions of Microscopical Society_, vol. I.)

**BLIGHIA**, a genus of plants named after Captain William Bligh, R.N. [Bligh, William, P.C.], belonging to the natural order Sapindaceae. It has a 5-parted calyx, five petals, a very short style, three stigmas, and a solitary seed with a very large aril. Only one species of this genus has been described, _B. sapida_, Alces-tree. It is a native of Guinea, from whence it has been introduced into the West Indies and South America. This tree attains a height of thirty or forty feet. It has pubescent leaves, with three or four pairs of oval-lanceolate veined leaflets. The fruit of this tree is a berry of a reddish or yellowish colour, about the size of a hen's egg, or even larger, the seed being a subacid flavour, and is eaten in Africa and the West Indies.

This tree does not produce flowers in this country. It may however be easily cultivated. It grows well in a mixture of loam and peat. Cuttings will strike in sand under a hurdles.

(London, _Encyclopedia of Plants._)

**BLITUM** (from _Blitrum_), a genus of plants belonging to the natural order Chenopodiaceae. It has no corolla, and a staminate flower with two stamens and a pistillate flower with two ovules in its herid calyx. Two species of this genus are known by the names of _Strawberry_ Blite—_B. capitatus_ and _B. nigra._ The former has its flowers in terminal spikes; the latter has its heads lateral and scattered. Some writers have made the _B. nigra_ only a variety of the first, but its auxillary flowers are constant. After flowering, the calyx of these two species swells out, and presents the size, appearance, and colour of the common wood-strawberry. It is succulent, Altarnated, and was formerly used in puddings. The taste is insipid. These plants are natives of Great Britain, but are common on waysides and in cultivated grounds in the south of Europe. The species of Chenopodium are cultivated in the botanic gardens, and many of them are closely related; Mr. Koch and Mr. Babington have both referred the European species of Chenopodiaceae to the genus _Blitum._ These are the _C. rubrum, C. Bonus Henricus_, and _C. pinnum_ of Babington's _Manual of British Botany_, all three of which are Linnaean species.


**BLIZARD, SIR WILLIAM,** was born at Barnes Elms, in the parish oflo, in 1743, when his father was an under-timer. His early education was neglected, but he was apprenticed to a surgeon and apothecary at Mortlake. During his apprenticeship he devoted himself to self-improvement, and paid much attention to botany. On leaving Mortlake, he became a student in London, and attended during that time hospital practice at the London Hospital, and the lectures of William and John Hunter and Mr. Pott. His assiduity recommended him to his teachers, and he was soon elected a student at St. George's Hospital. In 1780, he was elected surgeon to the London Hospital. About this time he connected himself with Dr. Macaulay as a teacher of anatomy, and they lectured together, first at a small place in Thames Street, afterwards in Mark Lane, and lastly at the London Hospital. Mr. Macaulay had such an institution for teaching medicine, it was the first that was established in London in connection with any of the large hospitals.

In 1767 Mr. Blizard was appointed Professor of Anatomy to the old Corporation of Surgeons, and in the year following he was unanimously re-elected. He was afterwards appointed an examiner. He was also elected a Fellow of the Royal Society in 1787. He took an active interest in procuring for the old Corporation of Surgeons a new charter, which was at last obtained, the new institution being called the Royal College of Surgeons. When this college was chartered in 1844, it is now called the Royal College of Surgeons of England. On granting of the first charter, Mr. Blizard was appointed, in conjunction with Sir Everard Home, a preacher of the order of the college, during his life, and delivered the Hilarian Oration three times. On the occasion of the great collection of John Hunter being presented to the college by the government, Mr. Blizard presented also his preserved specimens in human and animal pathology, amounting to about nine hundred preparations.

In 1796 he published a work entitled _Suggestions for the Improvement of Hospitals and other charitable institutions._ In this work pointed out the evils that existed at that time in the various institutions intended for the relief of disease. Such was the want of cleanliness and attention to ventilation in many of these places, that it was questionable whether they did not do more harm than good. This work of Mr. Blizard drew particular attention to these facts, and was followed by a beneficial improvement in many of the metropolitan hospitals; but such is the imperfect construction of the buildings, and want of attention on the part of the managers, that many of the charitable institutions, even to this day, are exposed to the charges brought against them in 1796.

In 1803 Mr. Blizard was appointed to present an address to the king, from the College of Surgeons, when he received the honour of knighthood. In 1819 he founded the Hunterian Society. This was the result of a distinct reference to medical men, and the discussion of medical topics at stated periods. He was the first president, and held the office three successive years. This society now possesses a good library, and its meetings are held on a Friday in the month of May in the Samaritan Society, which was instituted with the view of explaining the circumstances of cases in hospitals, that have a claim upon benevolence, of obtaining a fund from which relief can be given when it is required by them, and of properly executing and perpetuating the good design. This society has flourished, and now dispenses 500l. annually in the relief of objects of distress. Sir William took an active part in the formation of many of the metropolitan societies. He was one of the first founders, and for many years vice-president of the London Institution.

Besides being Surgeon to the London Hospital, and a member of the Royal College of Surgeons, Mr. Blizard held the offices of Consulting Surgeon to the Deaf and Dumb Asylum, the Marine Society, the Clergy Orphan Asylum, and the London Orphan Asylum. But with all his activity and industry, he did not escape the exception of an attack of fever, caught by working night and day, by which his health never failed him till the last. He belonged to a long-lived family; his father and mother died at the age of eighty-six, and his grandfather on his mother's side at ninety. In 1827 he was in his eigteenth year, but strong enough to make his first visit to Edinburgh. His eye-sight latterly failed him, and when this was discovered to be owing to cataract, he insisted, in spite of the entreaties of his friends, on having the operation of extraction performed. This was done by Mr. Lawrence in 1834, after which his sight was restored the use of his eyes. He was however now in his ninety-third year, and during the following year his strength and health visibly failed him, although he attended a meeting of the court of examiners at the London Hospital the last day before his death. He died on the 26th of August, 1835.

Sir William was tall in person, with features strongly marked. He was prone to jocularity, which exhibited itself in his conversation; and has obtained for him a place in the pages of _Joe Miller._ He was most punctuous in matters of etiquette, and retained the fashions of the last century to the day of his death. At one time it was customary for physicians and surgeons to attend at coffee-houses to be consulted. Sir William Simpson is said to have been in the metropolis who pursued this practice. He regularly frequented, for this purpose, Batson's coffee-house, Cornhill.

In early life, Sir William, in politics, was a great reformer. He regularly contributed to many of the periodicals of the day, under the signature of Curiosus. Some of these contribu-
plotted in the 'Middlesex Journal, or Chronicle of Liberty,' and in 'Freeholders' Magazine, or Monthly Chronicle of Liberty.' As he grew older, however, and his position in society improved, he became less democratic, was an admirer of Mr. Pitt, and a member of the Pitt Club. Subsequently, in his position of a member of the Council of the College of Surgeons, he was an opponent of all change in that body.

As a surgeon, Sir William Blizard never took the highest position in his day, but he was a good anatomist. His contributions to medical literature are few, and, considering the vast opportunities he must have had of witnessing all forms of disease in one of the largest hospitals in London, not so important or valuable as might have been anticipated. His principal papers are:—1. A new method of treating the Fimbria Labyrinthi, Phil. Trans., vol. Ixx. 2, 'Experiments and Observations on the external use of Tartar Emetic,' 1787. 3, 'Observations on the uses of Electricity in Deafness,' 1790. 4. Lectures on the Maritime School at Greenwich on the situation of the large blood-vessels of the extremities, explaining the use of the tourniquet,' 12mo., 1798. This was written with the view of affording sailors some knowledge of what could be done in cases of emergency from wounds of various kinds. 5, 'Observations on some epidemic effects,' 1792. 6, 'Hunterian Orations,' 1815, 1823, 1828. 7, Orations delivered before the Hunterian Society, 1819. 8, 'An Address to the Chairman and Members of the House Committee of the London Hospital, on the subject of Cholera,' 1831. 9, Desultory Reflections on Police, with an Essay on the means of preventing crimes and amending criminals,' 1785. This is an excellent essay, and contains some severe animadversions on the system of police at the time when it was published.

The materials for this notice have been chiefly selected from 'A Brief Memoir of Sir William Blizard, Knt.,' by W. Cooke, M.R.C.S.

BLOCK MACHINERY. The assemblage of machines devised by the ingenious Mr. (now Sir Mark Isambard) Brunel for the formation of the blocks employed in raising burlaths, and particularly in the important service of moving the rigging of ships, contains so many ingenious processes for guiding to the utmost amount of accuracy, and, at the same time, with the least possible labour, as to justify the opinion that it constitutes one of the noblest triumphs of mechanical skill; and, in this article, it is intended to give a brief description of the principal parts of which it is composed.

The machine may be said to consist of many saws and lathes; by these the work is performed, from the operation of cutting up a log of timber, to that of polishing the pins on which the pulleys turn; and motion is communicated to all of them by a single steam-engine.

A straight saw worked backwards and forwards, horizontally, by the engine, cuts off in succession different portions transversely from the log of timber (elm) which, for this purpose is made to rest on a table or low bench; the portions cut off being of the proper lengths for the dimensions of the intended blocks. For the smaller logs a circular saw is used; it cuts the tree transversely, and consequently its plane is perpendicular to the axis of the latter; the saw is capable of being raised vertically, or moved horizontally, in order that it may be made to enter the wood above or below, or on either side.

After the log has been cut in slices, the latter are brought to what is called the ripping saw: this is circular; and its plane standing vertically, in part above the level of the table, it serves to cut the slices into rectangular parallelopipeds. In this state the wood is brought to the boring machine, which may be thus described (the lower figure representing the plan, and the upper a side elevation):

The rectangle A B C D represents the surface of a strong table, on which is fixed an iron frame E having three legs; within these the parallelopiped F is placed between two of which appears at a, and it is rendered immovable during the operation by means of the screw b; this last being turned by the iron bar G H. c is one of the bores, which turns on its axis by means of the pulley K, the latter receiving a motion from the engine: this latter rests on the frame M N, which is capable of being moved towards the frame E by pressing on the end P of the lever P Q, so as to turn it about the pivot Q. A is another bore, which turns on its axis by means of the pulley B, the latter receiving a motion from the engine: this latter rests on the frame S T, which is capable of being moved towards the frame E by pressing on the handle U V, so as to turn it about the pivot V.

The former borer makes the hole for the pin on which the sheaves of the block are to turn; the other merely makes a perforation at a spot which is to form one extremity of the mortise intended to contain a sheave. If the block is to contain two or three sheaves, the borer is to make as many perforations, the frame S T being capable of moving in a direction parallel to B D, in order that the point of the borer may be placed where the required perforations are to be made.

A remarkably ingenious machine is employed to cut the mortises in which the pulleys are to turn; and it is hoped that the following cut and description will suffice to render the process quite intelligible. A B is a representation of the horizontal surface of the table or stage on which the block is placed; and the diagram above it exhibits a side elevation of the acting part of the machine, the pillars and braces which support it being omitted, as they would have concealed, in part, the apparatus. a is a frame made to contain the block b which, in the diagram, is but one mortise; the block is tightly fitted in this frame by means of the screw s at one extremity, and the frame is capable of being moved along the stage from s towards F, as much as the whole length of the intended mortise. The great screw C D is fixed at one extremity to the frame which contains the block, and works in a concave screw which is cut in the transverse piece F, the latter being fixed to the table or stage. E F is an axle which terminates with a crank at E and carries at the opposite extremity the fly-wheel G H, the revolving motion being communicated from the engine by
The circular motion of the crank at \( K \) produces by means of the bent rod \( L \), which turns on a joint at \( d \), a reciprocating motion vertically in the rod \( e \) which passes through a collar at \( f \); to the lower part of this rod is made fast the steel chisel \( g \) by which the mortise \( a \) is to be cut. This may be easily understood, that, if two or three mortises are to be cut at the same time, as many chisels may be fixed, in line, parallel to one another, in a frame which is carried by the rod \( e \). On the screw \( C D \) is a toothed wheel which, when it turns, can be moved round by means of the handle at \( m \); and thus a small motion may be given to the frame \( a a \) in order to bring the hole previously bored in the block vertically under the chisel \( g \). The axle \( E F \) carries an excursive wheel \( n \) (see edgeway), on the circumference of which rides one a bent lever \( p q r \), the lower branch of which lies tangentially on the top of a ratchet wheel \( r \); the inferior surface of this branch has a notch, the sides of which, by the movement of the excursive wheel, are made to act on a tooth of the wheel \( r \); and thus, the axle \( C D \) being turned, the frame \( a a \) is moved a little way towards the cross-piece \( t t \). This movement always follows immediately after the chisel has made a descent, and thus there is presented a new part to be cut out from the block. Since the screw \( C D \) is made to rotate through the block at each descent, and the movement is very rapid, the mortise is quickly made.

The extremity \( q \) of the bent lever \( p q r \) rests upon a lever whose fulcrum is at \( v \), and this rests at \( w \) on the bent lever \( s t u r v \), and when the frame \( a a \) at the notch \( y \) falls over the extremity \( z \) of a projection on the side of the frame, the notch \( y \) is lifted above the top of the wheel \( r \), and the mortise being completed, the frame with the block moves no further. The cylinder \( w \) is fixed, and inside it, \( E F \), is a cone which, while it turns with the axle, is capable of being moved backwards or forwards on the latter by means of a lever not shown in the cut: when this cone is thrust as far as it can go into \( K \), the friction is great enough to allow the axle to be turned with the fly-wheels and cylinder; but, on drawing the cone towards \( E \), its surface is disengaged from the interior surface of \( K \), so that the axle \( E F \) no longer moves with the fly-wheel. It is while the axle ceases to revolve that the mortised block is removed, and once in \( E F \) on which the operation is to be performed is put in its place.

The block is subsequently submitted to the action of a circular saw, by which the corners are cut off, and it is made to assume the form of an octagonal prism; in this state it is removed to what is called the shaping machine, in order to be reduced to the requisite figure.

The shaping machine consists of two wheels connected together and turning on the same horizontal axle: they carry between them three cylinders, of which the blocks at any distances from one another on the circumference; and at first the blocks are disposed so that the mortises in each are perpendicular to a plane passing through the common axis of the two cylinders, and the blocks being moved parallel to that axis. The wheels are made to revolve by a strap passing over a cylinder on the axle; the cylinder being in connection with the steam-engine: the cutting tool is applied, on a level with the axis of the wheels, to a horizontal frame which has the form of a circular arc; the centre being in the middle of that arc; and while the edge of the tool is pressed against the block it is slowly moved along the arc. Thus, the tool acting against the block during the revolution of the latter with the wheel, and being itself in motion horizontally, the face of the block is brought to the form of a segment of sphere. Each block is then turned on its particular axis: first one quarter round, then another quarter, and finally a third quarter round: and in each of these positions an edge or side of the block is, by the tool, brought to a form similar to that which was given to the first face; the last of the four sides being completed after each block has been turned three quarters round on its own axis. The ten blocks are then removed and ten others put in their places, to be shaped in like manner.

The blocks are not turned on their several axes by hand, the machine containing an ingenuity contrivance by which such revolutions are effected. In the following cut, \( A B \) is the axis on which the tools revolve, \( C \), of which is represented two of the radii, and \( E \) one of the blocks at the circumference. A bevelled wheel \( F G \) is fitted on the axle of the double wheel, and, in the teeth of this, work as many pinions, \( H, K, \text{etc.} \), as there are blocks; each pinion has an axle \( L M \) in the direction of a radius of the great wheel, and extending as far as the circumference of the latter; near the extremity \( M \) is cut what is called a perpendicular screw, whose threads work in the grooves of a pulley-shaped wheel \( N \), on the axle of which is the block \( D E \).

During the process of shaping the blocks, the wheel \( F G \) revolves with the great wheel, carrying with it the pinions \( H, K, \text{etc.} \), and their axes \( L, M, \text{etc.} \), the pinions not changing their places on the circumference of \( F, G \), and consequently the blocks having no movements on their particular axes.

But when the first faces of the ten blocks have been shaped, the whole machine is detached from the engine, and the wheel \( F, G \), which is capable of turning freely on the axle of the great wheel, being held fast, the latter is turned round and round, this causes the pinions \( H, K, \text{etc.} \) to move on the circumference of \( F, G \), and, at the same time to revolve on their own axes; thus the axes \( L, M, \text{etc.} \) revolve, and, on account of their connection at \( N, \text{etc.} \) with the axes of the blocks, the latter revolve also on their axes. The numbers of the teeth are so proportioned that four revolutions of the great wheel, while \( F, G \) is held fast, will cause each block to turn a quarter round on its own axis; this brings a new side of each block to the circumference of the wheel, and the whole machine being thus re-connected with the steam-engine, the process with the tool is again carried on till the new side of the block is shaped; the machine is then released from the engine, the blocks turned as before another quarter round, and there are cut on each of the faces the two grooves intended to receive the rope by which the block is to be suspended when in use: this operation is performed by means of two cutting tools, with curved edges, fitted at the opposite extremities of a small brass wheel which revolves on an axle by the movement of the latter with the same engine: the block is fixed in a frame in an inclined position, so that the cutting tools form a groove which commences near the pin-hole of the block and deepens gradually towards either extremity.

The sheaves are made of lignum vitae, and plates of the required thickness being cut from the tree, each of them has a circular form given to it by means of a trepanning, or crown saw, a cylinder of steel having teeth on one of its edges, and having on its axe a tool for boring the centre hole through which the pin is to pass; the plate of wood being fixed in its place, the workman by a lever presses the saw and centre-bit against it; and these by revolving rapidly, both give a circular form to the plate and boreed the pin-hole.

The sheave is then to be prepared to receive in its centre the metal rod or ring through which the pin is to pass; for this purpose it is laid horizontally on a plate, which may be kept at rest, or turned round on its axis, as may be required; a drill, or cutting tool, in a vertical position, is made to form in succession three semicircular excavations of small depth at equal distances from one another about the centre hole. During the cutting of each of these the plate carrying the sheave is moved; but in each interval it is turned one-third part round, by which means the tool is always carried to the centre hole to a small depth, quite round the latter; the side of the sheave is countersunk about its centre in the form of a circle having three segments cut in its circumference: the load to be carried by the sheave is always kept on the under side of the sheave. The coak, which is made of gun-metal and of a form to fit the countersink, is in two parts, one of them having a barrel which is to enter the centre hole; the parts are then introduced and riveted to the sheave. The middle part of the coak is then broached out so as to form a hole per-
feet cylindrical; and, lastly, by a lathe also connected with the engine, the groove for the rope is formed round the circumference.

The pins, which are of iron, are turned in a lathe of great strength; and are highly polished by being drawn with a revolving motion between two plates.

It should be considered as a complete description of this very ingenious and complex machinery, but our limits prevent us from going more fully through the details.

A complete assemblage of the machines was, under the direction of Mr. (Sir M. J.) Brunel, executed, in 1804, by the firm of Heineken, at Amsterdam, and a second was executed, in 1807, in the dockyard at Chatham.

BOIS, PETER OF. (Peters or Blos, P. C.)
BLOND, or BLO, JACQUES CHRISTOPHE LE, a pupil of Raphael, in Paris, 1670, known as the inventor of printing in colours. He appears to have been studying in Rome as early as 1698, and he probably lived there many years. Before 1711 he was practicing as a miniature painter with great success in Amsterdam, but he executed miniatures of so small a size that he injured his eyes, and he was forced to give up that style. Then he took to oil painting, and executed several good pictures in that style also; but he appears to have soon afterwards turned his attention to printing, and patient labor in the flat on the copper-plate, was a very much disappointed in the results. His prints were flat and dirty, and gave but very faint copies of their originals; they were however efforts of great merit and great novelty, and with many artists, they are now beloved, and much good might have resulted. Le Blond however, disinterested by the coldness with which his prints were received, and a consequent bankruptcy, neglected the discovery, and turned his attention to a new scheme—the weaving in tapestry of the Cartoons of Raphael.

His plan of printing was very simple, too simple to produce tone. He used only the three primary colours, and passed the prints three times through the press, printing with one colour each time; the secondary and tertiary colours were obtained by printing one colour over one or both of the other two primary colours; and the impression was repeated for those parts where great depth was necessary: they were first engraved in mezzotint. He published an account of his plan in 1722, in French and English, in 4to., entitled 'Le Colorio, or the Harmony of Colouring in Painting, reduced to Mechanical Practice, under easy Precepts and infallible Rules,' with five examples, and a dedication to Sir Robert Walpole. A second edition was published in Paris, in 1756, after the death of Le Blond, by one of his pupils. He published further articles in the 'Tableaux.' Le Blond executed altogether in this style thirty-three plates, many after the great masters, and all very large—some of the portraits, which are a considerable proportion of the plates. They are of two styles of colour; and the impression was repeated for those parts where great depth was necessary: they were first engraved in mezzotint. He published an account of his plan in 1722, in French and English, in 4to., entitled 'Le Colorio, or the Harmony of Colouring in Painting, reduced to Mechanical Practice, under easy Precepts and infallible Rules,' with five examples, and a dedication to Sir Robert Walpole. A second edition was published in Paris, in 1756, after the death of Le Blond, by one of his pupils.

Le Blond found also much assistance towards the completion of his undertaking regarding the Cartoons of Raphael, but it was so inadequate to the full accomplishment of the tapestries, that after he had spent all that was advanced, he saw the hopelessness of his undertaking; and in about 1778 he absconded and went to Paris, leaving his friends the partly prepared apparatus as the indemnity for their outlay. In Paris he again had recourse to his printing in colours, for which he had been distinguished by Raphael and the other great artists of the time; the enterprise failed, and he himself is said to have died in an hospital in 1741. He instructed some pupils in the art, who carried it on after his death, but with little success.

Cochin, fils, published an account of the process in an edition of Abraham Bosse's book 'De la Manière de Graver,' etc., Paris, 1768; and it is noticed in the 'Oeuvres Posthumes de Sylvain Bailly.' An artist of the name of Admiral, one of Le Blond's reputed pupils, was more successful than Le Blond, and his works are still in demand. The prints of the subject of Le Blond were of several varieties, for which it is fully applicable. He published six anatomical plates at Amsterdam and Leyden, between 1734 and 1741, and a book of insects a few years later.

(Hermeton, l'te Géne'rale d molto, Collection d'Entomop., etc.; Huber, Manuel des Amateurs, etc.; Strutt, Dictionary of Entomographers; Fiorillo, Geschichte der Zeichnenden Künstler, etc.)

BLOW, JOHN, Mus. Doc., was born at North C killingham, Notts, in 1646, and educated in the Chapel-Royal School, where he very early showed a taste for music and enterprise, for it appears, from Clifford's 'Collection,' that while one of the 'children' of that royal establishment, he composed several anthems, which had the honour to be performed before the king. His advancement was rapid, and he became the king's first musician, the principal composer of the art records; for he was successively appointed to the offices of Gentleman of the Chapel-Royal and Master of the Children; one of the King's Private Musicians; Composer to the King; and Organist of the Cluniacs of St. Paul's Cathedral, and Organist of Westminster Abbey.

Part of these duties must have been executed by deputy, and, most likely, part neglected. He died in 1708, and was interred in the Choir of Westminster Abbey, where a monument is erected to his memory, carved, by one of his famous 'Gloria Patri,' a canon, together with a long inscription, wherein it is stated, and to his honour, that he was the master to the famous Mr. H. Purcell.

Dr. Blow was remarkable for the elegance of his person and address, to which may, in some measure, perhaps, be ascribed his lion's share in the musical offices of his day. His compositions are numerous, but mere the offspring of study and patient labor. They are, however, genius. Two of his anthems however proved that he was an affectionate composer, in his 'Gloria in Excelsis,' etc., for the English College in Rome, and his 'O Pater Noster, com -posed over his art. And a few of the many secular compositions in his 'Amphiang Anglicus,'—a volume of songs, etc.—were deservedly popular during his life, and are worth revival.

The works of Mr. Blow, as published by Sir John Huber, in 1688, and a folio of his anthems, which so with what integrity he could redeem a benefit to the court to which he belonged, and whom he viewed as the enemy of his religion. In the chapel of James II., an anthem, by some Italian master, had been introduced, which the king, liking very much, asked Blow if he could make one as good. Blow answered in the affirmative, and the next Sunday produced the fine anthem, 'I beheld, and lo a great multitude.' When service was over, the king sent Father Petri to tell the author that he was much pleased with it. 'But,' added the popular composer, 'I myself think it too long.' 'That,' answered Blow, 'is the opinion of but one fool, and I heed it not.' The Jesuit was so displeased at this unceremonious assault, that he determined on revenge, and persuaded the king to put the composer under suspension; from which however he was soon released by the Revolution, which took place shortly after.

BLOWING-MACHINES, or machines for producing a current of air for the purpose of exciting the requisite intensity of combustion for metallurgical and other operations which require great heat, are a class of contrivances only slightly alluded to in the article BLOWING (P. C., p. 188), but which, from their great importance and very general use, demand further explanation.

The kind of blowing-machine to which the name of bellows is usually applied consists of a air-tight chamber of variable dimensions, having one aperture closed by a valve which can open only inwardly, or another, which is constructed either directly or indirectly with the nozzle, or pipe for the exit of the current of air, closed by a valve which can only open outwards. When, by the application of mechanical force, the chamber is distended or enlarged, the pressure of the external atmosphere opens the valve which closes, and when the chamber becomes filled with air; but when, by an altered application of power, the chamber is compressed so as to reduce its capacity, the condensation of the included air causes the valve to close, and the air is forced outwards to open, so that the air escapes by the nozzle, with a degree of force and rapidity proportionate to the pressure employed in compressing the chamber. The leather bag of the musical instrument called a bagpipe is an example of such a variable, or expandable and compressible, and the wind would therefore, if fitted with a nozzle, form a substitute for the common domestic bellows; but the same effect is produced, in a much more convenient way, by the use of a chamber formed of two bags, which are connected so that the air is leathered in folds in such a manner that the upper bag may be raised or depressed at pleasure, while the lower bag remains stationary. Of the precise arrangement of the parts alluded to in hand-bellows for domestic use it is unnecessary to give an account; but we may here mention some of the principal modifications of form and arrangement in large bellows employed for forge-fires and furnaces.

The blast produced by such a machine as has been de
served is intermittent, and also variable in intensity. The first of these defects may be remedied by the device mentioned in Bellows, P. C., of employing two or three separate bellows, or pairs of bellows, worked alternately, so that the one may be expelling air while the other is drawing in a fresh supply. While, however, the blast thus produced is continuous, it is by no means equal in force, to remedy which the air expelled from the chamber already described should be forced into a second chamber also of variable dimensions, but compressed by a weight so as to produce a constant steady pressure, and the nozzle should be made to open into the second chamber. In forge-bellows of this construction there are three boards, connected by leather sides which are kept in regular folds by hoops of cane. The middle board is fixed in a horizontal position, and has the nozzle attached to it, while the upper and lower boards are moveable, and loaded with weight, which is that which is with the bellows, the chamber formed between the upper and the middle boards is collapsed, while that between the middle and the lower boards is distended and full of air. When in use the lower board is raised by means of a lever and chain, and the air induced between it and the middle board is forced through a valve into the upper chamber; and by the rapid repetition of this action the upper chamber is filled with air more rapidly than the nozzle can carry it off, so that the upper board rises. The weight of bellows may then be adjusted to a continuous and equable blast will be maintained by the pressure of the loaded upper board until it has, by the complete expulsion of the air, descended to its original position. It should be remembered that this perfect equability of blast is only maintained while the working of the bellows is suspended, because during that time the blast is produced solely by the pressure of the loaded board; while, during the working of the bellows, the pressure alternates between that of the superior pressure produced by the influx of air from the lower chamber, whereby causing the upper board to rise and fall with each stroke. Many smiths' bellows are made of the pear-shaped form common to hand-bellows, and have the boards, or at least the lower and middle boards, united by a kind of hinge-joint; but the superior machines of this description have the boards circular, and the working apparatus so arranged as to make their action parallel; and in some cases, as for portable forgings, helical springs are applied to the boards in lieu of weights.

Beckmann, in an article on the invention of bellows (History of Inventions, English edit. of 1814, vol. i. p. 105), observes that large bellows, such as were formerly used in smelting-houses, when made with leather, were attended with much of hinge-joint; but the superior machines of this description have the boards circular, and the working apparatus so arranged as to make their action parallel; and in some cases, as for portable forgings, helical springs are applied to the boards in lieu of weights.

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and form which it is conducted to the blast-pipes, which are called tuyeres or tees. Barlow, in his 'Treatise on Machinery and Manufactures,' part of the Encyclopaedia Metropolitana, describes a very powerful blowing-machine at Woolwich Dockyard, in which four cylinders supply air, at a pressure sufficient to conduct the air-chest from which pipes extend to all the forges and fires in the smithy, the pipes being supplied with cocks by which the blast can be turned off or on at pleasure. To ensure equal pressure in all the cylinders, air is first caused to pass into air-pipes exceedingly compressed with opening into a safety-valve. Owing to the use of sliding instead of clack or flack-valves in the blowing-tyves, this machine works very quietly. Another mode of regulating the blast is to throw the air from the cylinders into a large iron box inverted in a cistern of water, and somewhat resembling a gasometer, but so fixed as to be incapable of more partial discharges and therefore of the condensation of air in the box is to force some of the water out, and the difference between the level of the water within and without the box forms a measure of the degree of condensation or pressure. In using such an apparatus care must be taken to conduct the air-pipes at so high a level as to render the forcing of water into the furnace impossible. The blast thus produced is exceedingly cold, which is a great disadvantage in a smelting-furnace. For a notice of the advantages of a hot blast see Bellows, p. c., and their application to steam-carriage furnaces is alluded to in Stearn-Carriage, P. C., p. 401.

BLUMENBACH, JOHANN FRIEDRICH, was born at Gotha, on the 11th of May, 1752. He studied medicine, and succeeded in 1776 of the foundation of many of his important investigations on this subject in after-life, and led to the formation of his collection of the skulls of all nations, which is one of the most extensive in existence. New editions of this dissertation appeared in 1776, 1778, and 1755. In the last edition a letter was added, addressed to Sir Joseph Banks, on the subject of some mummies which had been opened in London. The last edition of this work was translated into German by Gruber, in 1799, and into French by Chardel, in 1804.

In 1776, the year after taking his degree, Blumenbach was appointed extraordinary professor of medicine in the University of Gottingen, and in 1779 he was made ordinary professor. At the same time he also received the appointment of superintendent of the library and museum of natural history in the university. From this time his contributions to the sciences connected with medicine, especially anatomy and physiology, became more frequent. In physiology he pursued the work of Haller, and directed his attention especially to the structure and functions of the lower animals, as a means of determining the true laws of human physiology. After the publication of his inaugural dissertation, his next work was an anatomical essay, entitled 'Ueber die anthropologischen und physiologischen Merkmale der Natur in der menschlichen Körpervarietät,' 8vo., Gottingen. In this work he threw much light on the obscure subject of generation, and opened up a path for future inquirers. New editions of this work appeared in Germany in 1759 and 1791. It was translated into Dutch in 1790, and an edition, translated by Sir Alexander Crichton, appeared in English in 1792. In 1793, the work was translated into French and the title 'Histoire de la Formation des espèces, par voie naturelle,' 8vo., Gottingen. Mr. Crichton, in his translation of this work, was appointed 'Superintendent des Editions de la Bibliotheque de la Societe Medicale de Paris,' 8vo., Gottingen. He also published, in Lith., in the same year, an introduction to medical literature, with the title 'Introduction a l'Historie des Sciences, etc.,' 4to., Gottingen.

In the year 1787 he published his 'Institutiones Physiologice,' 8vo., Gottingen. This work was written in Latin, and was one of the first attempts that had been made to form a connected and comprehensive view of the whole system of medicine, without entering into the minute anatomical structure of the body. It quickly became the text-book of schools where physiology was taught. German translations by Eyster, 1790, and also by Crichton, 1795. His most important original work was published in 1798, 1810, and 1821. It was translated into Dutch by Wolf, in 1791, and again by Voesen, in 1808. An English edition, translated by D. Caldwell, appeared at Philadelphia in 1795. A French translation, by Pigenet, appeared in 1797. A second English translation, by Dr. Elliotson, was published in London, in 1817. A second edition of this translation was published in 1818, and is remarkable as being the first work that was ever printed by steam-machinery. Several subsequent editions of this translation appeared with copious notes by the translator, and these at last were so numerous, and the progress of physiology required so much of the original to be modified, that the last edition of the work, which appeared under the title 'Human Physiology, &c., with which is incorporated much of the elementary part of the Institutiones Physiologice of J. F. Blumenbach, by John Elliotson, M.D.'

Blumenbach, in all his contributions to physiology, had frequent recourse to the lower animals for the purpose of illustrating and developing the functions of those of the higher; and in 1805 he was induced to publish a manual of comparative anatomy. This work appeared at Gottingen, with the title 'Handbuch der vergleichenden Physiologie,' and an English edition of it appeared, in German, in 1815 and 1824. It was translated into English in 1806, by Dr. William Lawrence, surgeon, who, after John Hunter, was one of the earliest cultivators of comparative anatomy in connection with the study of medicine in this country. It was translated into French by Mr. Coulorison, and published in 1827. Although this work is meagre compared with those which have appeared since it was published.
BOBBO 210

The province of Bobbio is about 25 miles long, and about 10 miles wide. It is divided into four mandanici or districts: Bobbio, Ottonne, Vars, and S. Stefano. In all 27 communes, and about 32,000 inhabitants. The valleys produce corn, Indian corn, wine, and fruit. The mountains are partly covered with forests. Farms are mostly small. Sheep and pigs are numerous; the horned cattle is scanty and the poultry is not numerous. Bobbio is the most important town of the province. Many of the inhabitants emigrate to the plains to earn their subsistence.

Bobbio, the head town, is situated in a valley near the tenth mile, and is about 50 miles from Rome. The town is divided into many small sections, and is surrounded by the town of S. Stefano, which is about 4 miles in circumference. The town is less than 1,000 inhabitants. Besides the cathedral, the church and former convent of St. Columbanus are deserving of notice. The church is a vast and handsome building. The church, which is now a parish church, is large; it has 21 altars, some good trecei altar-pieces, and a substantial vault in which several of his discipies are buried. The church and convent were first built about the end of the sixth century, but they have been rebuilt or restored at various times. The well-known library, rich in valuable and rare MSS., among which were several palimpsests, has been distributed among the libraries of Milan, of the Vatian, and of the Turin university. The other buildings deserving of notice are the ancient cloth hall, the town hall, and the episcopal palace. There is another Bobbio in the Sardinian states, in the district of the Valdenses near Pigner.

BOERNE, LUDWIG, was born in 1784, of Jewish parents, at Frankfurt on the Main, where his father, Jacob Baruch, was a banker. After having received his preparatory education in his native place, he went to the university of Berlin, and afterwards to that of Halle, where he studied medicine, though against his will, for as persons of the Jewish persuasion cannot hold any public office in Germany, the only scientific department that can devolve upon him with any hope of advantage to themselves is medicine, which they are allowed to practice. In 1807 however he gave up his medical pursuits, and in the university of Heidelberg he began to study politics and political economy, which he continued at 1808 at Giessen. On his return to Frankfurt, which was then in the hands of the French, he received an office in the department of the police, which he held for several years, although it little agreed with his peculiar views. In 1815, when Frankfurt recovered its old constitution, Boerbe, being a Jew, was, of course dismissed from his office, but received a pension. Having thus got rid of all external ties, he now began to devote himself with energy and great success to what he conceived to be his calling: he became a political writer, successively published three 'Untersuchungen' (Casalis, Staats-Ristretto, Diet Zeitschungen, and Die Wapse), which were published at Offenbach, and to which he himself contributed some of the best of the political essays and literary criticisms written in the age of the French revolution. These periodicals were of too liberal a nature, the government of Hesse-Darmstadt suppressed them, and Boerbe himself was soon after arrested at Frankfurt, and charged with having promulgated revolutionary ideas. He was tried as a Jew, but as no evidence was brought against him, he was acquitted, and declared perfectly innocent. In 1817 Boerbe exchanged his Jewish religion for Protestantism, and altered his name Baruch into Boerbe. After having given up 'Die Eiche', he lived in the service of the French Republic. In 1818 he was employed in the army of Silesia, and in 1819 in the army of Italy, where he served as a journalist in the Sambre-Meuse. In 1820 he was appointed to the government of the city of Heidelberg, and in 1823 to that of the city of Strassburg. In 1825 he was appointed to the government of the city of Strassburg, and in 1829 to that of the city of Strassburg. In 1830 he was appointed to the government of the city of Strassburg, and in 1835 to that of the city of Strassburg. He was a man of great learning, and was esteemed by his contemporaries as a great man of letters. He was a man of great learning, and was esteemed by his contemporaries as a great man of letters. He died at Paris, in 1836.
Mr. Hardcastle, Dr. Waugh, and the Rev. Matthew Wilks, founded Paris for the purpose of promoting measures which had long been attempted for the diffusion of the Christian faith, and religious works into France, and in furtherance of which object he had written his ‘Essay on the Divine Authority of the New Testament,’ a work which, in addition to being very widely circulated in France and England, was soon translated into Spanish, Italian, and German. A copy was sent to Bonaparte while at St. Helena by the dowager Lady Grey, and, after his death, was returned to the author with some marked approval by the emperor. In 1816, in conjunction with Dr. Bennet, Bogue undertook the benevolent missionary tour, for the promotion of the cause of missions in the Netherlands; and during the remainder of his life he was continually engaged in efforts connected with the work which lay nearest his heart. Very soon after, when upon one of his numerous preaching tours for the Missionary Society, he was taken ill at Brighton, where he died on the 25th of October, in his seventy-sixth year. His remains were removed to Alvesford near Gosport, and interred with extraordinary marks of respect.

In 1815 the diploma of Doctor of Divinity was conferred upon Bogue, by Yale College, North America; and it has been stated that the same was offered by the university of Edinburgh, but Bogue did not accept it. He was keenly interested in the anti-Jacobin sentiment at this period, and his humorous writings did not always win the favor of his readers, but his works were received with much interest, and his character was a subject of critical discussion. He was a lover of the French language, and his works were soon translated into it, even in his published works. In addition to his intimate connection with the London Missionary Society, Bogue was one of the originators of the ‘Tract Society’ of the Church of England. The first tract issued by it was Bogue’s ‘Short Essay on the Character of the Public Mind.’ Besides various minor works, he published discourses on the Millennium, and in conjunction with his pupil and friend, Dr. James Bennett, a ‘History of Dissenters, their rise and revolution in England, from the year 1808,’ in four volumes, 8vo., 1818-1819. A second edition, somewhat condensed and re-arranged, was published in 1833, in two 8vo. volumes, by Dr. Bennett, who has written a continuation of the history as a separate work. Dr. Bennett has published a lengthy memoir of Bogue, and there is a very full account of him, containing some additional matter, in Dr. Morison’s ‘Fathers and Founders of the London Missionary Society.’ A brief French memoir in the ‘Archives du Christianisme’ for 1836 was reprinted at Paris as an 8vo. pamphlet. Bogue, the sculptor, has executed a bust of Dr. Bogue, from a posthumous cast, which conveys a good idea of that remarkable depth and solidity of character which led the French police, on occasion of his visit to Paris, to describe it as the ‘image of the public mind, characterized by what they termed “profundeur.”’

BOHLEN, PETER VON, late professor of Oriental literature in the university of Konderberg, was born on the 15th of March, 1735, near his heart, in the autumn of 1786, and was twelve years old, and it was thought necessary that he should learn some trade; he was put apprentice with a village tailor, in whose house he was obliged to do the lowest and meanest work, and that he might, as soon as possible, become a master and husband and wife; he was ill-used by his master and his querulous wife in a manner which afterwards related with shuddering, and he used to wonder that under such circumstances he had not been killed long before. In 1810, his father, an appleboy, for his honest labor, was caught and abused by his master, and he was the same, being unable to bear anything, sent to a prison for two weeks, and during that time was called upon to appear at Jever to be examined as to his fitness for serving in the army of Napoleon. He was delighted at the prospect of getting away from his master and of seeing something of the world.
found to be too short, and was obliged to return to the tailor. Some time afterwards he was called upon again, and was admitted into the army. At the examination the French general Guison took an interest in him, on account of the cheerfulness with which he appeared under his new life. Guison gave him some money, and permission to go and take leave of his friends. Bohlen, on his return, remained with the general in the capacity of servant; and in 1812 he accom-
mpanied him to England, with whom was engaged to go to Hanover, from which place frequent excursions were made to the neighbouring towns. Afterwards they travelled to Stuttgart, Switzerland, and Berlin. General Guison gradually ceased to demand any services of Bohlen, and treated him with more affection, and he received, in 1815, when the French army returned from Russia, Guison and his corps retreated to Magdeburg. Bohlen afterwards accompanied the general to Hamburg. At this time however the relation between them was not so firm, and in 1817 Bohlen became the Frenchman became more harsh and severe, and the young German, forgetting the kindness he had received, lost no opportunity of showing his obstinacy and his avarice to the French. During the siege of Hamburg Bohlen opened and read a note of great importance, which he had to carry to Fromont, the general's adjutant; and had it not been for Fromont's attachment to Bohlen, he would have paid for his curiously and indiscretion with his life. Fromont at length procured a situation for him to Adolphe Hermite, but he did not remain with the admirals above two months. Early in 1814 the French quitted Hamburg; and Bohlen, although he had nothing to live upon, refused to accept any other employment. He remained at Hamburg; he first lived for some time with a poor ferryman, who wanted Bohlen to engage in his own trade; but a black cook of Admiral Hermite, who had likewise remained at Hamburg, prevailed upon him to seek a place as waiter in an hotel. This was soon found; but the incessant work and the want of rest was more than he could bear; he accordingly left his place, and engaged himself as servant to a rich India merchant. As he had not much to do in his new situation, he got his master's clerk to instruct him in letter-writing and the like, and employed his time in reading. In the mean time he acquired a passion for writing poetry. He had the satisfaction of seeing his poems printed; and as some persons went so far as to compare him to Klopstock, his head was almost turned by his success. He had learned to speak French in his intercourse with Frenchmen, and he now learned English in the same way; for in the house of his employer scarcely any other language than English was spoken. He then began translating Burns into German; and, with the assistance of a dictionary and grammar, he even ventured upon translating Virgil. He next made an attempt to get admission into the gymnasium of Hamburg, but was refused, on the ground of being too old. In 1817 he moved to Berlin, and Bohlen again as poor as before; for he had never claimed his full wages, but only taken as much as he wanted at the time. Another attempt was made to get into the gymnasium; and the support of several benevolent men at length succeeded in getting him a place of scholar, and he became a pupil of the Johanneum at Hamburg. His diligence was extraordinary, and his conduct secured the good will of all. The gifts of benevolent friends, and private lessons which he began to give, procured him the means of living. His intention was at first to study theology; but the preparation that he made for it, the study of Hebrew, Arabic, and Persian, led him in another direction. About this time he was induced by his master to take the Greek name of Bohlen; he remembered however that his father was descended from a noble family.

In 1821 he went to the University of Halle, some distinguished and wealthy Hamburger having promised him with the other many others of lectures on Oriental and classical literature. At the suggestion of Gesenius, Bohlen copied, translated, and upon, an essay upon the Hebrew language, which was sent to the Prussian ministry for the purpose of obtaining assistance from the Prussian government to continue his studies, and of paying the way to a future appointment in Prussia. While he was in Halle, he left his family. Von Bohlen published a little work, 'Syntaxis ad Interpretationem Persica,' which was well received; and in the autumn of the same year he went to Bonn, to study Arabic under Freytag. Here he wrote a dissertation on the life and character of Motenabbi, which received the prize, and was printed at Bonn in 1824; it was very well received by those acquainted with the literature of the Arabs. In the mean time he continued his studies of the Persian language, and in 1824 he began that of Sanscrit. He had learned Italian and Spanish. Towards the end of this year the Prussian ministry summoned him to Berlin, that he might complete his studies there, and prepare himself for a profes-
sional life. Bohlen was appointed as assistant to Dr. Rosen. At Berlin he attended the lectures of Bopp, and formed an intimate friendship with the late Dr. Rosen. In 1826 he went to Königsberg to begin his career of academical studies, and was engaged, in the usual way, as a private lecturer. He received however, from the first, a salary of 200 gulden. In 1826 Bohlen was appointed professor extraordinary. In 1827 he travelled to Bonn, and married a lady whose acquaintance he had made during his stay there; and the year after he was appointed professor adjunction, on the recommendation of the Orientalist, which the Prussian ministry placed funds at his disposal. He was also provided by the government with Arabic and Devanagari types, and printed with his own hands the 'Carmen Amali.' Soon after he published his great work on Indian antiquities, 'Chrestomathy Persica,' which, in its portions and sub-
jects, is one of the most valuable books on ancient India; and no attempt has yet been made to supplant it, though Lassen's great work on the antiquities of India, which is now in the course of publication, is very splendid. In 1831 Bohlen returned to Bonn. In 1837 he undertook a second journey to England. He stayed some time with the son of the Marquis of Landzourne, and pursued his Oriental studies with his friend Dr. Rosen. On his return to the Continent he travelled with his wife to the south of France and Italy, for the benefit of his health. Bohlen's health also was in such a precarious state that his friends advised him not to return to the north. He therefore remained at Heidelberg and Bonn for some time, and then went to Halle. He has since resided in that town for the last 24 years, and has been the most active member of the society. In 1859, from this blow he never recovered. He was unable to return to Königsberg, and remained at Halle. In the beginning of 1840 his condition became worse, and he died on the 6th of February at Halle, where he was buried.

Bohlen appears to have been a most amiable man; and in his autobiography, from which this account is taken, he relates without any reserve all the vicissitudes of his life, in a manner which secures the affection and admiration of every reader. His character appeals to have been very much that of his friend Rosen. In 1826 he was elected a member of the Royal Asiatic Society of London. He possessed a most extensive knowledge of Eastern history and literature, and his works as an Orientalist are valuable, not only for their accuracy, but mainly from two causes; first, the great haste with which he worked, and secondly, a want of sound philological know-
ledge, for which he had little taste; though in later years this defect greatly impeded his antiquarian researches, as he himself confessed. He was never a great number of his own writings and reviews which Bohlen wrote for the leading journals of Ger-
many, and shall merely subjoin a list of his separate works: 1. 'Symbolae ad Interpretationem Sac. Cod. ex Lingua Persica,' Leipzig, 1822; 2. 'Commentatio de his bookio,' celebrating the Arab Poeta,' Bonn, 1824; 3. 'Carmen Arabicum, Amali dictum,' Königsberg, 1825; 4. 'Vermischte Gedichte und Gebwerzungten,' Königsberg, 1825; 5. 'De Buddhismos Textu,' Halle, 1821, 6. 'Indische Verzeichnisse mit bearbeitet,' 2 vols., Königsberg, 1827; 7. 'Bhartrihis Sanscrita et Carmen Chauroupachas,' Berlin, 1833; 8. 'Die Genesis, historisch-kritisch erlautert,' Königsberg, 1835; 9. 'Die Sprache des Bhartrihis,' metric Leipzig, 1838; 10. 'Die Sprache des Vedas,' metric Halle, 1839; 11. 'Die Semitische Sprache in ihren Untersuchungen,' metric Halle, 1840; 12. 'Bhartrihis Sanscrita et Carmen Chauroupachas,' Lips, 1840. Bohlen was a contributor to the Penny Cyclopaedia, for which he wrote the articles LOKMAN, MAHAMATAM, MAHMUD OF BAGHDAH, and MOHAMMED (including KORAN), MONGOLS AND TARTARS.


BOIE, ADRIEN, OIS, A French com-
poser, born at Saint-Denis, in the department of Val-d'Oise, in 1775. At a very early period of his life he manifested a most decided talent for music, and at eighteen wrote a one-act opera, which was produced at the theatre of his
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native city, and drew all the amateurs of Normandy to hear it. In 1798 he went to Paris, and brought out several compositions, of which many met with great success, and some are still performed. In 1800 he was appointed to give a course of concerts at the Opera Comique; and this was speedily followed by others. In 1800 he wrote three operas,—Benbowski, 'Le Calife de Bagdad,' and 'Ma Tante Aurèle,' all of them abandoned, for the audience were inferior to the music, and the stock pieces. On the establishment of the Conservatoire of Music, by the National Convention, Boieldieu was appointed one of the professors. In 1803 he accepted the Empress Alexander the appointment of Maître-de-Chapelle at the imperial Court of Moscow, for five years, and governed for one season at the Theatre de la Ville, and some other rank operas, and various smaller dramatic works. In 1811 he returned to Paris, and there, among other operas, produced 'Jean de Paris,' 'Le Petit Chaperon Rouge,' and his grand masterpiece, 'La Fille de Madame Blanche.' He afterwards was called upon to compose music for the baptism of the Duc de Bordeaux, and the coronation of Charles X. After this, the state of his health indicating the want of some repose, he proceeded to a watering-place in the Pyrenees, and appeared to be much benefited by his retirement and relief from business and care; but soon after he was suddenly attacked by illness, and died, October 3rd, 1836, after a very short confinement.

With the sudden and splendid public funeral, which was, in some degree, a military one, for he was an officer of the National Guard, and held the order of the Legion of Honour. Mass was celebrated in the grandest manner in the Église des Invalides, and his remains were then placed a magnificent monument, rising into the sky, of this very clever composer was claimed by the city of Rouen, and received with great pomp in the cathedral, which was magnificently decorated for the occasion, the council of the town having voted 12,000 francs to defray the expense of the solemnity. They also erected a column to the memory of their distinguished countryman; and the government settled a pension on the son of the composer, M. Adrien Boieldieu.

Boileau is the general name applied to vessels, whether close or open, in which fluids are exposed to the heat for the purpose of ebullition or evaporation; but the term is most commonly applied to the close vessels used for the generation of steam. Such boilers, to lessen the danger of explosion, are almost invariably made of wrought metal, which, if burst, will bear rather than fly to pieces, as cast metal would do; and the plates made for the purpose are formed of the best and toughest metal, and rolled or wrought with peculiar care. Engineers differ as to the comparative merits of iron and copper as a material for steam-engines, but the bolder admit that iron, when of good quality, has the greatest cohesive strength, although the greater uniformity of texture in sheet-copper renders it safe to construct-copper boilers of less dimensions. In 1773, Antonioli, in 'Dissertation on the subject of iron' published in 1773, gave his opinion that iron was essentially better than copper. Further than this, supposing an explosion to occur with a copper boiler, it is likely only to produce a rent or tear in the metal, while an iron boiler, even though wholly of wrought plate is frequently broken to pieces. The cost of copper is about four times that of iron, but, as, owing to its far more rapid transmission of heat, a copper boiler may be made considerably smaller than an iron one to produce the same quantity of steam, and may therefore be still further reduced in this respect and weight without impairing its strength; the cost of a copper boiler is nearer twice than four times that of an iron boiler of equal evaporating power; and, as a set-off to this increased expenditure, the value of the old copper, when the engine is broken up, is far greater than that of the old iron, while an old iron boiler is worth little more than the cost of removal. Steam-engine boilers are treated of under Steam-Engine [P. C., p. 482-484], Steam-Carriage [P. C., p. 490], and Steam-Vessel [P. C., p. 608], and those of railway engines are treated of by Boulton and Watt in their 'Improvements in Steam-engines' in 1775. It is possible that such an opposition as the one between Quadra and Stirling, and such readers as may wish for further information respecting the various schemes which have been devised for remodeling the real or supposed defects of ordinary boilers or steam generating machinery, will find the manufactures in this book. 'Boiler' in Heber's 'Engineer's and Mechanic's Encyclopedia.' Boilers for the production of steam or the heating of water for the purpose of warming buildings are noticed under Warming and Ventilation [P. C., pp. 99, 70].

The excellence to which this art has now attained is such that the manufacturing operations, one of the most important is that employed, under the name of Howard's Vacuum-Pan, for boiling sugar at a lower temperature than in the open air, by the formation of a partial vacuum. A representation of this apparatus is given under Sugar [P. C., p. 232].

BOL, FERDINAND, a very able portrait painter and etcher, born at Linz, 1722; and died at Antwerp, 1790.

He was the pupil of Rembrandt, and executed some portraits in his style, of equal merit. He painted also some historical pieces of great merit, which are at Amsterdam, but his works were but few. He died rich, at Amsterdam, where he principally lived, in 1786, advanced in years. He etched also sixteen spirited plates.

(Houbraken, Schouburgh der Kunstschieders, &c.; Bartsch, Catalogue Raissonné de l'Œuvre de Rembrandt, &c.; Heineken, Dictionnaire des Peintres, &c.)

BOLOGNA, JOHN OF, or GIOVANNI DA, a celebrated sculptor and architect, born at Douay in Flanders, about 1594. He went early to Rome, where he distinguished himself by his masterpieces. Though a Presbyterian, he is known only by the above name. Van Mander calls him Jean de Bologne, yet he lived the greater part of his life at Florence. Van Mander probably knew only that name by which he was called by Vasari, who speaks of him as Giovanni Bologna, or Giovanni Bolognese. It is a narration of some he seems to have acquired from his celebrated fountain at Bologna, of which the crowning colossal bronze figure of Neptune is one of the masterpieces of modern sculpture.

He was selected also by the Academy of Florence, and was also sculptor to the grand-duke Francesco I. In 1606 he was invited to Genoa, where he executed several admirable works, chiefly in bronze. He died at Florence in 1608, aged eighty-four, or, according to a note in De Yonge's edition of Van Mander, only seventy-nine, for it is there stated that he was born in 1558. Baldwin, the chief authority for the life of Bologna, mentions in a body of his article, that he died in August, in 1608, a few months before his bronze equestrian statue of the grand-duke of Florence, Ferdinand I., was fixed in its place; yet in the heading of the article it is said that he died in 1599, an inconsistency probably due to the editor. John of Bologna is the sculptor who, when he showed to Michelangelo, whilst at Rome, a carefully finished model, was told by the latter to learn to sketch before he attempted to finish—a precept which he did not forget. John of Bologna, with the exception of Michelangelo, surpassed all the sculptors of his age, or indeed of the sixteenth century, and was surpassed Michelangelo himself in proportion and execution. His Rape of the Sabines is a magnificence of three centuries, and his figures, bearing the woman away in his arms, and striding over a fallen Sabine. Andreaus has cut three excellent views of it in chiaroscuero, in wood; Louis XIV. had it cast in bronze.

(Vasari, Vie de Pittori, &c., ed. of Lenghor; Baldinucci, Storia dei Professores del Dizionario, &c.)

BOLSover STONE. The yellow limestone of Bolfow in Derbyshire is used in the construction of the new Houses of Parliament. It was selected for its durability, strength, fitness for ornamental work, and colour. It is quarried at Newchapel, near the Derwent river, and is a carbonate of magnesia with carbonate of lime, in small granular crystals, without the slightest trace of organization, flinty nodules, or other blemishes. It has been subjected to various severe operations, and has been subjected to the most severe operations, and has been tested with credit; but it is yet to be seen whether it can withstand the atmosphere of London, where it has destroyed the Bath and Portland colts.

BOLSwerk, SchelTius, a designer and very celebrated engraver, was born at Oirschot in Friesland, in 1596. He lived and worked chiefly at Antwerp, with his elder brother Boetius. His best works are after Rubens and Vandyck, after whom he has engraved several admirable works on a large scale. He was born in 1596, in the art of engraving. Boets is said to have examined and touched with the crayon all the proofs of Bolswert's engravings after his works. Bords's prints are distinguished as true works of art, not as mere excellent mechanical performances of the graver; and they are admirably drawn, various and true in their effects of colour, and effective in light and shade; he preserved also the characteristic style of the master after whom he engraved. He
was equally excellent in portrait, history, and landscape. 

BONAPARTE, Joseph, Napoleon's elder brother, was born in Corsica in 1768. He received his education at the college of Autun in France. After the death of his father, he re-

BONAPARTE, Letizia RAMOLINO, born at Ajaccio in Corsica, in August, 1776, married in 1797 Charles Bonaparte, a landed proprietor and a lawyer. Charles left under Paoli for the independence of the island against French and his young wife accompanied him through their mountain expeditions. The family are named under BONAPARTE, NAPOLIS, F. C.

After her son Napoleon became First Consul of France, Madame Letizia fixed her residence at Paris where she lived rather retired, but after the empire was proclaimed and the title of Madame Mme had her own household, her chamberlains, ladies of honour, and all the accessories of a court. Des Casess was appointed her secretary. Her half-brother Fesch had been made a cardinal. Madame Mme was afterwards murdered by her financial mismanagement in her expenditure, and she is said to have once observed that perhaps some day she would have to support out of her savings all these kings, meaning her sons. She was des-

...
named to Corsica in 1785. He applied himself to the study of the law, according to his father's wishes. In 1792 he was made a member of the new administration of Corsica, under Paulii, who was an old friend of the Bonaparte family. In the 1793, he was a member of the Legislative Convention, and called the English to his assistance. Joseph emigrated to Marseille, where lie married one of the daughters of a wealthy banker of the name of Clari, without ever resuming his seat, to which he was appointed by the English. Joseph repaired to Paris, from whence he was shortly after sent by the Executive Directory as ambassador to the pope. There was then at Rome a knot of enemies who were bent upon establishing a Roman republic, and they relied upon the countenance and support of the French. On the 28th of December (1787) they assembled to the number of about three hundred, under the guidance of a sculptor named Cersacchi, and proceeded to the palace Corsini, where Joseph Bonaparte resided, vociferating 'The Republic and the Roman people for ever!' and they applied to the ambassador, claiming French protection. Joseph desired them to leave the palace. In the mean time a detachment of the guard, who were on the various duties of the day, came to the palace, and insisted that the insurgents should leave the premises. Those from within insulted and taunted the soldiers, who at last rushed into the court of the palace to clear it of the fugitives. Some say that the soldiers did not enter the palace, because they were insulted, but Napoleon himself denied it. Joseph, attended by Generals Duhopt and Sherlock, came down the staircase to remonstrate with the pay officers, but could not make himself heard in the midst of the confusion, when Duhopt, young and impetuous, drew his sword, and rushed forward, followed by the insurgents, in order to drive away the soldiers. The soldiers then fired, killing several of their opponents, and Duhopt among the rest. The insurgents dispersed in the gardens of the palace, and the King himself was surrounded with just cause. The transactions were much misrepresented by the French and their partisans. Joseph wrote in a vehement strain to the Cardinal Doria, secretary of state, complaining of the violation of his residence, and requiring immediate satisfaction. The cardinal hesitated; Joseph demanded his passports, and, heedless of the explanations sent by the Roman government, he set off in the night of the same day to return to France. The Directory then ordered Berthier to take possession of Rome.

Joseph resumed his seat in the Council of the Five Hundred, and, during the absence of Napoleon in Egypt, he and his brother Lucien prepared the way for his return, and for the establishment of the First Consul, made Joseph councillor of state, and he employed him in September, 1800, to negotiate a treaty of peace and commerce with the United States of North America. Having exhibited some diplomatic skill in this transaction, he was sent in the following year to Lunéville, where he concluded a treaty of peace with the Emperor of Germany in 1801, and the next year he was likewise employed at Amiens to negotiate the treaty with England. He was made a senator, and on his brother's abdication imperial crown. Joseph was recognised as an Imperial Prince and Grand Elector of the Empire. It is said that his brother offered him, in 1804, the crown of the kingdom of Italy, but that Joseph refused, unless it was made independent of the crown of France. When Napoleon sent an army to invade Naples, at the beginning of 1806, he appointed his brother, 'Prince Joseph,' to lead the expedition, Marshal Massena acting as military commander. A few months after, Napoleon appointed by a decree his brother to become resideant under his own name in Sicily. Joseph resigned in Naples, though not in Sicily, little more than two years. The character of his administration is given in the History of Naples, by Colletta, a writer by no means prejudiced against the French rule. Acting as his brother's lieutenant, when Napoleon had taken the Island of Elba, Joseph raised himself into a cadastre, or survey and estimation of the landed property, for the better assessment of the land-tax; and he established a new and regular system of provincial administration. He also embellished the capital, began new roads in the provinces, and organised an effective gendarmerie to repress the robber bands in the provinces. Most of these measures were directed against the overbearing manner, like all the reforms made under Napoleon, and many individual rights and interests were overlooked and sacrificed. The times were stormy, and the Italian army was still tooning with insurrections and conspiracies, which were suppressed by a summation of the old system took place. Neither the nobility nor the body of the people became reconciled to the new system until years after, under the rule of Murat.

By a decree of June, 1808, Napoleon appointed 'Joseph Napoleon to be King of Spain and of the Indies,' and soon after Joseph Murat succeeded him as King of Naples. In Spain Joseph met with much greater difficulties than at Naples. He tried mildness and conciliation, but even these failed, owing to the stern unbending character of the people. During the five years of his Spanish reign, three times he was obliged by the successes of the allied armies to leave his capital; the last time (1810) to return no more. Joseph would have wished to be really and not nominally king of Spain, but this was prevented both by the people, who would not submit to him, and by his brother Napoleon, who appointed by degrees his own generals to be military governors in Spain, and they acted quite independently of King Joseph and his allies. In March, 1812, Joseph wrote to his brother, requesting to be allowed to reign his crown, as he saw that he could do no good in Spain. Soon after he repaired to Paris for the same purpose, and there his brother employed him in telling him that he expected to make peace with England, and then he should withdraw his armies from Spain. This was before the Russian expedition. General Foy, in his history of the Peninsular Wars, speaks of Joseph as follows:— "When he assumed the crown of Spain, Joseph was forty years of age. His figure was graceful, and his manners elegant. He was fond of women, of the fine arts, and of literature. His conversation was fluent and methodical, and was adorned with judicious reflections." After Napoleon's abdication (June, 1813), where he narrowly escaped being taken prisoner by the English, he withdrew to France. In January, 1814, when Napoleon set off for the army, he appointed Joseph lieutenant-general of the empire, and placed him at the head of the council of regency which was to assist the emperor. Napoleon wrote to him from Rheims on the 16th March, that in case the enemy should advance in irresistible force, he must send off towards the Loire the empress and his son, the Imperial court, the ministers, and all the heads of the administration. 'Do not leave my son for a moment,' added he; 'I should prefer hearing that he was at the bottom of the Seine rather than in the hands of the enemies of France.' Accordingly, when Rosenberg arrived before Paris on the 28th of the same month, Joseph sent off the empress and her son to Biar, after the battle of the 30th, in which the troops outside of Paris were driven in by the allies, Marmont told Joseph that he could no longer defend the capital, and Joseph authorised him to treat for a suspension of arms for a few hours in order to arrange the terms of a capitulation. (Thibaudet, Le Consulat et l'Empire, ix. 635.) Joseph then rejoined the empress at Biar. After Napoleon's abdication, Joseph and his brother Jerome thought of removing the empress and the regency to the south of France, but the empress refused, and was supported in her refusal by the members of the household. Soon after, the empress rejoined her father Francis of Austria, the regency was dissolved, and Joseph was set at liberty where he purchased the estate of Prangia, near Nyon, on the banks of the lake Leman. From thence he corresponded with his brother at Elba, and with Murat at Naples, who had been chosen Regent of the Empire by the Emperor of Austria for his grandson. He is said to have given Murat the advice of declaring against Austria in 1815, so as to make a diversion in favour of Napoleon, a diversion which proved of no use to Napoleon and was fatal to Murat. Napoleon having returned to Paris in March, 1816, Joseph rejoined the Imperial court, and was elected to the House of Peers. It is reported that, seeing the threatening appearance of the times, he advised Napoleon, before he set off for the army, to abdicate in favour of his son, and to appeal to his father's abdication, and to stand for the crown. 'This however was not done. After the return of Napoleon from his defeat at Waterloo and his second abdication..."
tion, Joseph embarked for the United States, after having a last interview with his brother at the ile d’Aix. He was well received in the United States, and after a time he fixed his residence on the banks of the Delaware, near Philadelphia, where he passed the winter. He changed the title of his house, de Survilliers, and lived in a style of affluence, affording employment to many of the labouring population, and hospitality to the French emigrants who resorted to America. His wife remained in Paris, and Frédéric settled in Brussels and afterwards at Florence. When the Paris revolution of 1830 became known in America, Joseph wrote a long letter or address to the House of Deputies, in which he put forth the claims of his nephew the young Napoleon. The letter was republished in the Chicago Journal of a story that England soon after, and resided some time in this country, and at last repaired to Italy, where he died at Florence, in July, 1844. He was buried in the vault of the church of Santa Croce. His name is said of the newspapers to have left a fortune of fifteen millions of francs.

(Biographical Sketch of Joseph Napoleon Bonaparte, London, 1833; Abel Hugo, Précis Historique des Événemens qui ont conduit Joseph Napoleon sur le Trône d’Espagne; Botti, Storia d’Italia; Compi, Anna di Vinc; Colletta, Storia del Regno di Napoli; Thibaudieu, Le Consulat et l’Empire.)

Bonaparte, Lucien, a younger brother of Napoleon, was born at Ajaccio in 1775. He emigrated to Malta with the rest of the family in 1793. He entered warmly into the revolutionary notions of that period, and made flaming speeches at various clubs, and wrote tracts pamphlets on liberty and equality. Soon after, he obtained employment in the French government in the south of France, wanted to remove to the prisons of Orange, where the guillotine was in constant activity. By showing a breach of the wants of the soldiers, and with informality in his commission, he detained the assumed victims under arrest at St. Maximin, until the fall of Robespierre put an end to the reign of terror. In the reaction which took place in the south of France against the so-called Jacobins, Lucien was arrested as such on account of his speeches, and one of those whom he had saved proved most hostile against him. He was however liberated after a time. In 1796 Lucien was appointed commissary at war, provost of the province of his native General Corps at Venice. In the following year he was elected deputy to the Council of the Five Hundred, and he went to reside at Paris, where he took a house, of which his sister, Elisa Baciocchi, was the honours. His drawing-room was resorted to by several of the most distinguished men of letters. He took the opposition side in the council, and allied himself to Sisylas and his party, who wished to try their hands at a new constitution. While Napoleon was in Egypt, Lucien wrote to him, complaining of the insolvency and misgovernment of the Executive Directory, and urging him to return to France, which letters are said to have been intercepted by the English cruisers. After Napoleon’s return, in October, 1799, Lucien, who was the president of the council, became the active leader of those who wished to overturn the Directory. In the stormy sitting of the 19th Brumaire, he resisted the motion made by several members to outlaw General Bonaparte, and as the confusion and uproar increased in the hall, he declared the council was increasing him, and they told them to march in and drive away the factious men who were sold to the English, the usual phrase in those times, and who were no longer the representatives of France. After the accomplishment of that revolution, in which he rendered most material assistance to his brother, he was raised to be a member of the commission which framed the new or Consular constitution. Soon after he was appointed minister of the interior, but remained in office only a short time, having had some quarrels with his brother upon matters of administra tion; and in October, 1800, after the campaign of Marengo, Napoleon sent him ambassador to Spain. His mission proved successful: he managed to ingratiate himself with the king, and, among other things, he succeeded in strengthening the French influence in Spain. He induced the weak Spanish government to join France in an attack upon Portugal, which ended by the latter country being obliged to sue for peace, for which it is paid dearly. He also completed the arrangements concerning the new kingdom of Etruria, to be given to the young infant, son of the Duke of Parma, who had married a Spanish princess, in exchange for which Spain ceded to France the island of Elba. The title of Duke of Parma and Lombardy to the title of Emperor of the French. To this last step the French court consented, and Napoleon’s vision of a united Italy, and also the institution of the Legion of Honour. Lucien was made a senator, and his brother gave him the senatorship or living of Sopeldorso, an estate of the former elector of Trelves. His wife being dead, Lucien married, in 1808, Mme. Sopelsdorf, a Portuguese lady, who was the daughter of the Duke of Braganza. Lucien disapproved of this marriage, as he had disapproved of the marriage of Jerome, because he looked forward to royal alliances for his brothers. Lucien himself, who was called the project of his life; but he says in his memoirs that he wished to have stopped there, and that he opposed from the first the idea of establishing an hereditary dynasty. When he saw his brother determined on assuming the imperial crown, he left France in the spring of 1804, and went to Italy, to Thibaudieu and others say that the two brothers quarrelled on other grounds: about Lucien’s marriage in particular. Lucien accuses Fouché of having, by his insidious reports, contributed to alienate his brother from his views. The Scandinavian war, and the hereditary succession in Napoleon’s family, named his brothers Joseph and Louis as eventual heirs to the throne, but made no mention of either Lucien or Jerome. Lucien, after a time, fixed his residence at Rome, but he was very friendly with his brothers, and became, as the Prince of Venice, and lived in a style of affluence. Being fond of literature and the fine arts, his house was much frequented. After the peace of Tilsit, Napoleon repaired to North Italy at the end of 1807, and sent for his brother Lucien to join him at Mantua. The two brothers had there a conference, in which it seems that Napoleon offered to give Lucien a kingdom in Italy, at the same time telling him plainly that in such case his brother would have to deliver up his empire to the internal as well as the external policy of his administration. Lucien declined accepting a crown on those terms, and said that he preferred to remain in a private station. ‘Be it so,’ Napoleon replied; ‘you cannot have henceforth any grounds of complaint against me.’ But he added in parting, that Lucien would not fall in with his system of politics, he must prepare to quit the Continent, where his silent opposition could no longer be tolerated. (Rapport de Lucien Bonaparte, Our Memorias de Lucien Bonaparte, Secret de Sa Majesté.)

Lucien returned to Rome, where he purchased the estate of Canino, in the province of Viterbo, near the borders of Tuscany. Pope Pius VII. created him Prince of Canino and Musignano in 1808. Soon after Napoleon began a course of persecution against the Roman Catholics. Lucien, who was in the arrest of the pope, and the seizure of his domains. When the French took possession of Rome in 1809, Lucien, who had expressed himself very freely against this part of his brother’s measures, was confined in the Caffarelli, and restored to his country estate. In 1810 he resolved to go to the United States, and having obtained passports from his brother, some say without any passports, he sailed from Civitavecchia, but was seized by an English cruiser and carried to Malta, where after a time he obtained permission from the British government to reside in England under surveillance. Ludlow castle was fixed upon as his residence. Some time after, he removed to a place in the neighbourhood, where he remained till the end of his days. His son, the last of the Bonaparte family, is the subject of a poem of Charlemagne. After the peace of 1814 he returned to Rome, where he dedicated to Pope Pius his poem of Charlemagne. When Napoleon returned to France from Elba, in 1815, Lucien repaired to Paris. His object in this does not appear very clear. He has been suspected of having received a generous impulse, to tender to his brother his advice in the hour of danger, and to keep him also, if possible, within constitutional limits. However this may be, he went to live at the seat of the Caffarelli family, and is the subject of an imperial prince, and claimed a seat of honour as much as in the new House of Peers. This was resisted by several peers, on the ground that he had never been acknowledged as a prince by the title of Caffarelli, nor was he entitled to receive a pension such. He then took his seat in the body of the house in company with the private councils that took place, he advised Napoleon to offer to the Emperor of Austria, in order to detach him from
The allies, to abdicate in favour of his son. This manoeuvre
not having succeeded, Napoleon set off for the army, lost the
battle, and himself, as well as his brother Joseph, was taken
by Lucien being appointed extraordinary commissioner of
the emperor, to communicate with the representatives of the
people, to revive in the Chamber of Deputies a feeling of
national devotion which it was right to shorten. In this
match, Lucien obtained the gratitude of the nation, but was
an answered sternly by La Fayette. 'The nation has followed your brother over fifty
fields of battle, from the burning sands of Egypt to the frozen
dezert of Africa. The army, as he feels it to be for this that we mourn the loss of three millions of Frenchmen!' Lucien advised his brother to dissolve
the Chambers, since he could not manage them, and to assume
the dictatorship. Napoleon hesitated, and at last refused; he
said he was not Paris and its brilliant glory. Lucien had
ever seen what Lucien did not see, that the attempt would only
lead to a short protracted struggle, attended by additional calami-
ties to France and to himself. Lucien says that he was opposed
to Napoleon's abdication, but when he saw his brother determined upon it, he assisted upon its being made
at least in favour of young Napoleon. Napoleon smiled and
shook his head incredulously, but at length inserted the
clausule in favour of his son. Lucien then proceeded to address
the Senate, and Napoleon repaired
Il, but in vain he cried out, according to the forms of
the old monarchy. 'The emperor has abdicated, long live
the emperor!' The House remained mute, and as he went on speaking in confusion. He represented himself with being an alien, a foreign titulary, a Roman prince,
and not even a citizen of France. Soon after the ill-disposed
armies made their appearance, Napoleon went to Rochefort, and Lucien set out to return to Italy. He rejoined his wife at Rome, where he afterwards spent many years in peaceful retirement.
In 1828 he began digging at a place called La Cucumella on his estate of Canino, which is believed to have been the site of the ancient Vetulonia, once an important Etruscan city, and he gathered an ample collection of Etruscan antiquities, of which he published a description: 'Museums Etrusci de Lucien Bonaparte, Prince de Canino.' During the insurrection in the Papal States, in 1831, Lucien kept himself and his family aloof from all trouble. When he returned from
his visit to England, where he published several of his works. He returned to Italy, where he died in 1840. His eldest son, Charles Lucien Bonaparte, well known as a naturalist, and
author of the 'Ornithology of the United States,' and of the
'Iconography della Fauna Italiana,' succeeded to the title. Enthusiastic in the cause of science, he has been the chief
promoter of the annual congresses of the scientific men of
Italy. Of Lucien's other children, one, having had some
affairs to attend to, it is reported that she had gone to Naples,
Italy. Lucien ranks as a French author in prose and in verse. His published works are:--1. 'Charlemagne, ou l'Eglise délivrée,' an epic poem in 24 cantos, which has been translated into English by S. Butler; 2. 'La Rev. F. Haremarte,' 1 vol.; 3. 'La Corse sauve,' a poem in 12 cantos. 3. 'Mémoires de Lucien Bonaparte, Prince de Canino, écrits par lui-même.' 8vo, London, 1836. 4. 'Réponses de Lucien Bonaparte aux Mémoires du Général Lamarque,' London, 1835. In
his public political confession, and at the same time an apology for his own
and Napoleon's political conduct during the hundred dias;
it contains some curious revelations and frank avowals, though
it is rather inconsistent in its reasoning, like all the attempted
justifications of Napoleon's political morality. Several of
Lucien's speeches while a tribune have also been published;
and among others his 'Rapport sur l'Organisation des Cultes,' and
'Discours sur la Légion d'Honneur.' A defamatory book, en-
titling, in which his father lost his life, and his mother was
imprisoned and was only saved by the timely death of Robes-
pierre. After the end of the reign of terror, Hertense
was intrusted to Madame Canpan for her education. Her
mother's second marriage with General Bonaparte bright-
ened her prospects; and when her stepfather became First
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Consul, Hertense went to enliven by her youthful grace
and sprightly humour the court circle of the Tulieres. Napoleon,
who was much pleased with her, as well as with his
brother Eugene, and he behaved as a real father to both.
In 1802 he gave Hertense in marriage to his younger brother
Louis. It seems that his other brothers were not favourable
towards this marriage; but Hertense had a son by him,
who lived for many years after his father's death.
In 1804, Hertense's relations with the Tuileries were as
friendly as before, and she succeeded to her father's
title of Countess of Harcourt, a title which he had
inherited from his mother Anne de Mercy. She
marriage with the hereditary prince of Baden.
In the same year Louis was appointed King of Holland,
and his wife followed him thither, not without regretting
her做不到. In Holland she was by no means able to favour his new subjects, the Dutch and their interests, but her
husband was all for France and for Napoleon, who expected
that his brothers should act merely as his lieutenants in the
countries over which he appointed them to rule. After the
death of her eldest son in 1807, Hertense was advised
to travel for her health, and she ultimately returned to Paris,
where she was delivered of a third son. In 1809, when Louis and Napoleon were at variance about Dutch politics,
when a corps of Poles was sent to Piacenza to enforce
her husband and keep him within the bounds of his allegiance
to his imperial brother. Louis however proved refractory,
and at last quitted Holland, of which Napoleon took possession.
He restored a brother to his wife, and was received in Paris,
where she had an hotel and a princely household, and went
by the name of the Queen of Holland, though her husband
was no longer king. The eldest of her two living sons,
was anIFICATION.
This son, in whom her mother lighted the prospects of Hertense and her children,
but she bore this disappointment with equanimity, always
professing the most unbounded devotion to Napoleon, and
obedience to his will. She became separated though not
divorced from her husband, whose temper and taste did not
agree with her own. In 1814 she remained at Paris and
was zealous in urging the defence of the town against the
allies. When Napoleon abdicated at Fontainebleau, she re-
signed herself and her children to the care of the King of
France; and in the return of Elba, which however has been denied by her
friends. Meanwhile her husband was in the French Courts to
have his two sons removed from her charge and restored to
him, but the return of Napoleon put a stop to the pro-
\nHurtense. She married Joseph Bonaparte's second daughter.
In 1831 both her sons, much to her annoyance, joined the
insurrection in the Papal States. The eldest fell ill during that short cam-
bination, and died at Amandola. The youngest, who was in
Italy by the anxious mother, and after some narrow escapes
they returned together to Arenenberg. This remaining son,
Charles Louis, was naturalized as a citizen of the canton
of Thurgau. In 1832 he married a sister of Thurgau.
In 1837 he married a young woman of fifteen, and himself at the head of a military insurrection at Sittard, he
was arrested, but Louis-Philippe interfered to save him
from punishment on condition of his emigrating to America.
Hertense was too ill to follow him, and she died at Arenen-
berg, in October, 1837. Her son had returned from America
to attend her last moments. Her remains were taken
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to France, and buried in the church of Ruel near Paris, by the side of three of her mother Josephine. Her son being afterwards expelled from Switzerland, in consequence of the remonstrances of the French government, came to England, from whence he made another insurrectionary attempt in 1839, for which he was confined in the castle of Ham, where he still remains. Hortense had been deprived of the duchy of St. Leu at the second restoration of the Bourbons. She published some reminiscences or fragments of her life, entitled her Mémoires, or "La Reine Hortense en Italie, en France, et en Angleterre, pendant l'année 1831," Svo. Paris, 1834. Amiable, kind-hearted, and womanly in her feelings and tastes, she is out of her sphere when talking of grave political questions, and administration of state affairs. It was a matter of impulse rather than of reason. Hortense was fond of music, and she composed several airs which have been applauded, among others a favourite one, "Partant pour la Syrie,—le jeune et beau Donos." (La Reine Hortense en Italie already quoted; Supplement to the Biographie Universelle, art. 'Hortense'; Thilaudeau, Le Consulat et l'Empire; Romances mises en musique par Hortense Duchesse de St. Leu, with a biographical notice, by Cowles.)

BONE, HENRY, R. A., the most distinguished enamel painter of his time, carried this branch of painting to a degree of perfection which his predecessors had not even approached. He was the son of a cabinet chair-maker at Truro, in Cornwall, where he was born in 1755. He showed at an early age some artistic ability, and was accordingly sent to learn the china business. He married one Cockworth, who, in 1778, at the expiration of Bone's term of apprenticeship, was settled in Bristol. He remained in the employ of Mr. Cockworth for another year, at the expiration of which the china business failed, and Bone ventured to try his fortune in London. For many years he chiefly employed in London by jewellers and others in enamel-painting for watch-cases, brooches, lockets, and the like; and also in a species of art called device-painting. He had, however, also the honor of being an enamet portrait of his wife, which he exhibited at the Royal Academy in 1780, and by an original picture of a Muse and Cupid, which, though only five inches and a quarter by four inches and a quarter, was at that time considered to be of extraordinary dimensions: it was engraved in 1790 by R. Dagle.

Towards the close of the last century his engagements increased to that extent, that he was enabled to decline the drudgery of his profession, and to confine himself to miniature and portrait painting, and he executed his own enamels and his own miniatures. In 1800 his reputation was established by the appointment of enamel painter to the Prince of Wales, a distinction which was succeeded in the following year by his election to the Royal Academy. In 1806, he was appointed to supply pictures, and in 1807 he became the first official artist to the British government, for which service he was granted a pension of forty pounds a year. He was also appointed to supply portraits of the royal family, and was expressly commissioned to execute for the Prince Regent some engravings of his first experiments in the art, which was the beginning of his reputation as a portrait painter. He was also commissioned to execute portraits of the King and Queen, and was subsequently appointed painter to George III., George IV., and William IV. He was elected a full Academician in 1811, and for twenty years from this time he was assiduously employed in producing a long succession of admirable works, most of them of unprecedented dimensions; but about 1831 his advanced years compelled him to cease his professional labours, and he left his house in Berners Street, where he had chiefly resided, and retired to Clarendon Square, Soho's Town, where he resided during the autumn of 1831. In December, 1832, he was in full employment for many years, his family was too numerous to allow him to grow rich. He had a son in the army and another in the navy, both of whom he survived: the former, Lieutenant Bone, died in consequence of wounds received at the battle of Toulouse. H. P. Bone, the present enamel painter to the queen, is also one of his sons. Mrs. Bone, whom he married in 1779, was a Miss Vandermeulen, and was directly descended from Peter, the brother of the celebrated Charles Anthony Vandermeulen, and himself battle-painter to William III.

The following are Bone's principal works:—The Death of Dido; Cynon and Iphigenia; Venus; and Hope nursing Love, after Sir Joshua Reynolds; a copy (in the style of the original) of Miss Bellini's portrait of Henry VIII. for his son, H. P. Bone, up of a picture of Beecheus and Ariadne, by Titian, eighteen inches by sixteen and a half, dimensions up to this time unapproached except by himself, which was purchased by George Bowles, Esq., of Cresw. Bab. Square, for 2000 guineas. The original picture, which is now in the National Gallery, was then the property of the late Lord Kinnaid, who lent it to Bone for the express purpose of copying it. A Venus recumbent, after Titian; Bathsheba, after N. Poussan; La Belle Vierge, after Raphael; and an Assumption of the Virgin, after Murillo. A series of portraits of the Rosell family, from the reign of Henry VII., to the present time, executed for the late Duke of Bedford, and now at Woburn Abbey. A set of portraits of the principal Royalties distingushed during the civil war of Charles I., for J. P. Ord, Esq., of Donnington, Chelsea, who unfortunately died the day after the portrait was completed. A portrait of Mr. H. P. Bone, who, in all the great works, was his father's assistant. And, finally, his greatest and most interesting work, a series of eight-five portraits of distinguished persons in the business of art, according to the plan of C. A. van Dyck, ranging from five inches by four to thirteen inches by eight: it remained in the possession of the artist during his life, but it was his desire that after his decease it should be offered to the government for purchase, which was accordingly done; but although at the moderate price of 5000l., the British government declined the purchase. The sum was considered too much for a collection comprising eighty-five authentic portraits of the most distinguished characters of one of the most interesting periods of English history. The fact of their being copies does not render them less interesting or less instructive to the public. They were disposed of by public sale, and the greater part of them were purchased, either at the sale or since, by W. J. Banks, Esq.

(Annual Biography and Obituary, 1856.)

BONINGTON, RICHARD PARNES, was born in the village of Arnold, near Nottingham, in 1801. Bonington's father was a landscape and portrait painter, and perceiving a strong tendency in his son to that branch of art, he gave him opportunities to study art. At an early age, he trained him from his childhood in such a manner as in his judgment was best calculated to fit him for his future profession, at the same time not neglecting his education, as frequently happens, in those branches of instruction most necessary to him; for the fact of his being copies does not render them less interesting or less instructive to the public. They were disposed of by public sale, and the greater part of them were purchased, either at the sale or since, by W. J. Banks, Esq.

Having obtained a considerable reputation in Paris by his works, which were chiefly marine and coast views, he visited Italy, where Venice, 'throne of her hundred isles,' offered him a rich field for study; and Bonington, with his usual precocity and genius for painting, so soon as he had become conversant with the art, undertook the making of a series of pictures, which he had already prepared the sketches for, but he was already the victim of a fatal disease; he was in a deep decline, and the nervous debility inherent in this complaint reduced him to such a low state, that his constitution sunk under the excitement of his very success when he returned to England. He died in London, shortly after his return from a second visit to Paris, in September 1828, having not quite finished his twenty-sixth year. He painted chiefly in water-colours, and mostly marine or river views; his style is simple and picturesque, quite free from conventionalisms.

Sir Thomas Lawrence, who attended Bonington's funeral, speaks of him in the following terms:—"A talent to a great degree, shortly after his death,—Your pupil has been so fatally verified! The last duties have just been paid to the lamented Mr. Bonington. Except in the case of Mr. Harlowe, I have never known, in my own time, the early death of a youth to excite more universal regret and so rapid a decline. If I may judge from the later direction of his studies, and from recollections of a memorable conversation, his mind seemed expanding in every way, and ripening into full manhood, and I dare not conceive he could have carried his ambition which makes confinement to lesser departments in the art painfully irksome and annoying:—"

But the fair guardian when we come to find,
Comes the blind Fury with the abhorred shaven,
And takes the thin open eye.
BOO

A series of twenty-four engravings from the works of Bonington has been published by Mr. Carpenter. (Cunningham, Lives of British Painters, &c.)

BONOMI, JOSEPH, an Italian architect who practised at Forlì, died January 31, 1755. He was born at Forlì, in the parapeted province of the same name, in the year 1664, and was the son of a barber. He first appeared in public life in 1685, when he published a treatise on the art of architecture under the name of Toodool. In 1697 he was invited to England by the brothers Adam, and was for many years employed by them as an assistant and architectural draftsman. The fruits of his labours in this respect are known to all in the form of drawings and sketches. In 1725, however, he returned to Italy, and was engaged in the design and execution of the celebrated church of San Zaccaria, near Venice, which was begun in 1711 and finished in 1716. In 1727 he published a treatise on the art of architecture under the name of "Bauzeitung," in which he gave a complete description of the plans and elevations of the buildings he had designed and executed. In 1744 he was elected an Associate of the Royal Academy, and was never raised to the rank of a full member. He died at Forlì in 1755, and was buried in the parapeted church of San Zaccaria, where a monument bears his effigy.

Bonomi's chief professional works are, additions and alterations at Langley Hall, Kent, 1790; the chapel of the Spanish nuns, 1796; the Eastern House, Kent, for G. F. Hatton, Esq., father of the present Earl of Winchester, 1783; the pyramidal mausoleum in Buckingh-arn Park, Norfolk, 1783; Longford Hall, Salop; mansion at Laverstock, Hants, for H. Portal, Esq., 1787; the splendid mausoleum of a lady in the park of Buckingham House, 1788; the Royal Library, Argyle, 1803, which last (not yet completed) is his most celebrated work, and is given as an example of modern design in the treatise on Civil Architecture (by Telford) in Brewer's Encyclopedia, although chiefly remarkable for the heresy, if not the selectism, of an entrance portico with a column in the centre. The reason assigned for this caprice is, that the portico was intended for carriages to drive through, it was thought a column in the centre of the front would express its purpose more truly ; and a column, taken by itself, a column in that situation is not a little objectionable, on account of its obstructing the view from the entrance door. Nevertheless the design is praised as "displaying originality of genius."

Bonomi also made designs for the new sacristy of St. Peter's at Rome, of which editions be bad been appointed honorary architect in 1804.

BOOKBINDING, or BUONSIGNORE, FER-

DINO, author of the "King of Sardinia, and professor of architecture at Turin," is entitled to honourable distinction in his profession. Although known to us only by one work, yet that alone sufficiently proclaims his talent and establishes his claim to immortal immortality. The title of his book, "Un Pezzo di Terra, in Turin, the ex-soto structure intended to commemorate the king's return to his dominions, is one of the most classical and tasteful specimens of recent Italian architecture; a happy application of the idea of the Pantheon at Rome on a moderate scale; but by no means a servile imitation of it—certainly is distinguished from it by being raised on a spreading-out basement about 16 feet high and 12 feet in diameter, which, following the plan of the rotunda, forms a concave or pointed arch, and forms a dome, which is effectually raised on the cupola, is divided on its plan into eight compartments alternately closed and open, the latter forming four semicircular recesses or trumens, with two Corinthian columns in each, and four circular divisions, with four large pannels with bas-reliefs in the attic above the order. The dome is richly coffered with octagonal caissons. Plans, &c., of this highly interesting structure may be found in the volume of the "Bauzeitung" for 1857.

BOOKBINDING is, in fact, merely groups of leaves, either of thin skin or of some kind of vegetable mem- brane, the art of the bookbinder was a very primitive one. He had simply to paste or glue the leaves together, so as to form an extended sheet, and to attach it to a cylinder round which it might be rolled. Even to the present day it is customary in some Oriental countries to write on slips of paper stuck together to form long sheets of paper, and then to roll these up, and to attach this to rollers at each end, clasped with gold or silver. The square form of binding, now so well known, was of later date, and constituted a vast stride in the art. It was adopted first by the Christians, and was next adopted by the Jews, in misused in Catholic countries, long before the invention of printing, and has been retained as the most convenient mode of binding.

In the binding of a book at the present day, whether done by machine or by hand, there are generally three classes or successive stages of operations, varying in detail according to circumstances, but following each other pretty much in regular order. These relate first to the grouping of the sheets to- gether, in a uniform and symmetrical way; next to the fin- ishing of the stiff covers or boards which give firmness to the book; and lastly to those processes which relate rather to the external beauty than to the strength or efficiency of the book. These we shall designate as—1. Preparing; 2. Binding; 3. Finishing; and shall notice the different kinds as we go on.

1. Preparing. A book is built up of several sheets, each one folded and re-folded so as to assume a more convenient shape. The number of these sections, called folds, or sections, foldings depends on the size of the work; thus octavo or 8vo. implies that there are eight printed pages on one side of a sheet, and that the sheet must be so folded as to be brought to one-eighth of its original size. The number whereby the sheets are designated is called the "number of pages," and is the number of printed pages obtained from one side of a printed sheet, such as folio, 4to., 8vo., 12mo., 16mo., 18mo., 24mo., 32mo., &c. Some of the sheets employed are larger than others; thus 'royal octavo,' though folded into the same number of pages as 'octavo,' is larger in size, through the sheet of paper being larger.

The folding of the printed sheets is one of the first oper- ations in preparing for the binder. Each sheet has a letter at the bottom, such as A, B, C, D, E, F, &c., usually in accordance with the numbers of the signatures, which are thus, as many signatures as there are sheets to form the volume. When the alphabet is in this way exhausted, another in smaller type, or duplicate letters, or letters combined with numerals, are employed. There is a heap of signature a, another heap of signature b, and so on. The folder sits before a bench, on which each sheet is spread out in succession; and the folding is aided by the use of a bone or ivory folding-knife: it is done with great rapidity, and with satisfactory accuracy which rarely results in error.

The folded sheets are 'gathered' into new groups, fitted to make up into books; that is, each new group is made to contain one copy of the sheet bearing signature a, another of b, another of c, &c. The groups are next 'collated,' that is, examined throughout to see that no mistake in the order of arrangement occurs.

If the sheets thus folded, gathered, and collated, are to be put into 'boards,' they are sewn in the next process; but if they are to be bound, and therefore finished in a more careful manner, they are beaten or pressed before being sewn, as a means of bringing them to a more compact and smooth state. Until recent periods this process used to be effected by means of the hammer; the volume being divided into parcels of a few sheets; and these parcels, held flat on a smooth stone, being beaten with a heavy hammer. But the 'rolling-press' has greatly improved the mode of proceeding. This press consists of two or more rollers, being set on a common shaft; the parcels of a volume are placed between the plates and then passed between the rollers, which gives them a more effective and eductive pressure than the hammer. Sometimes the ink becomes 'transferred' to the opposite page by this process, which is not properly conducted, to the great dis- figurement of the book.

In sewing together the sheets for a volume, they are not actually fastened one to another, but all are in common at- tached to a range of parallel straps or bands placed about the back of the volume. Sometimes marks are cut with a saw across the back edges of the sheets, to receive the strings; but in others cases this is dispensed with. The process of sewing is carried on by the aid of a sewing-press, which consists of a bed or boards, and by a needle of from 9 to 11 inches long, and a cross-bar at the top. The strings are fastened to this cross-bar and are stretched vertically downwards to the bod.
of the press, where they are firmly secured. The number of these strings depends principally on the size of the book, and varies from two to eight or ten. The sewers (a female) sits in front of the press, with a folded sheet of paper on it, with the back edge in contact with the strings, opens the sheet in the middle, and sews it to the strings, passing a needle and thread to and fro. The needle passes through the back edge of the sheet twice, and the thread, being taken out of the eye of the needle, is twisted around every string, and thus connect them and the sheet together. This being done with respect to the first sheet, a second is laid on the first, and sewn in a similar manner; and so on until the whole is done in the same way, they are then to form the volume—all the threads being fastened to all the strings, and, indirectly, to each other; for the threads pass from one sheet to another by a peculiar kind of stitch called a ‘kitch’ stitch.

The boards are by the sewing-process brought together into a book-like form, and are then ready to pass through the operations connected with the boards and covers. The back-edges of the sheets are glued together, to increase the strength of the volume; this is done simply holding the book in the left hand, and brushing on it a little warm melted glue. This being dried, the ends of the strings (which are allowed to hang loose for an inch or so beyond the volume) are scraped thin, for the sake either of being rendered less apparent, or for the strings to be more easily to allow of fastening on the boards. The volume is next rounded in a singular manner; that is, rendered convex on the back and concave or hollow on the fore-edge. The workman lays the volume on the board so as to make the back hand, with the left draws the sheets in such a way as to produce the rounding of the edges: the manipulation is a curious one; and as the glue is not yet quite dry, the sheets are enabled to yield a little to the action of the hand and hammer.

A groove is now made to receive the boards or stiff covers. These boards would project beyond the width of the back edge, and would be both unsightly and inconvenient, if some means were not adopted for compressing or confining them. A thin bevel-edged board is placed on each side of the volume far enough from the back edge to allow of a kind of ledge to be formed; these ‘back-boards,’ as they are called, are placed parallel with the back edge; and the volume, with these boards on either side, is lowered into the press, the back edge uppermost. By hammering this edge in a particular way, it is made to expand or spread out, and thus to form two ledges against which the covers of the book are to be placed. Although in common language we call the covers of a book the stiff sides which keep it firm and compact, yet the terms applied by a bookbinder are rather different. With him, this stiff envelope is called the board, the leather or cloth applied outside the board is the cover, and the two togethér form the case; and it will be convenient to retain the same terms here.

If the book is to be boarded, to use a familiar term, the edges of the leaves are not often cut; but if it is to be bound, this cutting of the edges is an essential process, and is done before the boards are fitted into the volume, which is thus effected. The volume, placed between two boards, is screwed in a press; one of the ends of the volume being left projecting a little above the press. A cutting instrument, called a ‘plough,’ partaking in some degree of the action of a carpenter’s plane, is passed over the end of the volume so as to shave off the ragged edges of the sheets, and leave them perfectly smooth. The volume is reversed in position, and the same thing done with the other end. It is then taken out of the press, and the edges are perfectly straight, so as to show the convexity of the back and the concavity of the front edge alike to a plane level, which admits of the front edges of the leaves being cut in the same manner as the top and bottom edges. These same operations are then repeated on being released from the press; and then presents the neat appearance which a concave front edge, convex back, and plane top and bottom edges, are calculated to give.

Bound books are made only for applying ‘to boards,’ boards made of ‘millboard,’ or smooth brown or drab-coloured pasteboard made of several layers of paper glued together and strongly pressed. The sizes and thicknesses vary according to the size of the volume and the kind of binding for which they are to be used. The boards are cut very quickly from the large sheets by a cutting edge applied nearly in the same way as in tobacco-shredding or in chaff-cutting. In attaching these boards to the book, the strength of the fastening depends on the kind of binding. If the book is to be bound, holes are made through the boards, opposite to the strings, and the loose ends of the strings, being passed through these holes, are glued down firmly to the inner surface of the back, thus rendering the book stiff and firm. On the other hand, the volume is to be in ‘cloth boards,’ the strings are not generally passed through and glued down in this way, but the boards are fastened to the book chiefly by being passed over the outer edge, and the volume is placed between the outer edge and the back of the book. These boards, in this latter case, are brought somewhat to a finished state before being attached to the volume; for the cloth is cut to the required size, and basted or sewed to the volume; and, as may be seen, they are placed sufficiently wide apart to allow for the thickness of the book. Some books, especially in the present day, are made ‘hollow in the back;’ which is thus produced,—A double layer of paper or of cloth is placed between the leather of the back and the outer edge of the boards; the latter is glued on to the outer edge, and the back edge of the sheets to the inner layer, and as the two layers are connected at their edges, but detached or loose from each other at their surfaces, they give a kind of hollowness to the back of the books.

Most well-bound books have a little appendage at the top of the back-edge, called the ‘head-band.’ This gives a neat finish to the book, and at the same time strengthens the leather covering of the back-edge at that part. For common books, the head-bands, as they are called, are made of a double thickness of paper, which is first pasted or sewed to the back of the book, and then cut off; for better work it consists of a little strip of vellum or paste-board, around which coloured silk threads are twisted by the same process which fastens it to the volume.

When the book is sewn with a single uniform colour, the cloth cover is applied to the boards before the latter are attached to the volume; but when it is ‘whole bound,’ having leather all over the outer surface, or ‘half-bound,’ having partly leather and partly paper at the surface, these coverings are put on after the boards are attached to the book. The leather in the case of a whole bound is cut to a size rather larger than is required to allow for turning and turning in, and is laid down sideways on a smooth board. The back of the leather is well pasted, and the book placed down upon it, the bands of the workman being, and adjusting, and pressing the leather, until it adheres closely to the book in every part. If ‘half-binding’ is the style of work, then the leather is so cut as to cover the back and a small portion of the front board or side; while four small pieces are applied to the corners. The paper is subsequently so pasted on as to hide the ragged edges of all these pieces of leather.

**Finishing.**—By the processes above described, the book has received all which is really necessary for service; the sheets have been arranged in proper order, sewed to rings, fastened to boards, and covered with cloth, leather, or paper.

But a large portion of the talent, the ingenuity, and the capital applied to this branch of manufacture depend on the subse- quent processes, which determine the kind which the book is subjected. These must be rapidly glanced at.

First, with respect to the edges. Most persons who purchase books are aware that, if in ‘boards’ or ‘cloth-boards,’ the top edges of the sheets, although placed level, are often slightly bevelled, so that they do not when the book is standing upright, lie exactly level, an appearance which is very unct. In some cases, to make a nearer approach towards neatness, the fore-edge only is cut; in occasional instances, too, the whole of the edges are cut, but left white. But a white edge to a book would soon become discoloured and unsightly; and it is far more usual either to scrape the edge with colour or to gild it. In sprinkling, the edges of several books are laid even one with another, and a piece of sponge, dipped into liquid colour, is passed lightly over the edges, so as to give them the required tint; or the paste is used, a more general method is that of sprinkling. The books are in this case ranged side by side on a bench, and a brush dipped in the liquid colour (which is formed of some such pigments as are generally used in paper-making) is passed lightly over the books, and lightly tapped against a stick, whereby a shower of spots fall on the edges of the books, producing an appearance depending on the colour employed, and the manner in which the shower is performed. These spots are sometimes produced, by a peculiar admixture and management of different colours sprinkled on the edge of the book.
a piece of steel, and is coated with a mixture of red chalk and water. The gold is blown out from small books, and spread on a leather cushion, where it is cut to the proper size by a saw. Then, as the gold is laid upon a table, a layer of white of egg mixed with water, and with this the partially dry edge of the book is moistened; the gold is then taken up on a flat kind of brush, and applied to the moistened edge, to which it adheres. When all the three edges have been gilt in this way, and left to remain for a very few minutes, the workman takes a burnisher formed of a very smooth piece of hard stone, and setting the end of his thumb against the shoulder, rubs the gold very forcibly—not (as might be supposed) to press, but rather that with the required degree of polish, by rubbing down the minute asperities which may be occasioned by the paper beneath. The gold employed has a greater or less degree of solidity according to the cost of the book.

From the edges we pass to the covers; and first, to leather covers. The leather so employed is 'roan' or sheep, 'sarf,' 'Morocco,' and 'Russia'; at least, these are the principal kinds, to which alone we need allusion here. These kinds of leather receive their colour at the dye-houses in Bermondsey, where, they are prepared; but 'roan'-bound books, such as school-books, are often sprinkled with colour by the bookbinders after the leather has been attached to the boards. For this operation an instrument of the form of a broad bar is used in a manner such that the leaves may hang vertically downwards, while the boards lie horizontal. A brush is dipped into the liquid colour, and dashed or sprinkled on the cover so as to give a group of spots or wavy lines, at the taste of the workman, or to suit the taste of the client. The surface of the boards is then beaten down; which, of course, occasions the formation of a new surface from the bookbinder; but Morocco is sometimes treated in the following manner—The Morocco leather employed for chair-covers and such purposes is made either of kid-skin or sheep-skin according to its quality, and has a wrinkled appearance, arising from the surface having been rubbed very hard with a minutely grooved piece of wood. Now for many purposes of bookbinding these wrinkles cannot be removed, and are, therefore, in many cases, used as an ornament, which may be formed into any required shape. Two pieces of leather being well flattened, and laid face to face, the upper one is rubbed in different directions with a flat piece of cork, by which the wrinkles are removed, and a slightly granulated texture produced.

The decorations produced on a leather-bound book by heated stamps or dies are very diversified. The dies for producing any particular device are fixed to handles, and when about to be used are warmed in a gas-heated stove. Many such dies are often used for one book, and the process of producing a sunken ornamental device by using these tools by hand is called 'blind-stamping.' But for many purposes it is more convenient to fasten a great number of small dies as partial devices to a metallic plate, by means of glue and clout, and then to stamp the required form on the flat plate by means of a press: this is called 'blocking.'

All the devices so produced on a book are called 'blind,' if no gold is employed; but much of the beauty of the workmanship and decoration consists in the rendering of this forming part of all the pattern. The leather, as laid on the book, is not in a fit state for receiving the gold without some modification of surface. It first receives a coating of parchment-silk; then two or three coatings of white of egg, whereby a slight glossiness is produced; and just before the gold is to be laid on, the surface is slightly moistened with oil. The gold, cut up into small pieces to suit the kind of ornament, is laid on the book with a flat camel-hair brush; and then, when the whole is dry, is pressed upon the gold, whereby two effects are produced at once—the production of the device, and the fixing of the gold to the leather. A piece of soft rag, lightly passed over the book, removes the small superfluous fragments of gold, and leaves the gilt device clearly marked.

But the decoration of volumes bound in cloth, although occupying a far lower level in respect to manual dexterity than the more costly binding in leather, has occupied much labour. The method was to starch the cloth, and then, using as a means for diffusing neat and even elegant volumes at a marvellously low price. Cloth-binding, in fact, has been the key of one great advance in the art—the application of machinery to book-binding processes with a similar economy. The cloth which books are covered is generally cotton of a particular kind, woven for the purpose. When the system of cloth-binding came up, about twenty years ago, the cloth was used in the unskirted state, with the warp and weft threads visibly crossing each other at right angles. But now the cloth is more generally so altered by an artificial embossment of surface, as to leave the threads barely visible, and to give to the paper a remarkable resemblance to the appearance of leather; a resemblance which, in some cases, the beholder has rarely received, may, indeed, have deceived many an eye a few years ago. This embossing is produced by drawing the cloth, while yet uncut for the purposes of binding, between two steel rollers, of which the concavity and convexity are employed respectively, so as to give a row of gas-jets through their hollow centre, so as to keep up a constant temperature. There must be as many pairs of rollers as there are different devices for embossing each book; so that the number of large factories is very considerable. Some of the rollers are intended for the production of a uniform device over the whole surface of the cloth; while others have particular devices for each particular book, and are consequently planned with especial reference to the size of the volume. The rapidity with which books can be now bound in this way, is one great cause of the surprising cheapness at which they are often sold. Five or six years ago, Dr. Ure said that 'should Mesers. Westleys (one of the largest book dealers) bind this list of volumes, on any given occasion, they can have them all ready for publication within the incredibly short period of two days;' and this has been more than borne out by what has since been done.

Other kinds of cloth-covers, especially those which are much decorated with gold, are stamped with the device after being pasted on the covers, instead of before; they are, in fact, cases, each one quite ready to affix to the book in a speedy manner after being stamped. Great pressure is required in this process, for the mill-board is required to yield to the force, as well as the cloth itself. The case is placed down flat on an iron bed heated with gas from beneath; above is a press, to the lower end of which is attached the stamping-die or block, face to face. Great mechanical power is then brought to bear on it, and the press descends with force sufficient to impart the pattern to the cover, gilt or not, according to the circumstances of the case.

India-rubber Binding.—The last few years have witnessed the introduction of a singular mode of binding, arising out of the use of a cement or glue of caoutchouc, instead of sewing, for fastening the sheets of books together. In this process, the sheets are not allowed to retain the folded form customary in other kinds of binding; but the edges are cut all four sides—on the back as well as the front, top, and bottom; the consequence of which is, that all the leaves are separated one from another. The group of leaves to form one volume is placed in a kind of cylindrical case, formed of india-rubber, to which the back-edge and concavity to the front; and a cement of caoutchouc is carefully applied to the back-edge, whereby all the leaves become cemented together. The subsequent operations are not very different as compared with other methods, a certain kind of flexibility resulting from this method, advantageous when the volume is thick. This method was introduced by Mr. Hancock, and in reference to it Dr. Ure remarks:—"For engravings, atlases, and ledgers, this binding is admirably adapted, because it can be displayed most freely, without the risk of dislocating the volume; but for security, three or four stitches should be made. The leaves of music-books bound with caoutchouc, are often turned over at their sides and do not fail; the sheets, and do not torment the musician like the leaves of the ordinary books, which are so ready to spring back again. Manuscripts and collections of letters which happen to have little or no margin left at the back for stitching them by, may be bound by Mr. Hancock's plan without the least encroachment upon the writing. The thickest ledgers thus bound open as easily as paper in quire, and may be written up to the innermost margin of the book without the least inconvenience." The operation consists of cementing the leaves or sheets together at the back, with a composition of isinglass, oil, sugar, and other ingredients; and in covering the cemented sheets with a leather or cloth, which is applied with a India-rubber bonding."
Long after the invention of printing and its introduction into England, books were dear. In the ‘Privy Pen Account of Elizabeth of York,’ published by Sir H. Nicoll, we find that, in 1505, twenty pence were given for a Primer and a Psalter. In 1506 twenty pence were given for half a pound of barley, and were equal to six days’ work of a labourer. In 1516 Fitzherbert’s Abridgement, a large folio law-book, the first published, was sold for forty shillings. At that time forty shillings would have bought three fat lambs; books of this size and price must have become cheaper as they spread more widely, partly upon a larger number of purchasers. The exclusive privilege that were given to individuals for printing all sort of books, during the reign of Henry VIII., Mary, and Elizabeth, though they were in accordance with the spirit of monopoly which characterized that age, and were often granted to prevent the spread of books—offering a proof that in that market was not large enough to enable the producers to use the risk of competition. One with another, 200 copies may be estimated to have been printed of each book, during the period we have been noticing; we think that proprietors would have been quite adequate to the supply of the limited number of readers—to many of whom the power of reading was a novelty unsanctioned by the practice of their forefathers.

The second period of the English press, from the accession of James I. to the Revolution, was distinguished by pedantry at one time, to which succeeded the violence of religious and political controversy; and then came the profuse publication of books in that extensive public spirit which was active during the political-religious contest. There is, in the British Museum, a collection of 2000 volumes of Tracts issued between the year 1640 and 1660, the whole number of which leaves us to the publications amounting to nearly 30,000. The number of impressions of new books connected with controversial subjects must have been very small during this period.

After the Revolution an act of parliament was passed that only twenty printers should practise their art in the kingdom. We see by a petition to parliament in 1666, that there were only 140 ‘working printers’ in London. They were quite enough to produce the kind of literature which the country required.

At the fire of London in 1666, the booksellers dwelling about St. Paul’s lost an immense stock of books in quires, amounting, according to Evelyn, to the value of 200,000l., which they were accustomed to store in the vaults of the metropolitan cathedral, and of other neighbouring churches. At that time the people were beginning to read again, and to think;—and as new capital rushed in to replace the consumed stock of books, there was once more considerable activity in the printing trade. The booksellers and printers who had had their hands full of work during the night, and with the great number of our press: they required translations and abridgments of the classics—versions of French and Italian romances, old chronicles, and sermons to delight the people. Caxton and his successors abundantly supplied these wants, and the impulse to most of their exertions was given by the growing demand for literary amusement on the part of the great. But the priests strove with the laity for the education of the people; and not only in Protestant but in Catholic countries, were schools established: the presses everywhere were a new source of employment for the press—A, B, C’s, or Abuses, Primers, Exercises, Grammars, Dictionaries, were multiplied in every direction. Books became as much of a necessity of ‘professional men. There were not many works of medicine, but a great many of law. They were too required instruction in the laws which they were required to obey; and thus the Statutes, mostly written in French, were translated and abridged by Darnell, a eminent law-printer. It was as early as the time of Caxton the press was employed to promulgate new laws.

Taken altogether, the activity of the press of England, during the first period of our inquiry, was very remarkable. To William Caxton, our printer, John Wynken de Worde, the able assistant and friend of Caxton, produced the large number of 450 books from 1493 to 1535, that is, upon an average, he printed 10 books in each year. To Richard Pynson, supposed to have been an assistant of Caxton, and his immediate successor, we are indebted for the first English translation of the Bible, which was printed at about the same time. From the time of Caxton’s press to that of Thomas Hacket, with whose name Dr. Dibdin’s work concludes, we have the enumeration of 2226 books. The ‘Typographical Antiquities’ of the name of the printer, and the number of the book, is given in each, thus 414, 1600. The same authors have recorded the titles (we have consulted the sufficient and complete list of the books printed) of nearly 10,000 distinct works printed among us during the same period. Many of these works however were only single sheets; but, on the other hand, there are doubtless many which have been lost. Dividing the total number of books printed during these 130 years, we find that the average number of distinct works produced each year was 75.

**script to William Caxton: a Biography, by Mr. Charles Knight, which gives a history of the Progress of the Press in England.** The subject may be divided into five periods:—

**I. From the introduction of printing by Caxton to the accession of James I.**

**II. From 1603 to the Revolution, 1688.**

**III. From 1688 to the accession of George III., 1760.**

**IV. From 1760 to 1800.**

**V. From 1800 to 1842.**

On the earliest objects of the first printers was to preserve from further destruction the scattered manuscripts of the ancient poets, orators, and historians. But after the first half-century of printing men of letters anxiously demanded corrections of the ancient classics. Michael Drayton and Stephen Gosson, translators and Plantinas produced neat and compactly printed octavo and duodecimo, in addition to the larger books, instead of only producing the expensive folios of their predecessors. The instant that they did this, the foundations of literature were widened and deepened. They probably at first overrated the demand; indeed, we know they did so, and they suffered in consequence; but a new demand very soon followed upon the first demand for cheap copies of the ancient classics. The first English Bible was bought up and burnt; those who bought the Bibles contributed capital for making new Bibles, and those who burnt the Bibles by so advertising them. The first printers of the Bible were however cautious—they did not see the number of readers upon whom they could rely for a profit. In 1544 Caxton printed only 500 copies of his complete edition of the Scriptures: and yet, so great was the rush to this new supply of the most important knowledge, that we have existing 326 editions of the English Bible, or parts of the Bible, printed between 1526 and 1600.

The early English printers did not attempt what the continental printers were doing for the ancient classics. Down to 1540 no Greek book had appeared from an English press. Oxford had only printed a part of Cicero’s Epistles; Cambridge, no ancient writer whatever: three only or four old Roman writers had been reprinted, at that date, throughout England. The English nobility were, probably for more than two centuries, the great engines of our press: they required translations and abridgments of the classics—versions of French and Italian romances, old chronicles, and sermons to delight the people. Caxton and his successors abundantly supplied these wants, and the impulse to most of their exertions was given by the growing demand for literary amusement on the part of the great. But the priests strove with the laity for the education of the people; and not only in Protestant but in Catholic countries, were schools established: the presses everywhere were a new source of employment for the press—A, B, C’s, or Abuses, Primers, Exercises, Grammars, Dictionaries, were multiplied in every direction. Books became as much of a necessity of ‘professional men. There were not many works of medicine, but a great many of law. They were too required instruction in the laws which they were required to obey; and thus the Statutes, mostly written in French, were translated and abridged by Darnell, an eminent law-printer. It was as early as the time of Caxton the press was employed to promulgate new laws.

Taken altogether, the activity of the press of England, during the first period of our inquiry, was very remarkable. To William Caxton, our printer, John Wynken de Worde, the able assistant and friend of Caxton, produced the large number of 450 books from 1493 to 1535, that is, upon an average, he printed 10 books in each year. To Richard Pynson, supposed to have been an assistant of Caxton, and his immediate successor, we are indebted for the first English translation of the Bible, which was printed at about the same time. From the time of Caxton’s press to that of Thomas Hacket, with whose name Dr. Dibdin’s work concludes, we have the enumeration of 2226 books. The ‘Typographical Antiquities’ of the name of the printer, and the number of the book, is given in each, thus 414, 1600. The same authors have recorded the titles (we have consulted the sufficient and complete list of the books printed) of nearly 10,000 distinct works printed among us during the same period. Many of these works however were only single sheets; but, on the other hand, there are doubtless many which have been lost. Dividing the total number of books printed during these 130 years, we find that the average number of distinct works produced each year was 75.
there were several London papers, regulated however by privileges and surveyors of the press. Soon after the beginning of the eighteenth century (1709) London had one daily paper, fifteen times three a week, and one twice a week: this was before a stamp-duty in 1724 there were three daily papers, six weekly, and ten three times a week. Provincial newspapers had already been established in several places. In 1731, Cave, at his own risk, produced the first Magazine printed in the 'Gentleman's.' This was a great success; and that in the following year the book-sellers, who could not understand Cave's project till they knew its value by experiment, set up a rival magazine, 'The London.' In 1749 the first Review, 'The Monthly Magazine,' was started; and in a few years was followed by 'The Critical.'

The periodical literature of this period greatly reduced the number of merely temporary books; and it had thus the advantage of importing much of the best work of the country. The斑斑点点 deduction for the pamphlets inserted in the catalogues already referred to, still appears that the great influx of periodical literature, although constituting a most important branch of literary commerce, had in some degree the effect of narrowing the publication of new books; and perhaps wholesome so. It appears from a 'Complete Catalogue of Modern Books published from the beginning of the century to 1756,' from which all pamphlets and other tracts are excluded, that in as many as seven years of the above period, which exhibits only an average of ninety-three new works each year. It seems probable that the numbers of an edition printed had been increased; for, however strange it may appear, the general prices of the works in this catalogue were found to be higher than in a few similar catalogues. The subscribers for new books, even at the high cost of subscriptions, had in many cases formed, in the Reading Societies and Circulating Libraries. Those new modes of diffusing knowledge were first established, it was predicted that they would destroy the trade of publishing. By their means the circulation of knowledge was increasing daily, enabling many to read new books at a small expense, created a much larger market than the desires of individual purchasers for ephemeral works could have formed; and a very large class of books was expressly produced for this market.

But a much larger class of society was always being sprung up, principally out of the middle ranks. For these a new species of literature had to be produced—that of books conveying useful information in a popular form, and published at a very cheap rate. The 'Clerk's Pocket Companion,' in 1727, was the first to lead the way in this novel attempt; in the same year the Society for the Diffusion of Useful Knowledge, which had been formed in November, 1826, commenced its operations, and several publishers of eminence soon directed their capital into the same channels. Subsequently editions of our great writers have been multiplied at very reasonable prices; and many a tradesman's and mechanic's house now contains a well-selected stock of books, which, through an annual expenditure of 2s. 6d., has brought in, in the middle of intellectual improvement, and all the tranquil enjoyment that attends the practice of family reading, home to a man's own fireside.

The increasing desire for knowledge among the masses of the people was however still not sufficient. In 1829 the 'Penny Magazine of the Diffusion of Useful Knowledge and Chamber's Journal' commenced to be published; and subsequently the 'Saturday Magazine.' The 'Penny Sheet' of the reign of Queen Anne was revived in the reign of William IV., with a much wider range of usefulness. It was said by some that the trade in books would be destroyed. They asserted also that the rewards of authorship would be destroyed, necessarily, at the same time. The 'Penny Cyclopaedia' of the Society for the Diffusion of Useful Knowledge, which was commenced at this double destruction. The work has returned about 160,000l., to the commerce of literature, and 40,000l. have been distributed amongst the authors and artists engaged in its production, of which 12s. 6d. was a profit, and 10s. 6d. has been ably earned by the diligence of the writers.

There is a mode however of testing whether cheap literature had destroyed the publication of new books, without including reprints and pamphlets. We may examine the relations of the four years from 1805 to 1842, as computed by Mr. J. M'Culloch in the last edition of his 'Commercial Dictionary.'

| NEW WORKS, 1829 to 1832. Value of a single Copy. |
|---|---|---|---|---|
| Year. | Vols. at Publication price. | £ | 6s. | 3d. |
| 1830 | 1641 | 11 | 15 |
| 1831 | 1619 | 9 | 9 |
| 1832 | 1620 | 8 | 0 |

This is a prodigious stride beyond the average of 89 per year of the previous period. From some causes or other, the selling-price of books had increased, in most cases 50 per cent., in others 100 per cent. The 2s. 6d. duodecimo had become 4l., the 6s. or 10s. 6d., and the 12s. quart, 1l. It would appear from this that the exclusive market was principally sought for new books; that the publishers of novels did not rely upon the increasing number of readers; and that the periodical works constituted the principal supply of the trade. The average of the increase of the sales in books must however have become enormous, when compared with the previous fifty years.

V. Of the last period—the most remarkable for the great extension of the commencement in books, shall represent the accounts of the first 27 years collectively, and of the last 16 years in detail.

The number of new publications issued from 1800 to 1827, including reprints altered in size and price, but excluding pamphlets, was, according to the London Catalogue, 19,660. Deducing one-fifth for the reprints, we have 15,888 new books in 27 years; showing an average of 588 new books per year, being an increase of 216 per year over the last 11 years of the previous century. Books however were still rising in price. The 4s. duodecimo of the former period became 6s., or was converted into a small octavo at 10s. 6d.; the 10s. 6d. octavo became 12s. or 14s., and the guinea quarto very commonly two guineas. The demand for new books, even at the high cost of subscriptions, was so great, that the Reading Societies and Circulating Libraries were enabling many to read new books at a small expense, created a much larger market than the desires of individual purchasers for ephemeral works could have formed; and a very large class of books was expressly produced for this market.
The average price of these papers is, as near as may be, 5d.; so that the sum annually expended in newspapers is about 1,250,000L.

The quantity of paper required for the annual supply of these newspapers is 121,184 reams, some of which paper is of an enormous size. In a petition to the pope in 1472, for the suppression of heretics, printed at Rome, they bitterly complain of the want of demand for their book, their stock amounting to 12,000 volumes; and they say, 'You will admire how and where we could procure a sufficient quantity of paper; or even rags, for such a number of volumes. About 1200 reams of paper would produce all the poor printers’ stock. Such are the changes of four centuries.

We recapitulate these estimated annual returns of the commerce of the press:

- New books and reprints: £435,600
- Weekly publications, not newspapers: 100,000
- Monthly publications: 30,000
- Newspapers: 1,250,000

£2,085,600

The literary returns of the United Kingdom, in 1748, were unquestionably little more than 100,000L. per annum. What has multiplied them twenty-fold? Is it the extent of the widening of the market—the exclusion or the diffusion of knowledge? The whole course of our literature has been that of a gradual and certain spread from the few to the many. As the printing press has been for over a century the cotton or the silk trade. Henry VIII. paid 12s. 4d. for a silk gown for Anne Boleyn—a sum equal to five guineas a yard of our day. Upon whom do the silk mercers now rely? The public. One may buy a silk gown at half-a-crown a yard. The printings-chine has done for the commerce of literature what the sack and the Jaccard-loom have done for the commerce of silk.

It has made literature accessible to all. (For an account of the ‘Book Trade of Germany,’ see *Journal of London Statistical Society*, vol. iii.; and the same work, vol. vi., for a notice of the ‘Book Trade in England.’ As to newspapers, see *Newspapers, P. C.*)

B. officinalis. *Common Borage*. This species has a stately tall five-deep spikes; a rotate cymula with the tube very short, the throat with short, erect, emarginate scales; exerted stamens, the filaments bifid, the inner fork bearing the anther; the anthers linear, lanceolate, convoluted in the form of a cone. All the tubular part of the flower is truncate or lanceolate leaves, and blue, paniced, drooping flowers.

B. officinalis, Common Borage, has the lower leaves oblong-obovate, obtuse, attenuated below; the segments of the calyx are ovate-oblong, the flowers are blue, and the whole plant is bipinnate with ciliated hairs. The genus appears to be originally a native of Aleppo, but is now naturalised in most countries of Europe. In Great Britain it is not uncommon and rubbing in waste places. Borage has formerly a great reputation as a cordial. Its virtues in this respect have been overrated, as in common with the whole family to which it belongs, it possesses no very active properties. The tissues contain gum, and on this account it may be used as a demulcent. It also possesses the use of potash, as well as other plants of the order, which renders it slightly terebinthaceous. Withering says the young tender leaves may be used as salads or as a potherb. G. Don has described three other species: *B. cressulaefolia, a native of Persia; B. longifolia, from Numidia; and B. lastiloba, a native of Cornwall*. They are all plants of the easiest culture. They may be always propagated by seed, which should be sown in the open ground. They form pretty border-flowers.

*BOO* 224

**NEW WORKS, 1839 to 1842.**

<table>
<thead>
<tr>
<th>Year</th>
<th>Title</th>
<th>Author</th>
<th>Publisher</th>
<th>Price</th>
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</thead>
<tbody>
<tr>
<td>1839</td>
<td>2302</td>
<td>11a. 2d.</td>
<td>821</td>
<td>327 16 10</td>
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<td>1840</td>
<td>2091</td>
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<td>1841</td>
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<td>92 5 9</td>
<td>696</td>
<td>6 8 4</td>
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<tr>
<td>1842</td>
<td>2193</td>
<td>95 6 2</td>
<td>904</td>
<td>9 7 6</td>
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</tbody>
</table>

The four years ending 1832 were published, of new books, 6149 volumes; in the four years ending 1842 were published 8097 volumes. The cost of a single copy of the 6149 volumes was 5492L.; of the 8097 volumes, 7560L. The average price of these volumes in the first period was 11s. 6d.; in the second period, 8s. 9d.

Mr. McCallie has also given the following table of reprints, from 1839 to 1842:

<table>
<thead>
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<th>Year</th>
<th>Title</th>
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<th>Price</th>
</tr>
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<tr>
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<td>1840</td>
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<td>2193</td>
<td>95 6 2</td>
<td>904</td>
<td>9 7 6</td>
</tr>
</tbody>
</table>

Mr. McCallie adds: 'From inquires we have made with much care and labour, we find that, at an average of the four years ending with 1842, 2149 volumes of new works, and 755 volumes of new editions and reprints (exclusive of pamphlets and periodical publications), were annually published in Great Britain; and we have further ascertained that the publication price of the former was 8s. 9d., and of the latter 8s. 2d. a volume. Hence, if we suppose the average impression of each work to have been 750 copies, it will be seen that the total value of the new works annually produced, if they were sold at the publication price, would be 708,494L. 8s. 9d., and that of the new editions and reprints, 231,218L. 15s. We believe however that if we estimate the value at which the entire impressions of both descriptions of works actually sell at 4s. a volume, we shall not be far from the mark; and if so, the real value of the books annually produced will be 435,600L. a-year.

But the most remarkable characteristic of the press of this country is its periodical Literature. It is most of the times, without exaggeration, that the periodical works issued in Great Britain during one year comprise more sheets than all the books printed in Europe in the period of Gutenberg to the year 1800.

The number of weekly periodical works (not newspapers) issued in London on Saturday, May 4, 1844, was about sixty. Of these the weekly sale of the more important amounts to little less than 500,000 copies, or about fifteen millions annually. The greater number of these are devoted to the supply of persons who have only a very small sum to expend weekly upon their home reading.

Of the weekly publications, independent of the sale of many of them in monthly works, we may fairly estimate that the annual returns are little short of 100,000.

The monthly issue of periodical literature from London is unequalled by any similar commercial operation in Europe. 227 monthly and periodical works were sold out, on the last day of May, 1844, to every corner of the United Kingdom, from Paternoster Row. There are also 38 periodical works published quarterly: making a total of 265.

A bookseller, who has been many years conversant with the industry of the great literary hive of London on Magazine-day, has favoured us with the following computations, which we have every reason to believe perfectly accurate:

The periodical works sold on the last day of the month amount to 500,000 copies. Mr. McCallie estimates them at 265,000.

The number of newspapers published in the United Kingdom, in the months of which can be obtained with the greatest accuracy through the Stamp Office, was 447. The stamps consumed by them in that year were 60,529,001. Their proportions are as follows:

1843.

<table>
<thead>
<tr>
<th>Weekly newspapers</th>
<th>31,609,092</th>
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<tr>
<td>English provincial</td>
<td>17,035,086</td>
</tr>
<tr>
<td>Welsh</td>
<td>339,500</td>
</tr>
<tr>
<td>Scotch</td>
<td>5,027,589</td>
</tr>
<tr>
<td>Irish</td>
<td>6,474,754</td>
</tr>
<tr>
<td>Total</td>
<td>60,529,001</td>
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</tbody>
</table>
BORDONE, PARIS (Cavalieri), one of the most distinguished painters of the Venetian school, especially in portrait, was born of a noble family at Treviso in 1566. He was for a short time the pupil of Titian in Venice, but they disagreed and separated, and Bordone chose afterwards Giorgiono as his master. He became a pupil of a spiral, and even in current style of his own, which however did not differ in anything material from the styles of these two great Venetian masters. Bordone's works are especially distinguished for all the beauty and interest of carrying the whole skill of his art to the drawing or invention. One of his best works is the Martyrdom of St. Andrew, in the church of San Giolbe at Venice. Vasari mentions the picture formerly in the Scuola di San Marco, now in the Academy, of the Fisherman presenting the Bishop with a fish, an enlargement by the master of his own little invention but though the colouring is rich and the general execution good, the composition is bad, the point of sight, or horizontal line, is placed so high that the spectator has a kind of his eye on the wrong scene; the figures are small; the background is rich architecture, but the perspective is incorrect.

It was taken to Paris by the French during the war, but was restored to Venice in 1816. His picture of Paradise, formerly in the church of Ogni Santi at Treviso, is now also in the Venetian Academy. Other metals have been used, among them a beautiful Holy Family by Bordone, and a picture of Apollo with a Lyre, and Marysia and Midas in the background. Bordone spent some time in the service of Francis I. in Paris, where he died in Venice, in 1570, according to the best authorities, but various dates are given both for his birth and death.

(Zassetti, Della Pittura Venetiana; Ridolfi, Le Maraviglie del disegno in metallo.

BORING INSTRUMENTS. The boring instruments commonly used by the carpenter consist of awls, or broad-aws, gimlets, augers, and bits of various kinds. The first-mentioned, which are only used for very small holes, and generally in soft wood, are solid cylindrical tools ground to a straight chisel-shaped edge, and mounted in round handles, by which they are pressed into the wood with an alternating semi-rotary motion, taking care, in commencing the hole, to apply the chisel-shaped end at right angles to the grain, so as to cut the fibres, instead of the wood, of which the handle is made. 

Gimlets are cylindrical tools hollowed out on one side, and terminating in a short conical screw with a sharp worm tapering off to a point. These, to afford more power, are mounted in traverse handles. Being pressed into the wood with a rotary motion from left to right, the conical screw, directed by its tapering point, cuts its way into the wood, while the sharp edge of the semi-cylindrical cavity or hollow in the side of the gimlet attaches and clears away all the cuttings produced by the point. They are generally used for boring the inner part of the tenon of the joint, or for boring the back of the hole when the hole is made with a brace and bit. Gimlets are made of various sizes, but are seldom used for boring holes except in wood, and are always made to revolve in the same way as the bit of the brace. 

Augers bear a general resemblance to gimlets, but are so large that their traverse handles are worked by two hands, while gimlets are used with one hand only. Sometimes the counters are made very similar to those of a gimlet, but in other cases there is no screw, the end of the instrument being formed more like a centre-bit. In other cases, again, the semi-cylindrical hollow or cavity which receives the boring, and by the sharp edge of which the sides of the hole are trimmed, is formed by the worm of the auger turned round the axis of the instrument, which then gradually tapers into a conical screw. Both augers and gimlets are made smaller at the upper part, nearer the handle, than near the end, which is the opposite to the case of boring tools. 

Bits are boring instruments made to fit into a large crank-shaped handle turned a brace, by which they may be applied with greater power and precision than gimlets or augers, and are used for boring holes which are more distant from the axis of the instrument in accuracy is necessary, and for boring hard woods. They are made in sets, and are readily fixed in or detached from the brace by means of a spring. The principal kinds, as enumerated in Nicholson's Architectural Dictionary (article 'Bit'), are shell-bits, which resemble such augers as have no screw at the end, but simply an interior cylindrical concavity, with a cutting edge. Centre-bits, which, as their name implies, turn upon a centre or projecting point in the middle of their breadth as upon an axis; they are of a flat or chisel-like shape, and have a vertical cutting edge projecting from the extremity at one side, so as to cut the wood across the grain round the circumference of the hole, while on the opposite side of the axis or centre is a radial cutter projecting obliquely, but almost horizontally, from the face of the bit, which, as the instrument is turned round, ploughs away, in the inner side of the cylinder, the concavity of the head of the vertical cutter. Such an instrument may be compared to a revolving plough, the vertical cutters representing the coulter, and the radial cutter the ploughshare; and, as it cuts clean large holes with but little risk of splitting. Taper-drills are used to enlarge holes in wood; and rammers are pyramidal bits, with a vertical angle of about 34°, the cross section of which is either polygonal or semicircular, used in like way as the auger or iron for boring holes, and for enlarging holes of scraping rather than boring; and those of a polygonal shape are intended especially for iron. Instruments of the same kind, mounted for use in the hand instead of a brace, are called broaches. Countersinks are made with a vertical angle of about 90°, used for widening the upper part of screw-holes, so as to allow the heads of screws to be countersunk into them. Those for iron have generally but two cutting or rather scraping edges; but those for wood and the softer metals have more. The countersink is made to form on the conical surface of the bit. A screw-driver is frequently added to a set of boring-bits, and used, like them, in the brace.

Small holes in metal are usually bored with drills or boring-bits formed with scraping rather than cutting edges. These frequently resemble the countersinks used for iron, but are sometimes made more in the shape of a centre-bit. They are occasionally used in a brace, and where the pressure required is greater than can be applied by the conical screw. They are placed against the chest of the workman, an apparatus termed a press-drill is used, in which the brace is pressed to its work by a weighted lever. Some drills are used in a kind of stock which receives an alternating rotary motion, and is worked by hand, the tight string of which is passed round a pulley fixed upon the stock, and rubbed with resin to prevent the slipping of the string. Another simple and effective mode of working a drill is by fixing it in the lower extremity of a vertical spindle, and turning the upper end of the vertical spindle by a wheel. The pressure of the opposite extremity with a heavy circular mass of metal to give it an impetus. A strong cord is passed through a hole in the upper extremity of the spindle, and is attached to the opposite end of a transverse piece of wood which, by means of a hole in the centre of the wood, is slipped upon the spindle, and is capable of moving up and down freely upon it. Before using the drill the transverse piece of wood must be turned round two or three times, so as to wind the spiral round the spindle half way, or to the required part of the circumference. The drill between the wood, set in the required place, and the spindle placed in a vertical position, the transverse bar is pressed almost downwards by the hand. By this action the cord is unstretched, and the spindle turns much more rapidly than before, so that the pressure is sufficient to wind the cord round it in the opposite direction, and thereby to lift up the transverse bar, the pressure on which is relaxed for the moment. A fresh application of pressure again unwind the cord, and occasion the bit to revolve in the opposite direction, and by a repetition of the same operation the spindle is kept in very rapid motion, though revolving alternately in opposite directions. This ingenious invention is derived from the native smiths of Ceylon.

Common drills are frequently used, especially for very delicate purposes, in a lathe, and all the larger operations of metal-boring, such as the boring of musket-barrels, cannon, and the cylinders of pumps and steam-engines, are performed by boring machines of the same general construction, the boring of guns being briefly alluded to under Cannon, P.C., p. 242. Musket-barrels are bored with a cylindrical plug of tempered steel about an inch and a half long, with its surface cut like a perpetual screw, with a flat thread about a quarter of an inch thick. The cylinder is made by fitting it on a lathe, and rendering it with a very smooth surface, and thus a very efficient boring implements, which, it must be remembered, has not to make a hole, but simply to remove inequalities from the inner surface of a cylinder formed by revolving or rolling. In the early manufacture of steam-engines and similar machinery the difficulty of procuring accurate cylinders formed a great obstacle to improvement. The old method of boring cylinders and pump-barrels resembled the plan adopted for boring wooden water-pipes, which was to place the pipe in a carriage made to move forward as nearly as possible in the direction of its axis, against a revolving.
borax or barium and giving rise to oxalic acid and calcium oxalate. These substances are excreted by the roots and accumulate in the soil, forming a white deposit on the surface. This deposit is known as tufa, which is a calcareous concretion and is often found around springs or in carbonate-rich water bodies. The borax deposits are a result of the crystallization of sodium borate in the presence of groundwater enriched with boron and calcium. The precipitation of these minerals is influenced by the chemical composition of the water, the presence of dissolved gases, and the temperature and pH of the environment. Understanding the factors that contribute to the formation of borax deposits is crucial for managing water resources and preventing the clogging of water sources, irrigation systems, and drainage channels. Research in this field has led to the development of methods for extracting borax and using it as a valuable resource.
principles. He was ordained, on the 91st of September, 1809, minister of the parish of Simprin, near his native place. In 1707 he was "translated," as it is termed, to the extensive but thinly peopled pastoral parish of Etrick. He was a member of the General Assembly of 1708. While this assembly was in the midst of its labours, and he was becom-
able to the court, it was dissolved by the commissioner, and the moderator, who, according to the theoretical principles of that ecclesiastical body, is the conductor of its routine, sanctioned the act by concluding the proceedings. Boston and others strongly protested against this compromise of clerical inde-
dependence. He was opposed to the oath of abjuration, and in general to all measures which created restrictions on the inde-
pendent movements of the ecclesiastical body to which he belonged. In 1709, he wrote his "Discourse Concerning the Marriage of Modern Divinity," in the controversy in the Scottish Church on that work. He died on the 20th of May, 1782. He was a very voluminous writer, and his works are extensively read in Scotland, and among the Presbyterians of England. His well known "Four Fold State," which was first printed in 1790, had a curious literary fate. It had been so far reconstructed by a person whom he had engaged to correct the press, that the author, scarcely recognising his own work, republished a reprinted edition in 1794. The title of this book in full is, "Human Nature in its Four Fold State : Of Primitive Integrity subsisting in the Parents of Mankind in Paradise; Entire Depravation subsisting in the Ungenerate; Begun Recovery subsisting in the Regenerate; and the Final堕落 subsisting in the Inhabitants of the Universe kind in the Future State." In 1796 there was published "Memoirs of the Life, Time, and Writings of Thomas Bos-
son, divided into Twelve Periods, written by Himself and addressed to his Children," a work containing quite as ample an account of this writer as the majority of readers will wish to possess.

BOTANY, FOSSIL, The progress now making in the examination of the structure of fossil plants by microscopists, is such as to induce a postponement of the results till a later period. [Plants, Fossil, P. C. S.]

BORODEENRON [Lodoreon, P. C. S.] 

BOTRCYMUS, a genus of fenns belonging to the sub-
order Cymodoceceae and the tribe Ophioglossaceae of that family. It has distinct threes disposed in a compound spike attached to a pinnate or bi-pinnate frond. There is only one species a native of Great Britain, the B. Lunaria, Common Moon-
wort. It has a solitary pinnate frond, with notched or crenate, lanceolate or fan-shaped pinnule. This is not a very conspicuous fern, but has been observed in almost every part of Great Britain. It grows on dry open heaths, elevated pastures, and waste lands which are generally shunned by other species of ferns.

In former times the ferns had a great reputation in medi-
cine, not so much on account of their obvious as their sup-
pposed virtues. The lunate-shape of the pinnule of this fern gave it its name and was the origin of much of the supersti-
tion of the Pliny and other old writers. The fern was especially gathered by the light of the moon. Gerarde says that it is singular to heal green and fresh wounds. It hath been used among the alchemists and witches to do wondres withal, who say that it will loose locks and make them to fall, hath the feet of horses that garse where it doth grow, and hath been called of them Martagon, whereas in truth they are all but drowsy dreams and illusions; but it is singular for wounds as aforesaid. Its healing powers are now however as much discredited as the French occupation of the island under the Bourbon dynasty. At the end of March, 1815, Napoleon's restored government appointed him Rector of the University of Nancy, which seems to show that he had turned round again with the crowd. He resigned his chancellorship at the second Bourbon restoration, but was ap-
pointed instead Rector of the University of Rouen, an office which he did not retain long, for in 1816 he was living at Paris as a foreigner without employment or pension. He then ap-
plied himself to write a contemporary history of Italy, in which the French occupied the city, and the growing of angry passions which had not yet had time to subside. He determined to write "the whole truth," as far as his means of information went; to speak with honest sincerity, not only to the French of the day, but to all of the future, to the friendless, to the few, to the en-
musicant of nonsense; to make a novel course after emerging from the inquisitorial system of Napoleon, when subserviency alone was praised, and resistance and independence were vitu-
perated and hunted out. Botta commenced this work, told him that he "either dared not or could not abide by his determination, and that even supposing that he dared and could, he ought not to do it." Luckily he persisted, and disregarding the prejudices of men of all parties, the Volneyists and liberal writers, of the Buonapartists and ultramontanists, he produced a book which went far to redeem Italian literature from the charge of almost Oriental servility which it had incurred during the period of Napoleon's reign. Alone perhaps among the nations of Europe, the Italian, or rather, a numerous and active class among them,
had, or thought they had, reason to regret the fall of that reign, when they found themselves placed in a false position; their wishes and national aspirations being opposed to those of the other European nations who had risen against the despotism of the conqueror. Italy had enjoyed fifteen years of peace and of internal harmony, but it was not a peace of tranquil promises of an eventual national union of the whole peninsula, which however appears to have been far removed from its thoughts; and it had meantime obtained considerable influence in the councils of the central powers, and obtained its recognition as a national institution. No wonder that the bold, the strong, the aspiring, among the Italians, should regret Napoleon and confound his cause, as many of the French have done and are still doing, with that of social progress and freedom. Botta displayed his talents for aileding a task, not disdaining to conclude the advocates of old absolutism. He published his work at Paris in 1824: 'Storia d'Italia dal 1750 al 1814,' 4 vols. 8vo. The book was assailed by strictures and denunciations, some of them very abusive and personal; but it stood its ground, went through numerous editions, both in Italy and abroad, and it has long since taken its place in every Italian library. The work is one of lasting interest: the author excels in the description of stirring events, the bustle of the camp, the alarms of a siege, the din and tumult of triumphal processions, the calamities of the devoted inhabitants—the victims of famine, pestilence, or the sword. His account of the insidious arts used by the French directory towards the disarmed court of Sicily, of the fall of Venice which this re-division of 1799, the march of Suarow, the battle of Novi, the siege of Genoa, the dreadful massacres of Naples, the pass of the Splugen by Macdonald's army, Napoleon's coronation at Milan, the revolution of 1796, the evacuation of the French from Calabria, and Ali Pasha, the horrors of the war of extermination in Calabria, are all masterly sketches. His style however is upon the whole unequal, and his sentiments at times seem inconsistent with one another. He is not always successful in drawing individual characters, or in scanning the internal workings of men. Some of his battle descriptions are somewhat confused. There is also a disproportion between the various parts of the work; twenty books are bestowed upon the Italian civil and political history from the peace of 1748, at Vienna, in 1801, and only seven upon the subsequent period down to 1814. But notwithstanding these faults, Botta's history is a noble work, and one that does honour to Italian literature.

Encouraged by the success of this work; a certain number of Italian and French lovers of literature urged Botta to attempt a continuation of Guicciardini's history of Italy, from 1550, down to 1775, so that the end should meet the beginning of his 'History. These friends made a subscription among themselves sufficient to allow him to receive a decent annual income during the time that he should be engaged in his laborious undertaking. Botta accepted the task in 1826, and he completed it at the end of 1830: 'Storia d'Italia in Continuazione dal 1775 al 1814' Paris, 10 vols. 1832. This larger work was received with applause, owing in part to the author's already established reputation as a historian. The Academy of La Cruscia bestowed upon the author its decennial prize; and Charles Albert, king of Sardinia, created him a knight and gave him a pension. This was the first token of favour obtained by Botta from any government for his writings, and, it is well to observe, that it was for the old and not for the contemporary history that it was granted, and therefore could not affect Botta's character for independence. In fact Botta lived and died poor. In 1832 Botta revisited his native Piedmont, and was very favourably received there. He afterwards returned to France, whose king, in 1835, made him a member of the Academy of Science, a medal of first class of the French Institute, and a pension.

Besides the works mentioned in this article, Botta wrote—
1. 'Il Camillo, o Vejo conquistato,' a poem, Paris, 1815; 2. 'Storia dei Popoli Italiani da Costantinopoli a Napoli,' a compilation published first in French in 1825, and afterwards in Italian in 1826. His history of American independence has been translated into English, by Oris, and has been greatly praised in the United States. As a literary work however it is much inferior in merit to the two histories of Italy.

(Tipaldo, Biografia degli Italiani Illustri: Foreign Quarterly Review, No. 1, July, 1827, article on Botta's 'History of Italy'; Dr. Boer's Life of Botta, in the same journal, A Review of his 'Continuation of Giuc."

BOTTOMRY BOND. [Bottomry, P. C.]

BOUCHARDON, EDM., a distinguished French sculptor, was born in Seine et Marne, in 1730. He was instructed in his youth by his father, who was likewise a sculptor and architect; and, after he had made sufficient progress, he entered the school of the younger Coston at Paris, where he remained five years, when he went to Rome, and was decorated with a prize of the Royal Academy in 1729. By this prize he was entitled to study for a limited period at Rome, at the expense of the French government, in the French academy established there by Louis XIV. Bouchardon remained at Rome for ten years, during which time he was much employed, especially in busts, and he was selected to execute the monument to Clement XI.; but, being recalled by the French government about the same time, he did not execute it. He returned to Paris in 1732; in the year following he was elected Agedé, in 1744 a member, and in 1746 a professor, of the Academy of Painting and Sculpture. He died at Paris in 1792. Bouchardon's principal works were the Fontaine de Grenelle, and the equestrian statue of Louis XV. The Fontaine de Grenelle was executed in 1770, when Bouchardon was 39 years of age, and was first exhibited in 1739 and finished in 1745: the inscription is by Cardinal Fleury. The authorities of Paris, by whose order it was made, were so well satisfied with its execution, that they voted Bouchardon a pension for life. He then executed the equestrian statue of Louis XV., which was of marble, was placed in the Place Louis XV. in 1763, and was destroyed by the populace in 1792. Bouchardon was occupied in its execution during twelve years, yet it was unfinished when he died: the pedestal was executed by Figari, who was also chosen by Bouchardon himself to complete the monument. It was engraved by Catheline. There are also some statues by Bouchardon in the church of St. Sulpice, and in the gardens of Versailles, Choisy, and Gravelines, and a large sculptor to the king. Many of his works and sketches have been engraved, and there are a few etchings by his own hand.

J. J. Preisler engraved fifty antient statues from drawings by him. Count Calvius engraved many others, besides several of Bouchardon's original works; but it was also chosen by Bouchardon himself to complete the monument. He died at Paris in 1792, or, according to another, 1770, director of the academy.

Boucher was a painter of very great ability, and had extraordinary facility of execution, but he disapproved every cor- rect principle of execution to a picturesque effect, which consisted in a more variegated tissue of light and shade. His figures are utterly void of expression. His subjects were chiefly mythological, amorous, and pastoral, and he peopled the whole of Fennel, the temple of a nymph, and the scene of the union of pure taste, partly effected by Watteau, was fully accomplished by the works of Boucher, for though in his time a great popular favourite, his style has been subsequently condemned in the very strongest terms, even by his own countrymen. The French have called the Ancien de painters, a compliment (if one) which, though it may apply to Boucher's subjects, cannot apply to his execution of them. His designs are extremely numerous, amounting to several thousands; and a great many of them have been engraved; a few by himself, and others by upwards of 140 different engravers, French and foreign.

(L'Abbe de Fontenel, Dictionnaire des Artistes; Heineken, Dictionnaire des Artistes, &c.; Watelet and Leravoix, Dictionnaire des Arts, &c. Bouche, Louis.)
BOUFFLERS. There were two remarkable females often mentioned in the literary history of the eighteenth century who bore this title, and who are frequently confounded with each other. The one was the N. Micheli; the other was the N. de Boufflers-Renémerou, a correspondent of Voltaire, and the principal female ornament of the court of Stanislaus Augustus of Poland. She was a great reader, and wrote some pleasing verses. The other was the Comtesse de Boufflers-Rouvrel, who is perhaps better known in the English classics for all his drollery and the satirical satires of the Prince de Conti, and on the death of her husband, in 1764, was disappointed at not becoming the wife of that prince. She fell in love with an Englishman, and the suitor. Several editions of her English letters show that she was a very accomplished woman.

BOULDER FORMATION, in Geology, a title now introduced to supplant that of diluvial deposits. Till is an equivalent term employed in Scotland. By these accumulations are ranked in the ill-defined class of Pleistocene deposits.

BOURNE, VINCENT, was probably born three or four years before 1700, but the date of his birth does not appear to have been recorded. He became a king's scholar in Westminster School in 1710, whence he was elected to be sent to Trinity College, Cambridge, in 1714; he took the degree of A.B. in 1717, and that of A.M. in 1721. He obtained a fellowship at Trinity, and was admitted to the Mastership of Westminster School, in which situation he seems to have continued for the rest of his life. He never took orders. He died December 2, 1747.

Vincent was the author of a considerable number of short Latin poems, of several translations of short English poems into Latin, and of a few epitaphs in Latin and English. He is an exceedingly pleasing writer. He has great originality and variety of thought, and great vivacity of imagination, often combined with a delicate humor quite peculiar to himself. His subjects are generally occasional and of little importance; but the treatment is very delightful, and entirely free from classical or any other commonplaces. His Latin is refined and elegant, and his composition is without a flaw; his style is exquisite, and his versification has a facility and harmony not surpassed by any modern writer of Latin poetry.

Some of Bourne's Latin translations are of poems admired ones, but little valued now, such as Mallet's 'William and Margaret,' Rowe's 'Colin's Complaint,' and Tickell's 'Lucy and Colin;' but the versions are of singular excellence, retaining every trace of thought and expression which is really poetical, and improving, without appearing to change, the style, imagery and spirit; and the formal language of the originals: the trivial and monotonous versification has also disappeared, and the poems have assumed a propriety and grace to which they had previously little claim. In poems of a higher poetical character, such as Gay's beautiful ballad of 'Black-cloaked Squire,' and his 'Hymn to the Sun,' and is distinguished by a fidelity which, to those who know the difficulty of approximating two languages so dissimilar in structure, is as curious as it is admirable. But even here he gives an occasional heightening touch; for instance, in translating the exquisite simile

"So to the sweet lark, high born in air,\nErects his pinions to his breast,\nIf the his hue be not too bright,\nAnd drops at once into her nest,

Bourne not only poises the lark, as Gay has done, but he gives the vibrating motion of the wings, so characteristic of the lark when singing. He has also transposed the second and third lines, in which Gay has obviously inverted the natural order of thought for the sake of the rhyme:

"The Dick; the Jackal; The Parrot; The Cricket, and\n"The Glow-worm," in none of which, skilful as he was, has he equalled his original. Cowper speaks of Bourne in one of his letters. As he was well situated in the world, and well qualified to appreciate the value of his poetry, it is worth while to give the passage entire:—"I love the memory of Vinny Bourne. I think him a better poet than Tullibius, Persius, Petronius, and all the rest I am acquainted with. Ovid, and not at all inferior to him. I love him with a love of partiality because he was the usher of the fifth form at Westminster when I passed through it. He was so good-natured and so indolent, that I lost more than I gained by him, for he made me as idle as himself. He was such a sloven as if he had trusted to his genius as a cloak for everything that could disgrace you in his house. And if he has any writings no almost made amends for all. His humour is entirely virile; he can speak of a magpie or a cat in terms so exquisitely appropriated to the character he draws, that one would suppose him animated by the spirit of the creature he describes. And in his character of Tullibius this is also the case, and he makes the poet so contemptible at nobody's expense; who is always entertaining, and yet always harmless; and who, though always elegant and classical to a degree not always found in the classics themselves, charms more by the simplicity and playfulness of his ideas than by the neatness and airy manner of his verse. Yet such was poor Vinny. I remember seeing the duke of Richmond set fire to his gossipy locks, and box his ears to put it out again."

The first edition of Bourne's 'Pomastia' was in 1734, 8vo. To the third edition, in 1743, an appendix was added of other translations and poems, forming nearly one-half of the whole collection, 'Pomastia, Latin partam redditus, partam scripta,' a V. Bourne, 12mo. There was another edition in 1750, 12mo. In 1772 a handsome volume in 4to. was published by subscription, 'Miscellany of Translations in the Latin Tongue,' by Vincent Bourne, formerly of Trinity College, Cambridge, and Usher of Westminster School.' It contains a few additional poems, and two letters, one to a young lady, and another to his friend, the late Charles Bannister; also 'Poetical Works, with his Letters,' 2 vols. 12mo., was published in 1808. We have not seen this edition. There has since been another edition in one vol. 12mo.


BOVISTA, a genus of plants belonging to the natural order Fungi. This name was given it by Dillenius, and is a Latinised version of Bofist, its German name. In many parts of England its common name is Bull-fitch or Bullhead, and in Scotland it is called Bull-pawl. The genus Bovista was at one time included under Lycoperdon [Lycoperdon, P. C.], and the type of the genus, Bovista gigantea, was called by Linnæus Lycoperdon Bovista. The present Lycoperdon Bovista is the common or wolf-pawbell. The difference between the genera is, that Lycoperdon has a single peridium, while Bovista has a double one.

The Bovista gigantea, Bull-Pawbell, Frog's Chees, and Bull-eye, is interesting on account of the peculiar nature of its fruiting-bodies. It attains. It has the form of a flattened ball, at first of a perfectly white colour. Specimens have been gathered measuring as much as nine feet in circumference. When they have attained their full size, they begin to change colour; the outer peridium bursts at the apex. The interior is composed of a mass of tissue, which when young is white and moist, but at length becomes coloured and dry, and on being pressed emits a large quantity of powder as matter, which, on being examined, is found to consist entirely of spores. On examining the mass inside, it is found to consist of filaments which are mixed with spores. Burnett says, 'It is probably the smoke that clouds the surface of these fungi whilst they are burned, or some of their allies the Lycopérdes, which forms the secret method advantageously employed by some persons who keep bees, in order to supply the insects without killing them, while their hives are being robbed of all their honey. Gerardo says, 'The common people generally used this fungus for food, or to burn.' He also says, 'In some parts, where the neighbours dwell far aunder, it is used to carry fire from place to place, whereof one species took the name of Lucernoram fungus.' It is used also at the present day in many parts of the Continent as a tinder, by the name of German tinder. The dried inside of this fungus was also at one time in great repute among surgeons as a styptic. A small pledge of it was always employed to cover the wound made in bleeding. It is now seldom used, except for that purpose. This plant is small; it is calculable. An Italian species, the D. furfuracea, which grows in great abundance on the heaths near Florence, is collected and sold in the markets, and, according to Micheli, is esteemed a delicacy (Bois, "Medicinisch - Pharmaceutische Botanik"; Burnett, "Outlines of Botany.")
BOWDITCH, NAthalien.
The materials for the life of Dr. Bowditch are contained in a very full and interesting account, written by his son, and prefixed to the fourth and posthumous volume of his translation of the ‘ Mécanique Céleste.’ There are also before us ‘Eulogy on Nathaniel Bowditch,’ by John Pickering, Boston, 1838; ‘Discourse on the Life and Character of Nath. Bowditch,’ by Daniel Appleton White, Boston, 1838.

Dr. Bowditch was born at Salem, in Massachusetts, March 26, 1773. His family is traced to one of three brothers who emigrated from near Exeter at the beginning of the seventeenth century. His father was a poor working cooper, and could not give his son more education than he himself had. Bowditch, however, was quick to learn; he committed to memory the accounts of the new almanac for the year 1760. He learnt the elements of geometry and algebra by himself, and was taught navigation by an old British sailor. He taught himself Latin that he might read the great books of science, which he could get hold of by the age of twenty-one. At different times of his life he also taught himself, in some cases with a little assistance, most of the European languages; his plan was to translate the New Testament and a dictionary, and begin to translate, writing down the words, as they came into his head. Bowditch was a devoted student; he was an excellent navigator, and on one occasion found his way into St. Helen’s Bay, and in a dark and snowy night, with no other guide than his own reckoning and one instantaneous glimpse of the light on Baker’s Island. He taught every man on board his ship how to find a ship’s place, and on one occasion had twelve seamen, being all his crew, every one of whom could take a lunar observation. He edited three editions of the celebrated work on navigation by John Hamilton Moore; but at last he had corrected so many errors, and made so many changes, that he thought himself justified in publishing it under his own name, and in a new American edition; it is a dear thing to me by Steely.’ In this form it went through eight editions, and became very well known. His maritime life ended in 1804; in 1798 he married, but his wife died before the end of the year. He spent the next six years in Newburyport, leaving a grown-up family. To the memory of this lady his translation of the ‘ Mécanique Céleste,’ of which we shall presently speak, is dedicated.

In 1804 he was appointed to the presidency of the Essex Fire and Marine Company at Salem, a situation of emolument, which he held until 1823, when he accepted another and a still more lucrative appointment, the actuaryship of the Massachusetts Hospital Life Assurance Company, at Boston. He had been actuary of a large insurance company for such a long time that, after making all allowances for filial and friendly partiality in the accounts above named, we must say they ought to have been published even though their subject had not attained any reputation of another kind.

Dr. Bowditch was the author of a good many papers in the Transactions of the American Academy, all on astronomical subjects: one in particular is on an extension of Napier’s rules (vol. iii. pp. 35-58), by which they are applied (it is said) with great success. He is also said to have compiled a table which will carry his name down in Europe, and which entitles him to be considered as the first great promotor of mathematical analysis in the United States, is his translation of the ‘ Mécanique Céleste’ of Laplace, with a commentary. For this the most accurate and complete English translation of the original, are completed and published, the last posthumously, Boston, 1829, 1832, 1834, 1839. The publication was substantially ready in 1817, but was deferred, among other reasons, by the expectation that Laplace himself would publish another edition. To the third volume is added a volume of appendix (Boston, 1844), containing the translator’s collection of methods for computing the orbits of comets from observations, with auxiliary tables. All this was done at Dr. Bowditch’s sole expense, with the cheerful consent of his family; the dedication above mentioned expressly states that ‘the public service would not have been undertaken without his wife’s consent.’

The commentary is valuable, not only as giving the reader of Laplace more recent views and simplifications, and guiding the mind through the vast details of the whole great work, but by bearing upon the text, but also as a real and effective running explanation of all the innumerable steps which Laplace has omitted. Bowditch said, ‘I never came across one of Laplace’s “Thus it plainly appears” without feeling sure that I have failed to get at the point of it, and that I must go back and find out and show how it plainly appears.’ We remember ourselves asking a distinguished extender of Laplace’s views, what were the existing helps to the reading of the ‘ Mécanique Céleste,’ and getting for answer ‘A ream of paper and several hundred of quills.’ There was no facilitating comment in existence, except on detached portions; and Dr. Bowditch supplied this defect in a sound working manner. It is easy to see that his explanations are for the most part those by which he himself was guided in his work of elucidation in bringing his reader. A mathematician, who thought more of his own fame than his reader’s progress, would have discontinued to publish the plain straightforward explanation of Laplace’s methods. But Bowditch was precisely such as a student of the most successful class manages to supply for himself. But this is the beauty of Bowditch’s commentary, as a comment; and appears to us well worth the results of reading which appear in many of the notes, and which, though intended for use out of place, rather extended to explain. As a whole, and independently of its author, this translation is a great undertaking; as the work of a self-taught man, closely engaged in professional business, it is a wonder.

Dr. Bowditch bequeathed his library to the state of Massachusetts, and it forms the commencement of a public library, named after him, at Boston.

BRACcio ForteBRACci, cAllEsd als BRACcio da Montefeltro, by the grant of his patrimonial estate, was born at Perugia, A.D. 1436, of an old patrician family. Bracio, before he was twenty, served as a Condottiere, or leader of a mercenary troop, in the service of the Count of Montefeltro against the Malatesti family of Rimini. In 1468, when a general insurrection of the popular party took place at Perugia, in which a number of the nobles were killed and the remainder driven away, the castle of Montone became a rallying-point for the exiles, and Braccio one of their most zealous supporters. He held the castle for a few months, but found himself unable to defend it and retired to Montone. He engaged in various enterprises of every kind for several years, the popular party applied for protection to Gian Galeazzo Visconti, the powerful Duke of Milan, and paid allegiance to him in January, 1460; and after the fall of Visconti, in 1476, to Alfonso the Second of Aragon, Duke of the two Sicilies, and King of Naples. In 1477, he submitted to Pope Boniface IX., under the plea of ‘the welfare of the Republic,’ on condition that the emigrant nobles should remain in banishment. Braccio now resumed his life of a Condottiere, and served in Lombardy under the great leader Alberico da Barbiano. He afterwards carried on a partisan warfare on his own account, in the Marches of Ancona, against the Marquis Ludovico Miglonari, the nephew of Pope Innocent VII., when he levied contributions, plundered towns, and destroyed the common property of the cities. In 1482, he was invited to the court of the King of Naples, which was at that time under the government of the Papal States and all central Italy, and he set himself to Braccio in 1489, to induce him to enter his service, promising to forward his views towards the subjection of his native town, Perugia. Braccio accepted the proposal, received a sum of money for his troops, and immediately set out. In 1490, he occupied the head of a considerable body of horse and foot, he scoured the valley of the Tiber and took several towns in the name of the king. The people of Perugia, in alarm, sent ambassadors to Ladislas, who was then at Rome, and offered him the de-
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Braccio, being joined by other bands of the Aragonese party, was in possession of the whole Abruzzo. In December, 1423, Sforza, on the advice of Alfonso, made common cause with Lelio Anjo, ordered Sforza to march to the relief of Aquila. Braccio, being joined by other bands of the Aragonese party, was in possession of the whole Abruzzo. In December, 1423, Sforza

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mishan of their city, provided he would not let the emigrants return. 'Rather than make peace with the nobles,' said the leaders of the people in the council, 'we will submit to a foreign king.' Ladislaus accepted, in June, 1408, the duchy of Naples of the Pope, who promised him that he should have the island of Capua as a fief. He agreed that the emigrant nobles should not be allowed to remain within thirty miles of the gates of Perugia. He also sent a large body of Neapolitan cavalry to attack Braccio, who, having received timely information, retired to the Marches. From Rieti, Alfonso went to the king of Sicily; the king of Sicily, who was at the same time offered to Braccio the command of his land forces, with the rank of high-constable of the kingdom, and paid him down two hundred thousand ducats to advance. 1416, Braccio had fallen in love with his cousin, the Princess of Abruzzo, with a large force, surprising by the rapidity of his march the partisans of the Anguinas, who submitted, except Count Caldora, who took refuge in the mountains. Sforza capitulated. Braccio, lassoing out of the defiles of Abruzzo, surprised Capua, and suddenly appeared before Naples, which was then besieged by Sforza and by the fleet of Louis of Anjou. King Alfonso meantime arrived with his fleet at the entrance of the bay; Sforza was obliged to raise the siege, the Anguinas retired to Castellamare, and Braccio entered Naples in triumph with King Alfonso, who, together with Queen Joanna, solemnly bestowed upon Braccio the golden staff of high-constable of the kingdom, with supreme command over both the Neapolitan and Abruzzese forces, and agreed to give him the crown of Naples, which was bestowed upon him by the nobles. 1416, in the course of the summer, the two rival chiefs, who had both served in their youth under Albertico da Barbiano, renewed their former acquaintance. But Braccio having been now in Capua, which he had not been in since 1415, he returned to Perugia, after having taken on his way Città di Castello, which he added to his other territories.

In the following year, fresh disturbances having broken out at Naples, Alfonso sent again for Braccio, and Queen Joanna gave the messenger a crown to present him as Prince of Aquila and Capua, with full power to subdue and govern the important province of Abruzzo, which had again revolted. On the 18th of February, 1423, the Lord, seated on a seat of state at the great palazzo del Capitano, was attended by the lords of Foligno and Camesino, received the Neapolitan envoy, from whom Corrado Trinci, lord of Foligno, having received the crown, placed it on the brow of Braccio and a golden chain round his neck, amid loud aclama-
ations of 'Long live the Prince of God! long live the Prince of Aqui-
la.' As the dominion of Braccio extended over great part of Umbria and the Marches, and on the south over the prin-
cipality of Capua, the acquisition of Aquila and the Abruzzo would have joined those two portions so as to form the whole into a compact principality. Braccio's ambition is said to have soared still higher, and to have aspired to the crown of Naples. In May, 1423, he gathered his bands near Todi, to the number of 9000 horsemen and some thousand foot, and made common cause with the kingdom of Naples, and through the province of Campania and Apulia, defeated the partisans of the Angevins, took Bari, and advanced into Calabria; then retracing his steps towards the Abruzzo, he laid siege to the strong town of Aquila in the name of Joanna and Alfonso, whose commission he bore. The authorities replies that they were liege of their queen, and that as she was at that time in durance in conse-
quence of the dissensions which had arisen between her and Alfonso, they were unable to obey his orders. Upon his return harmony was restored in the capital and at the seat of government. Braccio then blocked the town and devastated the surrounding country. Joanna, who had now revoked her former act of submission to the crown of Naples, being joined by other bands of the Aragonese party, was in possession of the whole Abruzzo. In December, 1423, Sforza began his march from Apulia along the coast of the Adriatic, took Ortona, and crossed the river Pescara near its mouth, his advanced guard making their horses swim through the stream.

...
As the body of Sforza's army remained on the opposite bank, Sforza plunged again into the river to encourage them to cross. One of his men, being carried away by the current, was in the act of drowning, when Sforza pushed his horse forward to rescue him; but the current was so strong, that the horse and the man were both swept away to the deep and water disappeared. Thus died Sforza Attendolo, the great Condottiere, on the 4th of January, 1442. His army, disheartened, retired from the Abruzzo. Braccio, who was at Chieti, used the news, and the name of his father, to make some pretense that this unexpected catastrophe boded no good to himself. He however pushed on the siege of Aquila with renewed vigour. The town began to suffer through famine. The archbishop encouraged the besieged by telling them that he had heard the Turks intended to suppress the Papacy. Braccio, who had communicated Braccio in the name of the pontiff. At last, in the spring of 1424, the Anghin army, led by Count Caldora and other chiefs, marched into the Abruzzo, and encompassed on the hills above Aquila. Braccio drew out his troops in the plain below in order of battle. His officers entreated him to attack Caldora's soldiers as they came down the defiles of the mountain and before they could form, but he obstinately refused, saying that he wished to fight the whole force of the enemy and to decide the question at once. The battle was fought on the 2nd of June. Caldora's army was greatly superior in numbers, and in the midst of the fight a sortie from the people of Aquila, falling on the rear of Braccio's line, deprived the latter of proportion. Braccio, while giving quarter on the left, received a blow on the head and fell senseless. He was taken prisoner to the camp of Caldora, and treated with humanity. He survived for three days, refusing to take food, though urged to do so, and would not utter a word. He said he had not more than thirty-five years. He died on the 6th of June, 1424, in the fifty-sixth year of his age. Rome rejoiced at his fall; Ludovico Colonna took his body to Pope Martin, who ordered it to be buried in unconsecrated ground outside of the walls. Eight years after, Nicolò Fortebraccio recovered from Pope Eugenius IV. the remains of his relative, and deposited them in the church of the Franciscan convent of Perugia. Oddo Fortebraccio, son of Braccio, resigned the government of Perugia to the hands of the pope, in July, 1431; and two months afterwards he was made Duke of Montone. The history of Braccio's life forms an important part of the history of Italy during the fifteenth century, which was the last age of its tumultuous independence.

(Fabretti, Biografie dei Capitani venturieri dell' Umbria; Campanus, De Vita et Gestis Brachii; Lomonaco, Vite dei famosi Capitani d'Italia; Compagnoni, Storia della Marca; and the contemporary local chronicles, among whom must be cited the most genuine and the most learned, the epic of Città di Castello, a poem of one hundred and one chapters in terza rima, entitled L'Altro Marte, in which he narrates in chronological order the deeds of Braccio and of his contemporary Ficochinu. This curious poem was printed at Vicenza in 1489: it is now extremely rare.)

BRACHYPHYLLUM, a genus of fossil plants, supposed to belong to the Coniferae. One species, B. mammillare of Brongniart, occurs in the carbonaceous beds of the Bath oolite formation on the Yorkshire coast.

BRACHYPODIUM, a genus of grasses (Graminaceae, P. C.) belonging to the tribe Festucine of that order. It has unequal many-flowered glumes; the outer pales rounded on the back, sericeous on the margins, inner nerves slightly converging, not vanishing upwards; the inner pales fringed on the ridge with rigid setae; the styles terminal. Two of the species, B. syriacum and B. pinnatum, are British. This genus is distinguished from Triticum (wheat) by the unequal glumes alone.

(Babington, Manual of British Botany.)

BRADFORD CLAY, a thin, cold bed of pale-coloured clay which lies upon the Bath oolite, especially at Bradford in Wiltshire. It is said to be the barmy (a pale earth having a fungous, the Pear Eocenite (Apocrinus rotundus of Miller).

BREAK, or BREAK, in Machinery, a contrivance for retarding or arresting motion, by creating an amount of friction too great for the moving power to overcome. Brakes generally consist of blocks of wood so connected with a system of levers or screws that they may be pressed firmly against the periphery of a wheel mounted upon the member of the machine; but in the wheel of the machine, instead of a block of wood, a strap or belt of iron, of sufficient length to embrace one-half of the periphery of the brake-wheel, or a series of small blocks of wood attached to the concave surface of such a strap, is used. The brakes of carriages are worked by levers, and often consist of a block of wood or a strap, which, by being pressed against the brake-wheel, stops the carriage. The brakes of railroad wagons, if small, as in the case of contractor's earth-waggons, are generally worked by levers, and often consist of a block of wood or a strap, which, by being pressed against the brake-wheel, stops the carriage. The brakes of locomotive engines have been worked by steam; but they are not generally used, being deemed better to confine the brakes to the tender and a few carriages in each train. With a view to prevent accident by the continued motion of the hinder part of a train when the engine is stopped by an accident, brake-ladders have been devised, which would begin to act as soon as the buffers of two adjacent carriages were pressed together, and would arrest the revolution of the wheels with a force directly proportional to the amount of the accident. Thus, if the brakes were adopted, but of these and many other schemes for the prevention of accidents, it is doubtful whether the inconvenience under certain circumstances would not more than counterbalance the anticipated advantages.}

BRAHMAH, or Brahman, was born on the 18th (New Style) or 2nd (Old Style) of April, 1749, at Stainborough, in York-}
shire, where his father followed the occupation of a farmer. He was the eldest of five children, and was intended for his father's occupation; but he very early exhibited marks of mechanical talent, and being, at the age of sixteen, incapacitated for agricultural labour by lameness, he was apprenticed to a carpenter and joiner. He subsequently removed to London, where he worked for some time at the cabinet-making business, and became a most expert in the same business himself. His adoption of the profession of engineer or machinist appears to have arisen from his invention of some very important improvements in water-closets, in consequence of which he became a manufacturer of such articles. His next important mechanical invention was the ingenious lock still known by his name, and which, after a lapse of sixty years, during which time many new kinds of lock have been introduced, maintains its character as one of the most satisfactory locks in general use [P. C. S. C. S.] This invention was patented in 1784. Among the numerous other inventions of Brahms were improvements in water-cocks, pumps, and fire-engines, and the hydraulic press, a machine of immense utility, and in which he was the principal inventor of the hydrostatic paradox. This invaluable machine, of which a description and representation is given under HYDRAULICS, P. C., p. 364, was patented in 1796. The boundless power which it enables one man to exert renders it an invaluable agent in many manufacturing processes, one of which is described under BANANAS, P. C. S., p. 169. In the following year he patented the elegant and convenient beer-machine which is now so universally adopted in taverns for drawing brandy in the bar from barrels deposited in the cellar, by means of a force-pump. He was also the author of improvements in steam-engines, especially in boilers; in machinery for producing smooth and accurate surfaces on wood or metal; in paper-making machinery; in iron-rolling-mills; in the process, by which several bars, resembling steel pens, are cut out of one quill, and fixed in a holder for use; and in the construction of carriages. In 1806 he contrived an exceedingly ingenious mode of printing, which was shortly after-ward employed in the number of newspapers, by the introduction of which, during the issue of one-pound notes by the Bank of England, the labour of 100 clerks out of 120 was dispensed with. This machine consists of a number of dies or other forms, which, when the financial power is turned on the periphery of each, the whole being mounted upon one axle, but capable of turning independently of each other. By the action of mechanism which is incapable of error, the position of one wheel of the series is moved between each operation of type setting, and the result is that it will print a series of numbers in regular progression, without the possibility of twice producing the same number. In 1812
he patented a scheme for laying down large water-pipes through the principal streets of London, of sufficient strength to withstand great pressure, to be applied by force-pumps; his object being to lengthen and cheapen the sea-waters, by throwing water without the aid of a fire-engine, and also to supply a lifting power applicable to the raising of great weights, by forcing water or air into an apparatus consisting of various pipes and engines, which united nearly to form a telescope, and capable of being projected when necessary. He asserted his ability to make a series of five hundred such tubes, each five feet long, capable of sliding within each other, and of being extended in a few seconds, by the pressure of air, to the length of 2000 feet. He proposed to raise wrecks, to submerge trees in Holt Forest by his hydraulic press, on the 9th of December, 1814, in his sixty-sixth year. In the construction of some water-works at Norwich, Bramah acted with success in the department of the civil engineer. He also appeared as an author in a" Dissertation on the Construction of Locks," and a 'Letter to the Right Honourable Sir James Eyre, Lord Chief Justice of the Common Pleas, on the subject of the canal engines,' which was published in 1797, and is referred to under WATT, P. C., p. 141. A memoir, which gives a very pleasing account of his amiable private character, and of his energy and probity in business, was published in the 'New Monthly Magazine,' and the centre of the city was given to the streets of London. A memoir by Brown, M.D., and a biographical notice, chiefly derived from Dr. Brown's memoir, is given in Stuart's 'Anecdotes of Steam-engines,' pp. 400-404.

BRANCHIOSTOMA. The name given by Costa to the most anomalous of all living fishes, and indeed of all the Vertebrata. This extraordinary animal was first discovered on the coasts of Brazil, a single specimen having been sent to Pallas from the coast of Cornwall, during the latter part of the last century. The great naturalist of Russia described and figured it in his 'Spicilegia Zoologica,' under the name of Linnaeus lanceolatus, but declaring it to be a mollusk, though remarking, in his description of it, on the resemblance of some of its characters to those of a fish. It seems to have been lost sight of for more than half a century; and, with the exception of a brief reference in Stewart's 'Elements of Natural History,' we find no notice of it in any synonyms of animals. In 1834 it was rediscovered by Costa, on the Neapolitan shores, who described it in the 'Annuario Zoologico,' under the name of Branchiostoma labriform; and some years after, in his Fauna of Brazil, he gave a description of it, in which he first perceived that it was a fish, and not an invertebrate animal, and remarked its affinity to the Cyclostome fishes. In 1836 Mr. Yarrell gave an account of it in his 'History of British Fishes,' under the name of the Lancelet, Amphioxus lanceolatus. He had not then met with Costa's account of it. He figured and described it from a specimen found by Mr. Couch at Polperro in Cornwall, the first taken in that locality since its original discovery there. Mr. Yarrell gave the first correct notice of the chorda dorsalis and vertebral column. About the same time, singularly enough, considering how long it had escaped notice since the days of Pallas, it was taken by several naturalists on the coasts of Sweden. Sundevall and Loven found it in Bohuslan in 1834, but did not give it the name of Branchiostoma. Loven published a notice of it in the Berlin Proceedings for November, 1839, in which also is a communication on the same subject by Professor J. Müller. Rathke gave an account of it in his 'Beiträge zur Anatomie der Wirbeltiere.' J. Goodrich published an elaborate memoir on its anatomy in the 'Transactions of the Royal Society of Edinburgh' for 1841, being the result of his examination of two examples taken in the Irish Sea, by Professor E. Forbes, in 1837. In 1842 a memoir on Branchiostoma was published by Professors of the Royal Society of Berlin, by Professor J. Müller, and this paper, beautifully illustrated, appeared in the volume of Transactions of that Society published in 1844.

The great interest which attaches to this fish depends on the strangeness of its anatomical characters, the unexampled degradation of its organization among the Vertebrata, and the peculiar and important fact which it furnishes to the physiologists, of the similarity of the circulatory systems of the lowest. A vertebrated animal without a brain, a fish with the respiratory system of a mollusk, and the circulatory system almost of an Annelide, presents a combination of characters which excited the interest equally of the physiologist and the systematic naturalist. Scarcely any animal yet discovered is so likely to change received views of classification and relative order of characters as the Lancelet. As yet however it has attracted but little attention among the zoologists, and anatomists have hardly perceived its value. For these reasons we shall give a full account of what is now known respecting its external character, structure, and habits.

Description. The size of the Lancelet is about two inches in length. The height to the length being as 1:10, and the breadth to the length as 1:10. It is of a lanceolate form, tapering to each extremity, and riband-like. Anteriorly it terminates in a head scarcely distinguishable from the body, apparently pointed, but in reality rounded and convexal. The body seems to end in a rounded and somewhat spathulate rostrum, beneath which is the mouth, a longitudinal opening, fringed on each side by a row of long filaments, which can close in the same manner as the protective blades of a scythe. Along the back runs a continuous flise, which dilates near the anterior extremity on each side, so as to form a sort of caudal fin. Near the tail opens the vent, in front of which is a median slit continued to another opening, situated a little behind and to the side. The organs of the larynx and pharynx are presented as an outlet for the genital products. Continued from this forwards nearly to the mouth, are two strong lateral fold, mistaken by Pallas for the margins of a ventral disk, and hence leading him to consider the animal to be a Mollusk. The entire animal is transparent and of a silvery whiteness, its sides being marked by the indications of the lateral lachrymic muscles, which give it the aspect of a small sand-eel.

Organization. Skeleton. The osseous system consists of a chorda dorsalis tapering at both ends, and, strange to say, not presenting the slightest vestige of a cranium, and of the germs of superior and inferior inter-spiral bones and fin-rays in the most rudimentary state. The chorda dorsalis is represented from sixty to seventy vertebrae, which are also in a rudimentary state and little more than indicated. The 'chorda dorsalis,' to quote Mr. Goodrich, 'is formed externally of a fibrous sheath, and internally of an immense number of lamines, each of the same form and shape of a section of the column at the place where it is situated. When any portion of the column is removed, these plates may be pushed out from the tubular sheath, like a pile of coins. They have no great adhesion to one another, and, by the removal of the constituent mine, can be distinguished from the bladders, as if formed of two tough fibrous membranes pressed together.' Besides the skeleton of the nervous system, there is a hyoid apparatus, forming the armature of the mouth, and consisting of two sets of 17 articulated pieces, from each of which, except 2, a ray proceeds. These rays form the outer cirri. Müller takes a different view of this structure, maintaining that it corresponds neither to the jaw-bone nor to the hyoid apparatus in other animals, but is analogous to the carina-branchial ring of the mouth of the lampreys and the Myxinid fishes, a system peculiar to that family. There is also in the lancelet a series of fine, transparent, carina-branchial hair-like ribs, seventy to eighty on each side, forming a cage for the protection of the branchial cavity.

Nervous system. The column of nerves extends from the head along the length of the spine, but is not quite so sharp at the fore-end as behind. It presents no trace of a brain. From 55 to 60 nerves pass off from each side of it, which do not arise by double roots. A single branch of the nerves at the anterior extremity is given by Mr. Goodrich. Müller and Rathke have observed the existence of rudimentary eyes, consisting of a small black spot of pigment, but not furnished with any optical apparatus. No traces of organs of smelling or hearing have been met with.

Vascular system. The observations of Müller having been made on the living animal, he was enabled to pursue this part of its organization further than the other observers. According to him, the vessels are arranged in general arrangement with that of fishes, differing however in regard to the heart from that of all other vertebrate animals, and displaying a striking accordance with that in worms, for
the branchial canal, and the musculature is highly developed.

The Respiratory system consists of a series of lateral muscular bundles corresponding in number, size, and position to the vertebral of the chorda dorsalis, and bearing a general resemblance to the lateral muscles of the higher fishes. Müller classifies the muscles of the Lancelet under the heads of 1st, lateral muscles; 2nd, abdominal muscles; 3rd, muscles of the oral ring and tentacular; 4th, muscles of the ring between the oral cavity and branchial sac; and 6th, muscles of the branchial apparatus. The skin is tough, and scaleless.

Habits.—The Lancelet lives in sandy ground at a depth of between ten and twenty fathoms water. It probably buries itself in the sand. When taken, it swims rapidly with a snake-like motion, but after a time settles down, unless disturbed, lying flat on its side. It is very tenacious of life. We have had it for three hours in a watch-glass under the microscope, at the end of which time, when disturbed, it seemed as lively as at first. It dislikes the light. It can be handled without injury. Its food was found by Müller to be the intestinal canal of some of the specimens hatched from the eggs of infusorial animals. The Lancelet does not swallow but simply imbibes its food.

General Remarks.—Branchiostoma, says Müller, is evidently a protected animal, and its food consists of larval forms of different species of the Cyclostomata fishes, but not among them, being removed from them by distinctions which are greater than the differences between naked and fringed individuals.

Viewed as an entire animal, writes Mr. Good, the Lancelet is the most abstruse in the vertebrate sub-kingdom. It connects the Vertebrata not only to the Anamniote animals, but also, through the medium of certain asymmetrical Ascidians (the genus Poliama of Forbes and Goodfellow) to the Mollusca. We have only to suppose the Lancelet to have been developed from the dorsal aspect, the seat of its respiration to be transferred from its intestinal tube to a corresponding portion of its skin, and the latter to be developed into a pair of one or more of its anterior spinal nerves, and inferior branch of its second pair, to have a true Anamniote animal, with its peculiar circulation, respiration, generative organs, and nervous system, with other-asomphal ganglia and dorsal ganglionic recurrent nerves.

Taking all we know of the structure of this truly wonderful animal into consideration, we are inclined to regard it as the relic of some great order of fishes, which in their organization bore a closer resemblance to the vertebrated than to the reptiles, or have been transferred to the lower forms of Mollusca, and which became extinct in some former epoch of the world's geological history, and, from the unapproachable character of their bodies, and the absence of hard parts, have left not a wreck behind. The more so, the more are we convinced that there are no isolated organisms; that beings apparently anomalous are members of orders either partially known or for the most part extinct. Of all anomalous creatures the Branchiostoma is the most so, and it is much more consistent with the principles of scientific zoology to admit it as the type of a distinct order among
ashes than to attempt to place it among defined groups. The strange combination of characters which it presents—a vertebrated animal without a brain, having the respiratory apparatus of an Ascidian Mollusk, and a ciliated intestinal cavity—if it does almost "arrant its erection to the type of a clav of its own rank" is a classification: it is thus sufficient to constitute it the type of an order in the lowest of the vertebrate classes.

**BRASSES, MONUMENTAL.** By a "brass," as the term is commonly used, is meant a plate of brass which has been cast in one piece, and then subjected to a sort of "polishing" being laid in melted pitch and riveted through the stone. The effigy of a person deceased is usually engraved on the brass plate; there is frequently a canopy over the head, and there are often armures which the brasses are represented with, and generally with inscriptions, sometimes on labels, sometimes round the border of the slab, but mostly below the feet of the effigy.

These separate parts have been, in almost all cases, engraved on detached plates, each of which is inlaid in its own cavity of the stone. The engraved plates were not originally in the plain state in which they now appear, but were generally burnished and sometimes gilt, and the incised parts were filled with black or coloured resinous substances. The plates were secured to the effigy by means of a flat, square, polished piece of a dark colour, and thus became an appropriate background, giving distinctness and relief to the engraved brasses, and adding to the beauty of the figures and ornaments. Slabs with brasses are commonly laid in the pavement of churches or cathedrals with the figured brasses; and the art of making brass was not introduced into England till 1630, the plates are all of foreign manufacture, of the hard kind of brass formerly called "latten." The art of engraving on the plates was probably brought to England from Flanders and France, as well as the plates themselves; early brasses still exist in this country which are known to have been engraved by Flemish artists, and there are many fine brasses still remaining in the churches of Flandrel. Those of France were mostly destroyed during the Revolution, when they were converted into coin or cannon.

It is impossible to determine when monumental brasses were first introduced into England, most of the oldest specimens having doubtless been destroyed, but it was probably in the early part of the reign of Henry III. Brasses with dates as early as about 1240 are known to have been destroyed. Probably one of the earliest now remaining in England is that of Sir Roger de Trumpton, at Trumpton, in the county of Cambridge, who died in 1280. During the fourteenth century monumental brasses became more and more numerous; in the fifteenth century they were in still greater abundance; but towards the close of the sixteenth the number began to diminish, and in the reign of James I. the use almost entirely ceased. Of all the fifteenth century there is a very fine brass of Harnett, archbishop of York, who died in 1631: it is at Chigwell, in Essex. The number of brasses which now remain in England, though still considerable, is very small compared with what it has been. Many were destroyed when the monasteries were suppressed in the reign of Henry VIII.; many have been torn up, and sold as old metal; but the greatest destruction of them took place during the predominance of the Puritans, who regarded them as superstitious.

The effigy on a monumental brass is generally represented reclining on the back, with the hands on the breast placed palm to palm, in the attitude of prayer; and this form applies equally to men and women; but on the effigy of children it is extremely rare. The head usually rests on a cushion, which is sometimes supported by an angel on each side. Military noblemen are generally in full armour; ecclesiastics in the vestments peculiar to their orders; ladies have frequently a small dog lying at the feet. The canopies and other engraved architectural embellishments are frequently extremely elegant. The canopy is sometimes a pediment with pinnacles and finial; sometimes a foliated arch; and sometimes a foliated arch below a pediment. It is frequently supported on slender pillars. Occasionally armorial bearings are placed on the pillars and spandrels, of which a specimen is shown in the article Town, P. C., in the beautiful brass of Eleanor de Bohun, in Westminster. The effigy of Reginald Bray, son of Edward III. The shields of arms, devices, and peculiarities of costume, appropriate each brass to its period in a remarkable manner. Each period has also a form of alphabetic character almost peculiar to itself, which, in the early brasses, is adhered to with singular uniformity. Some inscriptions in the Gothic letters are very handsome. Roman letters are rarely used before the reign of Henry VIII., and are generally inelegant enough. The Gothic forms continued to be used occasionally till a late period. Most of the early ones of the French inscription, and were in use from 1350 to 1400. English inscriptions afterwards became more common, but Latin still continued to be frequently used.

Monumental brasses in England have been most abundant in the eastern counties, partly perhaps in consequence of the contiguity of those counties to the Continent, whence the use of brasses seems to have been introduced, and partly of the want of stone suitable for the effigy in relief, for which the brass has been substituted. The number of brasses in the north of England brasses are comparatively rare. None have been found in Scotland; and only two in Ireland, which are of late date, in Dublin cathedral.

Specimens of monumental brasses are easily obtained by the process called rubbing. Paper of moderate thickness, transparency, and softness, is laid upon the brass, and rubbed with a black or coloured material, which adheres to the paper where the brass is solid, leaving its original state where there are inscriptions or figures on which the paper does not rest. With a little care a perfect fac-simile may be obtained. Shoemakers' heel-ball, which is a composition of tallow, wax, and lamp-black, has hitherto been found most convenient as a rubber; the operation is clean and easy. Paper of suitable transparency, or of a thin sheet of lead with a soft slab is manufactured on purpose, as well as suitable heel-balls.

Another material for making rubbings has recently been invented, which is composed of a yellow metallic powder mixed with the elastic substance of which the rubber is composed, as the lamp-black is mixed with the tallow and wax. When the rubbing is made on a dark-coloured paper, a fac-simile is obtained not easily distinguishable from the original: the figure appears to be the brass itself, and the paper which represents the rubbing seems to be the stone slab in which the brass is imbedded.

The first collection of copies of brasses was made by Sir John Cullum, Cirentr Ormd, and the Rev. Thomas Cole, not by rubbing in the manner just described, but by a rude process resembling copper-plate printing, which was successively worked over by the pen, and cost much time and labour. The collection was sold for 43l. to the late Francis Douce, and was bequeathed by him to the British Museum, where it is now in the print-room. In 1840 the first number was published of 'A Series of Monumental Brasses, extending from the reign of Edward I. to that of Elizabeth; by J. G. and L. A. B. Walker.' Parts I. to XV. have been published. The selection of specimens is very judicious, the plates are exceedingly accurate, and the work is accompanied by explanatory letter-press.

(As described in the article, 'Brasses,' and as translated from the original in the Penny Magazine, Nos. 812 and 813.)

BRAY, Sir Richard, of Wotton-under-Edge, near Gloucester, son of Edward III. The seventh of his chapel at Westminster, was the second son of Sir Richard Bray, one of the privy council to Henry VI. All that has been ascertained of his personal history is that he was greatly attached to the study of architecture, and stood in high favour with Henry VII.; therefore that he should be employed by that king to design the sumptuous structure intended for his own mausoleum was almost matter of course. Nevertheless, Bray's claim to the honour of so great a work has been widely disputed. It is certain that he did not live to see the building greatly advanced, the first stone being laid on the 18th of January, 1502 ('by the hands of John Islip, abbot of Westminster, Sir Reginald Braie, R. of the Garter, and others'), and he dying on the 6th of August in the following year. It is about a year and a half afterwards prove nothing more than that he did not live to see his designs for the edifice fully realised, the fact of his assisting with the abbot in the ceremony of laying the first stone having been most eagerly insisted on by the architect or designer of the fabric, it being the most unlikely thing imaginable that he would have taken an active share in such a ceremony had the building been the work of a rival artist. Besides, that Bray possessed talents equal to the occasion, it is most likely that he would not have been engaged by those who would reduce his fame, that he erected the nave of that other singularly beautiful structure, St. George's Chapel at Windsor, commenced by EdwardIV. Sir Reginald's arms, crest, and device, R. B., and a nem.-BM, occur in
many places on the ceiling of that building, and in the south aisle there is a chapel still called after him, in which he was buried.

BREAD, BEER, AND ALE, ASSIZE OF. [As-

size, P. C.]

BREATH-WATER. [Plymouth, P. C.]

BREAST WHEEL. [Hydraulics, P. C., p. 384.]

BREECA. [Omphrythus Breeca and Caerens, P. C. S.]

BREVIA RIA ALARICIANUM is now the usual name of the code which was compiled at the command of Alaric, king of the Visigoths, from the Roman law and Roman jurisprudence. It was completed a.d. 506, in the second year of his reign. The code was confirmed by the nobles and bishops, and signed by Anianus, the referendarius of Alaric, a circumstance from which it is supposed that he had a hand in the compilation that was the compiler of it. The title Breviarius Alaricianum was only introduced in the sixteenth century; it was sometimes called Lex Romans, and sometimes Lex Theodosii, in respect of the most important part of its contents.

The contents of the Breviary are formed of abbreviations or compilations from the following sources:—1, Codex Theodosianus, 16 books; 2, Novellae of Theodosiius I., Valenti-
nianus II., Marcian, Majorian, Severus; 3, The Institutions of Galien; 4, The Perpetual Senate of Paulus; 5, Codex Gregorianus; 6, Codex Hermogenianus; 7, Puginianus, lib. 1, Responsorum. Accordingly the code was composed of Imperial Constitutions, or Laws, as they are properly termed in the terms of writings of Roman jurists, which in the Breviary are termed Jus.

This Code is of some value for the history of the Roman law, as it contains extracts from portions of the Roman law which are ready matter to jurists, and is a work of public use, and from the first five books of the Theodosian Code, which however, owing to recent discoveries, are less imperfect than they were. The discovery of the Institutions of Galien [Gaius, F. C.] has rendered that part of the Breviarium in which Galien is epitomized of little value. The lacunae in Galien cannot be filled up from the Epitome, because the compiler paid little attention to retaining the words of the original, but the Epi-
tome shows what matters were discussed in those parts of Galien which were omitted. The whole body of the Breviary is contained in the 'Jus Civile Antejustinianum,' Berlin, 1815.

BREXIA/CER, a natural order of plants belonging to Lindley's polycarpous group of monopetalous Exogens. This order contains at present but one genus, and was constituted by Lindley in the first edition of his 'Natural System of Plants.'

The following is his description of the order:—Calyx inferior, small, persistent, 5-parted, articulation imbricated; petals 5, hypogynous, imbricated in stamens; stamens 8, hypogynous, alternate with the petals, arising from a narrow cup, which is toothed between the petals; ovary superior, 5-celled, with numerous ovules attached in two rows to placenta in the axis; seeds small, stipitate; fruit dry, 5-celled, many seeded; seeds indefinite, attached to the axis with a double integument, the inner of which is membranous; no albumen; cotyledons ovate, oblate; rachide cylindrical, centri
tetal. The species are trees with nearly single trunks; the leaves are coriaceous, alternate, simple, not dotted, with deciduous minute stipules; the flowers are green in axillary umbels, surrounded by bracts on the outside.

Dr. Lindley remarks that the habit of Brexia is that of some plants of the grassaceous, especially of Theophraster, from which it differs in being polypetalous and the stamens being alternate with the petals. Its relations are also strong with Rhamnaceae and Celastraceae, but its stamens are hypogynous, and its seeds are as in those two, with some resemblance to Anacardium may be seen in the recent appearance of the young shoots and in its habit. It agrees with Pittosporaceae in its hypogynous de
definite stamens, its polypetalous fruit, and alternate undivided leaves. There are three species of Brexia, all of them ele
gent, but differing from each other in the general form of turfy loam and poat, and cuttings with their leaves not shortened strike readily in sand under a hand-glass in heat, or a leaf with a bud attached will grow. The leaves are covered with a redness which causes rain to run off them immediately, and thus induced Noronia to give these plants the name of Brexia, from Brexia (Breixi), which signifies 'a wetting.' In gardens they are commonly called Theophrastes, but they differ considerably from that genus. All the species are natives of Madagascar.
water than usual, was knitted in a 'pug-mill' to a stiffer consistence than ordinary, thereby rendering a shorter period for drying sufficient. The rate at which the bricks were made by this machine was stated to be from one to two thousand pieces per hour.

Mr. Marquis of Tweeddale's invention, which bears a considerable resemblance in principle to that of M. Terrasson, arose out of a wish on the part of that nobleman to aid in forwarding improvements in the draining of land for agricultural purposes by removing the surplus water from land by means of drains or conduits formed of tiles, and laid beneath the surface of the ground; and it was with the hope of enabling these tiles to be made quickly and cheaply that the machine in question was devised. In 1787, a model of it was exhibited, and the most material part of what degree this machine differs from that of M. Terrasson.

The clay, in the first place, is forced between two rollers placed half an inch apart, so as to crush any stones contained in it; and is then worked up to the proper consistence in a revolving cylinder. The clay passes between two cylinders, which give it the proper thickness for a tile, while two side pieces give the requisite width: it traverses an endless apron which carries it to a piece of apparatus where the long side of clay is bent to the requisite concave form, and where a descending wire cuts off, by separate movements and at successive instants, pieces of the proper length for tiles. The action of the machine is continuous; for the long ribbon of clay is bent to, on which they are moulded, and by modifying the adjustments of the apparatus, the pieces so cut off may have the proper form for draining-tiles, house-tiles, flat roofing-tiles, or bricks. One man and two boys, with the aid of this machine, can make in one day ten thousand brick-shaped boxes, at the expense of sixpence per box. The second stage consists of twenty thousand flat tiles for the draining-tiles to lie upon; and the tiles so made are said to be stronger, more impervious to water, and smoother than those made by hand.

From about the year 1840 to 1842 the suggested or patented improvements in brick-making were very numerous; but they do not call for lengthy description. In Mr. McNab's method there is a sliding-frame beneath the bottom of the mill, in which the clay is ground; and this frame contains for the clay on which they are moulded, and by modifying the adjustments of the apparatus, the pieces so cut off may have the proper form for draining-tiles, house-tiles, flat roofing-tiles, or bricks. One man and two boys, with the aid of this machine, can make in one day ten thousand brick-shaped boxes, at the expense of sixpence per box. The second stage consists of twenty thousand flat tiles for the draining-tiles to lie upon; and the tiles so made are said to be stronger, more impervious to water, and smoother than those made by hand.

Another method introduced about the same time is nearly on the principle of the above. It is usually defined to consist in the mode whereby a screw forces the clay out of the mould, and also in the way in which the wires descend to cut it into bricks. A method patented by Messrs. Cook and Cunningham is on a different principle to the above. It consists in a frame or slide containing two moulds, is applied to the side of the mill in which the clay is prepared. The clay is forced, by the rotation of arms within the mill, through an opening into a box; and a piston working in this box presses the clay into one of the moulds in the sliding frame. When one of the moulds has been thus filled, the frame moves forward, which brings the other mould under the box, while the first mould is carried over an empty movable mould placed on a table; a piston pressing the brick in the empty mould, and the mould thus set free returns to receive a fresh supply from the box. The mode is thus so far a continuous one—that while one mould is emptying its contents into the movable one, the other is receiving a fresh supply at the box; while a boy receives the moulded bricks from the movable mould as fast as they are deposited in it. Mr. White's patent, of the same year, related principally to an improvement in the mode of supplying the clay from the mill, in the way of a separator. Mr. Gibbs has proposed a method in which both the materials of the bricks and the mode of manufacture are taken into account. He proposes to use Merthyr sand or pulverized Merthyr sandstone, combined with London clay or piper's ashes. It was found that a mixture of the former was a good clay, as in the latter, the ash was a powerful object of manufacture. The mode of making bricks under the patent embraces two or three modifications, of which one consists in rolling the clay out into a sheet of uniform thickness, then cutting it by machine-worked wires or wires into brick-shaped pieces, and compressing these by a separate machine. An American method introduced more recently by Messrs. Beach and Lukens, seems to be founded mainly on the plan of Messrs. Heaton, but to contain a provision for transporting the bricks to any convenient spot by means of an endless belt.

Mr. Freson's method is one of making bricks, tiles, and small articles of earthenware, from earth or clay almost in a state of dryness. This subject is noticed in connection with some of the recent inventions relating to Mosaic Pavements.

A communication was made to the Surveyor, Engineer, and Architect, a year or two ago, concerning the use of floating bricks. The Romans were acquainted with the use of bricks which would float in water; and M. Fabbroini, in the year 1530, discovered the use of earth or clay for this purpose. It occurred near Castel del Prano in Sicily; and the earth consisted of silica, clay, magnesia, lime, iron, and water. Bricks made from it floated in water, conducted heat with extreme slowness, and could not be fused in an ordinary fire. It is proposed in the paper just alluded to, that bricks so formed would present many advantages on ship-board, in all erections connected with furnaces and fire-places; and also that a novel kind of ornamental pavilions or houses might be formed on lakes in pleasure-grounds; the base being a platform of durable wood, and the superstructure of these buoyant bricks. The weight of the bricks, made by any method, is an important matter in relation to the purpose for which they are intended. The Marquis of Tweeddale, in a letter to the Royal Institute of Civil Engineers, after the reading of a paper relating to bricks, several engineers objected to the use of bricks made wholly by machinery, on the ground that their extreme compactness made them heavier and more costly than those produced by the ordinary art. The Marquis, however, brought in use a contrivance something like that of the Marquis of Tweeddale, but where hand-power and slight pressure are substituted for machine-power and heavy pressure. The decision as to whether or not the use of machine-made bricks, will probably depend, as in most other cases, on the relative expense in comparison with the hand method; hitherto they have been rather too costly.

Brick-edges are of two classes, public and private. Public bridges may be built quite as cheaply as private ones, and yet be more convenient and economical for highways, although the principle of that distinction does not seem very clear. Every county bridge is a highway, inasmuch as it is a bridge over which a highway passes; it is therefore in that respect strictly a highway; so also is every other public bridge over which a highway passes. The usual distinction drawn between them is derived from the nature of the space over which the bridge gives a passage. A county bridge, or, in other words, a bridge which the county is bound to repair, is formed by a line that is a highway. But sometimes a river or water flowing in a channel more or less definite, whether such river or channel is occasionally dry or not. This is evidently a very loose definition, for it does not prescribe or define the nature of the space, it only avails to this; but it seems clear that a county bridge must pass over a water, as the county would certainly not be bound to repair a bridge erected across a ravine, or over an ancient road crossed by a new road, having no reference to water. A county bridge may be either a foot, horse, or carriage bridge. A private bridge is any bridge which does not answer the description of a county bridge or a public highway. It is subject to no other laws than the general laws of property.

The liability to repair and maintain both county and private bridges is thrown on the whole county, that is, highways on the inhabitants of the parish wherein such highways lie. Prima facie, therefore, by the common law the whole county is the county to which is chargeable the repair of any bridge erected within it; or that some person, individual or corporate, is liable to that expense. In the case of private individuals, such liability may depend either on tenure, that is, by reason that they and those whose estates they have in the lands or tenements are liable in respect thereof, or on prescription. In the case of cor-
porate bodies, on prescription only. With regard to corporate bodies, Lord Coke says, 'If a bishop or prior, &c. hath at or twice of alms repaired a bridge, it bindeth not (and yet is evidence against him, until he prove the contrary); but if in the service of the bishop, they and the brethren, or such Alms of alms, this shall bind to it.' (2 Inst. 700.) Any bridge answering the description given above of a county bridge may become a charge upon the county even though not under the control of the corporation, if it be built by the county or by a private individual: but not every bridge which answers the above definition is therefore chargeable to the county for repair, unless it be also used and useful to the public. The public use and benefit seem to be the criterion: and they and the corporation, or any sort, which is principally for his own benefit and only collaterally of benefit to others, he will be liable to the repair, and not the public: but where the public derive the principal benefit to, or over, and adjoining it, and that ground that it would greatly discourage public-spirited persons from erecting useful bridges if they were ever after to be burdened with the costs of repair. The county are even liable to the repair of a public bridge erected by commissions under an act of parliament, even though the commissioners are empowered to raise tolls in order to support it, or though other funds are provided for the repairs; unless there be a special provision for exempting them from the common law. For it is not the common use and liability of a county to repair a public bridge is so strong, that although it has been erected and constantly repaired by trustees under an act of parliament, and although there are funds for the repairs, the county are still liable to it. And where trustees are appointed to erect and build a bridge, where a culvert would have been sufficient, but a bridge was better for the public, it was held that the county could not refuse to repair such bridge on the ground that it was not absolutely necessary.

The first statute on this subject is the 29 Henry VIII. c. 6, called 'the Statute of Bridges.' This statute is merely in affirmance of the common law. In course of time, owing to the indistinctness of the principle on which public bridges were held to be chargeable to the county, it was considered expedient to pass an act to come to a clear up the doubts and difficulties arising from this principle. In order, therefore, to ascertain more clearly the description of bridges hereafter to be erected, which inhabitants of counties shall and may be bound or liable to repair and maintain, it is enacted by stat. 43 Geo. III. c. 69, § 5, that no bridge hereafter to be erected in any county at the expense of any individual or private person, body politic or corporate, shall be deemed to be a county bridge, and shall be chargeable to the county, unless such bridge be made to pass in a plain manner under the direction or to the satisfaction of the county surveyor, or person appointed by the justices of the peace at quarter-sessions to superintend and inspect the work. This is extended to bridges newly built, and not to those repaired or widened.

It was found in very early times that many practical difficulties arose from the indistinctness of the common law as to the precise limits of a bridge—that is to say, as to the precise point where it ceased to be a bridge and began to be a highway; and vice versa. This indistinctness gave rise to many disputes about the liability to repair, and it was found expedient to enact, by stat. 22 Henry VIII. c. 6, § 9, that such part and parcel of the highways as lie next adjoining to the ends of any bridge, or the whole of every such part or parcel of said lands by the space of 300 feet, be made, repaired, and amended as often as shall need require; and that the justices of the peace should act respecting the repairs of such highways as they were empowered to act respecting the bridges themselves. The effect of this statute was merely to limit or fix the length of road which the county was to repair at 300 feet. By the common law the county was bound to repair the roadway at the end of every county bridge, but the length of that road was precisely determined till the passing of the above statute.

But this liability of the county has been very much narrowed by the stat. 5 & 6 Will IV. c. 60, § 21 (the General Highway Act), which, with respect to bridges to be built after the 20th of March, 1850, have a bridge shall hereafter be built, which bridge shall be liable by law to be repaired by and at the expense of any county, or part of any county, then and in such case all highways lying within five miles of such bridge shall be from time to time repaired by the parish, person, or body politic or corporate, or trustees of a turnpike road, who were by law, before the erection of the said bridge, bound to repair the said highways: provided, nevertheless, that any such bridge shall not be warranted to convey any county or part of any county from repairing the walls, banks, or fences of the raised causeways and raised approaches to any such bridge or the land adarche to it.

Till late years no persons could be compelled to build or to contribute towards the building of new bridges, or even the maintenance of old bridges under their construction or even under the act of parliament; and even when the county was bound to repair a bridge, it was not therefore bound to widen it. Nor could the inhabitants of a county by their own authority change the location of a bridge. But by the stat. 14 Geo. IV. c. 33, § 1, Old Gaol Bridge in the county of Lancaster, quarter-sessions are enabled to compel the county to widen or change the situation of old bridges, or build new ones. (See also 54 Geo. III. c. 99, which extends some of the provisions of the above statute.

With respect to the appointment of surveyors of county bridges, their duties and powers, and the modes in which such powers are to be exercised, see stat. 22 Hen. VIII. c. 5, § 4; 48 Geo. III. c. 69 (coupled with stat. 6 & 7 Will IV. c. 60); 54 Geo. III. c. 99; 56 Geo. III. c. 143. The various provisions of these statutes are very numerous.

For the mode of taxing and collecting the moneys necessary for the repair of bridges and the highways at the end thereof, see stat. 22 Hen. VIII. c. 6; Act 1, c. 18, 12 Geo. II. c. 29; 52 Geo. III. c. 110; 56 Geo. III. c. 143.

In case of non-repair or nuisances, either to bridges or highways, the modes of prosecution are the same: namely, by indictment, or for minor offenders, a fine, &c. speaking, an action cannot be maintained against the county by an individual for the non-repair of a county bridge, unless in some cases of special damage accruing to such individual from the non-repair.

A criminal information is very rarely resorted to, and only in cases of either very aggravated neglect or where there seems to be little chance of obtaining justice by preferring an indictment.

The appointment of a public bridge for non-repairs, &c. may by common law be before the Queen's Bench or at the Assizes. By the stat. 22 Hen. VIII. c. 5, § 1, presentations may be made before the justices in general sessions, and they may proceed therein in the same manner as the judges of the Queen's Bench were in the habit of doing, or as it should seem by their directions to be necessary and convenient for the speedy amendment of such bridges. See also for minor regulations respecting presentations, 1 Anne, sess. 1, c. 18; 1 Geo. II. c. 12, and consequent.

The indictment of a county bridge is subject to the same rules as any other indictment. And though the whole county be liable to the repairs, any particular inhabitant of a county, or tenant of land charged to the repairs of a bridge, may be made defendant in the indictment for the non-repair of it, and, speaking, an action cannot be maintained against the court for the default of repairs, and shall be put to his remedy at law for a contribution from those who are bound to pay proportionable share in the charge.

The malicious destruction or damaging of public bridges is said to be punishable as a misdemeanour at common law, since it is a nuisance to all the king's subjects. By 7 & 8 Geo. IV. c. 50, § 13, it is enacted, 'that if any person shall unlawfully destroy, or be maliciously, or negligently, or by a lawful bridge, or do any injury with intent and so as thereby to render such bridge, or any part thereof, dangerous or impassable, every such offender shall be guilty of felony.

(For further information see Lord Coke's Second Inst.; Burn's Justice; Russell On Gates.)

BRIDGEWATER TREATISES, a series of works which were published in accordance with the last Will of the Revd. Wm. Hill, minister of Bredwardine Church, and Revd. Geo. Bridge, who died in February, 1829. The Will, dated February 25, 1825, directed certain trustees to invest in the public funds 6000L., which sum, with the dividends accruing thereon, was to be at the disposal of the President, for the encouragement of learning. The trustees, being unable to determine who should be the President, or persons nominated by him. The testator further directed, that the person or persons selected by the said President should be appointed to write, print, and publish 1000 copies of a work 'On the power, wisdom, and goodness of God, as manifested in the creation; illustrating such work
by all reasonable arguments, as, for instance, the variety and formation of God's creatures in the animal, vegetable, and mineral kingdoms; the effect of digestion, and thereby of continued reproduction, on the species of animal life; and, lastly, the infinite variety of other arguments; as also by discoveries antient and modern, in arts, sciences, and the whole extent of literature. He also desired that the profits arising from the sale of the works so published should be paid to the authors of the works published.

The then President of the Royal Society, Davies Gilbert, requested the assistance of the Archbishop of Canterbury and of the Bishop of London, in determining on the best mode of carrying their request to the sovereign. After due consultation with his advice, he appointed eight gentlemen to write separate treatises on the different branches of the subject, which have been published, and are as follows:


5. By Prof. Dr. C. Wilby. 'Chemistry and Physiology, considered with reference to Natural Theology,' 2 vols. 8vo., London, 1840.


The Earl of Bridgewater also left upwards of 12,000l. to the British Museum, the annual income arising from which he directed to be employed in the purchase of manuscripts, and in taking the care of them for the use of the public.

In 1815, Matthew Boulton, the wealthiest man in Scotland, which, like the English brief, has a common root with the German brief, a letter or written paper. Its general character is that it contains permission or directions to make an inquiry regarding certain matters. It would appear that when the supreme civil court consisted of a committee of Parliament, permission to pursue before such a body was granted by brief from the Chapel Royal of Chancery, containing the questions on which a decision or answer was required. Of this character is the brief to the sheriff, which, in modern times is the inquest for service of heirs. This form is necessary for feudally investing an heir in his ancestor's landed property. If the ancestor was himself feudally invested, the heir sues out a brief, and is presented with the figures of the county where the lands lie, or if they lie in different counties, to the sheriff of Edinburgh, requiring him to enpanel a jury, and through their finding to return answer to certain questions. The brief and corresponding answer, or Retour, set forth the death of the person who was last invested in the property; the shape, whether as heir at law or by special provision, in which the heir succeeds, &c. This process is termed a Special Service. If the last proprietor was not feudally invested, the process is called a General Service, or a General special Service: the former, when the claimant is heir at law; the latter, when he claims under any particular provision. In both these kinds of service, the brief is the same as that in a special service, but the return leaves the particular questions unanswered. Where there is more than one person claiming the character of heir, separate briefs may be taken out, and a competition may take place before the jury, which may be, and generally is, carried into the Court of Session. The other briefs known in the law of Scotland are:—the brief of Tutory, by which an inquiry is made as to the person legally entitled to be tutor to a minor pupil, or, as it is termed in England, an infant; the briefs of Idiocy and Fruiriti, by which inquiry is made as to the quality of land, and of the income derived from the same, and medically deprived of the management of his affairs; the brief of Torace, for assigning the portion of the deceased husband's property, which is to be the widow's terce; the brief of Divorce, for settling the claim of heir's portioners; and the briefs of Lining and of Forfetment, for settling disputed boundaries.

BRIGGS, HENRY PERRONET, R.A. This distinguished painter, both in history and portrait, died in London, in January, 1844, aged fifty-one. He was of Norfolk family, and was the son of the painter. He commenced his career as a portraiture painter, and was an exhibitor on the books of the Royal Academy in 1814. In 1818 he exhibited a picture of 'Lord Wake of Cottingham setting fire to his castle, to prevent a visit from King Henry VIII.' He was afterwards employed to carry out the portrait of his patron, but in 1824 he exhibited a subject from Boccaccio (Gior. viii. Nov. 2), representing Calandrino, a Florentine painter, thinking he had found the Eletropia, and thereby become invisible, jelted out of a house by the sovereign and Buffalchino. These were followed by others of a higher class, as Orsello relating his adventures to Desdemona; the first interview between the Spaniards and the Peruvians; and George III. on board the Queen Charlotte, presenting a sword to Earl Howe, after the victory of the 1st of June, 1794. The last picture was presented in 1825 by the British Institution to Greenwich Hospital. In 1831 he exhibited a large picture of theuentes Britons instructed by the Romans in the Mechanical Arts, for the Mechanics' Institute at Hull. He was elected an Academician in the following year, from which time he was nearly exclusively employed in portrait-painting. His portraits are very effective as regards colour; but the colouring is rather conventional, and the features are not sufficiently modelled. His botanical drawings are also the following well-known persons:—Sir S. Meyrick, Baron Alderson, Sir Fowell Buxton, Rev. Sidney Smith, Mrs. Ojle, Mrs. Siddons, Charles Kemble, Duke of Wellington, and many others.

BRILL, PAUL. This celebrated landscape painter, was the younger brother and pupil of Matthew Brill, whom he greatly surpassed. He was born at Antwerp, according to Van Mander, in 1566, and received his first instruction from D. Wreteman; but having heard of the success of his brother at Rome, who was in great esteem there as a landscape painter during the pontificate of Gregory XIII., Paul joined him at Rome, and soon became not only a sharer of his brother's prosperity, but acquired a much greater reputation than he. He married a beautiful girl at that time Paul pursued an unrivalled career at Rome. No Italian had up to this period turned his attention exclusively to landscape with success, and Paul's ability was the more valued. He executed several large landscapes in oil, in the apartments of the Pope and other dignitaries of the church; in many cases, views of the villas or summer residences of his employers, all painted from nature, views, no doubt, in their town residences, as well executed, calculated to afford the highest gratification. He painted several celebrated pictures at a moderate price, in fresco, and of very large dimensions. In many of his works he introduced figures from the stories of ancient mythology, and Annibal Carracci is said to have sometimes painted subjects similar to his. Paul's works are often on copper, which are very highly finished; the foregrounds are fresh and bold, and the distances are well managed. His masterpiece was considered a large landscape in fresco, in the Sala Clementina in the Vatican, painted in 1602 for Clement VIII., and representing the triumphs of St. Clement: it was sixty-eight feet long and of considerable height. Paul died at Rome in 1622: his age and death are differently given by Ballinucci, who says he died in 1626, aged 72. Several of Paul's brilliant pictures have been engraved, and he executed a fewetchings himself. There is a print of him by De Jode after a portrait by Vandyck.

(Mautish, Het Leven der Schilders, &c.)

MITTISH. SHUL. IZIS (C. S.)

BRITISH HUSBANDRY. (HUSBANDRY, P. C.)

BRIZA, a genus of grasses (Graminaceae, P. C.) belonging to the tribe Festucineae, of that order. It has nearly equal, broad, fibrous glumes; 3-8 flowers densely infested in a short disconical cyme; the lower lemma heart-shaped, obtuse, rounded on the back, unarmed; the glumes and palea membranous with a sericeous margin; terminal styles. Two species of this grass are natives of Great Britain, the B. minor and B. major. They are known by the common name of Milhoppers. The stamens are usually in clusters of 3-8 flowers; the dense clusters of flowers are hung upon the ends of a very delicate filamentous peduncle, forming an elegant pendant which sways with the slightest breath of air, hence the name making-grass. It is a pretty grass in pictures, but do not yield much nutriment for animals, which feed upon it.

(Babington, Manual of Botany.)
BROZIO, FRANCESCO, a distinguished Bolognian painter, and one of the best of the scholars of the Carracci, was born at Bologna in 1674. He was a journeyman shoemaker until his twentieth year, when by the permission of his uncle, he was allowed to learn painting under Passerotti. He however soon made sufficient progress to perceive that the school of Ludovico Carracci was a surer road to success than the path of Passerotti, and he accordingly left the latter school, and in the school of the Carracci he became a favourite of both Ludovico and Agostino, for he devoted himself to engraving as well as painting. In painting also, Brozio did not, as is too often the case, restrict his studies to the human figure and its disposition, but he dissected the head, and by the aid of the form, perspective, architecture, and landscape. He was superior in these accessory parts of painting to all his Bolognese contemporaries, and, says Lanzi, was, with the exception of himself, the most able man in the school of the Carracci. His masterpiece is the Coronation of an image of the Virgin in the church of San Petronio. He died in 1623, aged 49. His son Filippo Brozio, and Domenico degli Ambrogio, called Menichino del Brolio, were his principal scholars, and were both very able painters.

Gandellini describes many prints by Brozio after the Carracci, Correggio, and others; 31 are noticed by Bartisch in the ‘Pezzato-graveur’. They are executed in the style of Agostino Carracci, and are sought after by many of the latter collectors. Brozio is better known for his prints than for his pictures.

MALVASIA, Felizit Pitture; Gandellini, Notizie loricelle degli Insiatruzioni, &c.; Lenz, Storia Pittorica, &c.; and VIRGILIO, originally the servant of Ben Jonson, gained a well-merited reputation as a comic dramatist. Of his life hardly any particulars are known; and it is only by inference that he is set down as having died in 1652. His extant comedies are fifteen. The earliest of these, ‘The Northern Lass,’ was printed in 1593. Five others appeared in one volume, in 1633; and five more in a second volume, published in 1693. His ‘Jovial Crew, or the Merry Beggars,’ has a place in the tenth volume of Dodge’s ‘Old Plays,’ and a second of the others are now known to be of dramatic composition in the school of Brome’s old master. They possess, in particular, great force in the representation of character. Altogether he may fairly be ranked among the best of our old dramatists of the second class.

BROMLEY, WILLIAM, a distinguished line-engraver. He engraved the ‘Allegorical Figures of Time’ in 1760, and was presented by his master with a London watch on his eighteenth birthday. He also engraved the ‘History of England’ after Stothard. He engraved several portraits after Sir T. Lawrence, including two of the Duke of Wellington, one on horseback, and Young Napoleon. He was engraved also the Woman taken in Adultery, after Lely. He was latterly almost exclusively engaged by the Trustees of the British Museum, especially in engraving the Ear Marbles from drawings made by the late H. Corbould. Bromley survived his son John Bromley, likewise an eminent engraver, and both are the last of a line of eminent print-engravers whose name has been for many years an associate engraver of the Royal Academy of London, and a member of the Academy of St. Liz. at Rome.

John Bromley was born in Chelsea in 1795. He followed his father’s profession, but he chose a different branch of it: his works are in mezzotint, in which line he had his superiors. He died in 1839, aged only 44, leaving a wife and a large family to lament his loss.

A Duc. and Generals’ Pick-Me-Up is the following:—The Trial of Lord William Russell, after Sir G. Hayter; Lady Grey refusing the Crown, after G. R. Leslie, R.A.; the Monks preaching at Seville, after J. Lewis; the Duke of Wellington, after G. Kneller; R.A.; the Trial of Queen Caroline, after Sir G. Hayter; and the Reform Banquet, after B. R. Haydon.

(‘Art-Union Journal, June, 1839; December, 1842.)

BROMUS (Bromus-grass, P. C.)

BRONCHOTOMY. (Trachyotom, P. C.)

BRÖNDSTED, PETER OLUF, a distinguished Danish archaeologist, was born on the 17th of November, 1873, at Hornema in Jutland, where his father was pastor. He studied at Copenhagen, and in 1896 he accompanied his friend Koes to Paris. After a stay of two years in the capital, both friends went to Italy. In 1816 a party consisting of Bröndsted himself, Koes, the architect Haller von Hel-


Bronome, mostly in the form of hydrobromate of magnesia, having been found in sea-water, and in many saline springs, such as that of Epsom, and that of Pittville, Cheltenham, and other places, and containing the salts of bromine, the per- cent Drottwich, either alone or associated with iodine, partic- ularly those of Kreznusch in Rhenish Prussia, it was inferred that it would prove useful in the treatment of scrofulous diseases. It is not, however, of much service in diseases with excess of potassa, in dilute liquid potash. It is in this latter way that it has proved most useful. It has also been used in baths, and likewise as an ointment.

The fact that many enlarged glands have lessened on its employment, led Dr. Willis to surmise that it would prove beneficial in enlargements of the spleen. He is su- guine of good results, but the number of cases in which it has been used is insufficient to warrant any general conclusions; and it is the great external or nostril person who is chiefly im- paired, either from a long residence in hot coun- ties or from having long suffered from agues, little can be expected from any agent. (Dr. Robert Williaus, Elements of Medicine, 1, p. 533.)

A bromide of iron has been formed, which is worthy of attention, as well as a bromide of mercury: there is likewise a bi-bromide of mercury.
BRONZINO, ANGELO, a celebrated Italian historical and portrait painter, was born at Montecelli, near Florence, in 1501 or 1502. He was the scholar of Pontormo, and the friends of Vasari, and like him an enthusiastic admirer of Michelangelo. Though Bronzino was not himself one of the gross anatomical marmesters with which Florence abounded in the latter part of his own life, he was one of the most influential causes of the predominance of the anatomical school, for by his own boundless admiration of Michelangelo, he set an example to the younger artists less able to discriminate the good from the bad in Michelangelo's style, and they of course appropriated what was most obvious to their senses, of features. A pupil of Filippo Alboni, the nephew and favourite pupil of Bronzino, was one of the most uncomprehending leaders of this school.

Bronzino painted in fresco and in oil; and executed many altar-pieces and other smaller easel pictures, which are scattered over the whole Italian peninsula. Besides, he was a good designer of medals, and his son Cristoforo Allori frequented adopted the surname of Bronzino, and it is a name often applied to them in catalogues.

(Vasari, *Vite de Pittori, &c.; Lanzi, *Storia Pittorica, &c."

BRORA COAL. Beds of very poor coal, lying in the midst of the oolitic deposits in the district of Brora in North Scotland and near Scarborough in Yorkshire, are thus termed. The coal is perhaps composed principally of Equiseta.

BROWN, THOMAS, better known by the familiar name of 'Tom Brown,' was born in Shropshire, in the year 1863. At the age of fifteen he was appointed a scholar of Christ Church, Oxford; but he left the university in disgrace without taking a degree, and, going to London, became a Grub-street writer.

The most respectable part of his career was his holding for a short time the mastership of the free school at Kingston-upon-Thames. Among the characters who composed the list of authors and "The immortal Brown," but more frequently designated by the familiar sobriquet of 'Capability Brown,' who was originally a kitchen-gardener, raised himself to be the eminent landscape-gardener of his day, and 'improver of grounds,' as to whom was considered the oracle of taste; and he also acquired no small degree of reputation by his skill in architecture. He was born at Kirkdale in Northumberland, in 1715, and in the early part of his life was in the service of Lord Cobham as gardener in the district of the person, and was noticed by the master of Stowe. After which he was similarly engaged by other persons of distinction, but of his rise until he formally established himself professionally as an artist-gardener, we have no account. His personal history is a scanty but an enviable one; he not only realized a handsome fortune, but he graced his acquired station of gentleman by the manners and feelings of one. After having arrived at the dignity of high sheriff for the county of Huntington, which office he filled in 1770, he was created a baronet in 1778; and died in 1783. One of his sons, the Earl of Donegall; made additions at Burleigh, for the Earl of Exeter; additions at Prior Park near Bath, 1765; the picture-gallery at Comber; considerable alterations at Trentham (now superseded by the present mansion), for the Earl of Shrewsbury; and the Earl of Donegall; made additions at Burleigh, for the Earl of Exeter; additions at Prior Park near Bath, 1765; the picture-gallery at Comber; considerable alterations at Trentham (now superseded by the present mansion), for the Earl of Shrewsbury; and the Earl of Redgrave; additions at Nuneaton, and the house at Claremont, now occupied by Queen Victoria. This last might be considerably extended, for it happens very...
singlyard that we possess a fuller and more authentic catalogue of Brown's architectural labours than of those of any one else in that profession; we shall however merely add that he designed several of the buildings in the gardens at Stowe.

(Repton On Gardening, by London.)

BROWN, DR. JOHN, an unfortunate man of letters, was born in 1715, at Rothbury, in Northumberland, where his father was curate. He studied at St. John's College, Cambridge, and took his degree with reputation: after which he resided for some years at Carlisle on a minor canonship and lecturership, and distinguished himself by acting bravely in the controversy in the relative of successively held and resigned several livings in the church. Of these one at least was procured through the influence of Warburton; a patron however whose letters show he has treated with little tenderness. Brown's temper was naturally tender in next to mental derangement. In 1766 the reputation with which his writings had obtained gained for him an invitation from the Empress of Russia to visit St. Petersburg, and assist in organising a scheme for public education. Ill health compelled him to decline the engagement. Other vexations preyed upon his spirit; and in September of the same year, seized with a fit of insanity, he cut his throat. Brown's works were both numerous and diversified, in verse as in prose. It was evidently one of the first steps of his vapour, was entrusted to Warburton to his editions of Pope's works. His tragedy of 'Barbara's, brought upon the stage in 1756, was highly successful for a time in spite of its extravagance and feebleness, and has been reprinted in several collections. It is said that 'Athelstan,' was not so fortunate. His principal prose writings were the following:—

"Essays on the Characteristics of Lord Shaftesbury," 1751; 'An Estimate of the Manners and Principles of the Times,' 1765, 2 vols. 8vo., a work which went through seven editions before the end of the next year, and received, a broad as well as at home, an attention which it owed to its severity of uncanonical version on national vices rather than to its merits as a philosophical speculation; an 'Additional Dialogue' of the Duke of Devonshire, 1744, another "Essay" on the "defence of the political character and conduct of Lord Chatham;" and a 'Disquisition on the Rise, Union, and Power, the Progressions, Separations, and Corruptions of Poetry and Music,' 1763, a treatise of considerable ingenuity.

All his works are enumerated in the long article under his name in the 'Biographia Britannica.'

BROWNE, WILLIAM, one of our minor English poets, was born in 1590, of a good family, at Tavistock in Devonshire, son of Sir Edward Browne, Excitor College, Cambridge, but left the university without a degree, and went to London, where he entered at the Inner Temple. In 1624 he returned to his college, and acted as private tutor to Robert Dormer, afterwards Earl of Caernarvon; and the degree of M.A. was conferred upon him by the university. Afterwards he became the joint owner of the Earl of Pembroke's library; and it is said by Anthony Wood that he was able to amass money enough to purchase an estate. The time of his death is uncertain; but it may have happened in 1645. But perhaps, as Mr. Burke remarks, his "Elogues;" a long series entitled 'Britannia's Pastoral,' a shorter entitled 'The Shepherd's Pipe.' In the narration of events, and in the delineation of characters or passions, he is feeble, confused, and tedious, especially in his more elaborate series of pastoral. But his poetry abounds in beautiful landscapes, painted with much delicacy of feeling and not without frequent richness of fancy. In 1772 there was published a complete edition of his poems, in three volumes, 12mo., which contained his 'Inigo;' a poem of some merit, printed in 1644 and 1646. He was mentioned several times by Barthelemonus Facius, 'De Viris Illustr.,' Florence, 1745; and Rathgeber, 'Annals of Painting, &c., in the Netherlands,' p. 105, enumerates twenty-nine works attributed to him. He is styled \textit{auctor terra}, from his book, 'Britannia,' and \textit{auctor terrae} from his book, 'Britannia.'

BRUCE, a genus of plants named in honour of James Bruce, the celebrated traveller in Abyssinia, belonging to the natural order Rutaceae. It has the following characteristics:—Flowers monocious; calyx of two parts, unequal; petals 4, hardly equal the length of the calyx; stamens 4, inserted round about a 4-lobed gland-like central body; the pistilliferous flowers with four abortive stamens; ovaries 4, seated on a 4-lobed receptacle, each terminated by a single, acute, reflexed stigma; fruit a drupe, 1-seeded. The species are shrubs, with unequally pinnate leaves, 6 pairs of opposite, entire, or serrated leaflets, without dos.

BRUCE, Charles ("Braces ferruginea" of L'Héritier), Woodbine, has rare leaflets covered with rusty villi on the nerves beneath; racemes simple, spike-like. This plant is a native of Abyssinia, and is said to be a tonic and astringent, and to act favourably in dysentery. By some mirtakes it was at one time supposed to be the plant which yielded the true Angustura bark of the shops. By the substitution of the fake Angustura bark of the shops. By the substitution of the fake Angustura bark for the true Angustura, P.C.] fatal effects have been known to follow. At the time that the false Angustura bark was supposed to be the product of \textit{Braces ferruginea}, an alkaloid was discovered in it which had long been known as \textit{angusturin}. [Smith, F.C.] Supposed now however, that there can be little doubt about the Angustura bark of the shops is a species of \textit{Strychnos}. Of this subject Dr. Christison, in the last edition of his Dispersary, has the following remarks:—"The Angustura bark (\textit{Galpinia Cinapioides} in our country is said to be genuine, and, as far as he knows it, perfectly genuine. But on the Continent a most serious fraud has been often practised, by the substitution of a highly poisonous but long erroneously conceived to be that of the \textit{Braces ferruginea} species. In America it is not uncommon to find a species of \textit{Strychnos} presented externally a dirty greyish yellow ground with numerous irregular spots or tubercles of a lighter grey tint; which appearances are in the larger pieces displaced a patches, or entirely, by a uniform, loose, bright, natty-colored efflorescence. The speckled ground is most resembling to the smaller pieces of true Angustura, but are easily distinguished by their greater thickness, their firmer, less intense bitterness, without either aroma or pungency, and also, the reluctance among the kernels to have the fracture becoming bright red when touched with nitric acid. Another excellent character mentioned by the Colleges, but applicable only where dusty specks exist, is that such specks become deep bluish green with the same acid; which, on the other hand, will not alter the speck of genuine Angustura bark, which, if not similarly altered the spurious bark, where it is quite free of dusty efflorescence. Fatal accidents from the substitutes of the spurious for the true bark were at one time not uncommon on the Continent, in Austria they were so frequent, that upon one occasion the government ordered the whole Angustura bark in the empire to be destroyed. This adulteration has never been publicly noticed in Britain, and experienced wholesale and retail dealers, whom I have consulted, have here in London, were unaware of its existence. A few weeks ago, however, Dr. Moore Neligan of Dublin informed me that on inquiring for Angustura bark at an extant and respectable drug-warehouse in that city, he got the spurious bark; which proved to have been part of a considerable stock kept in the establishment, since at least the beginning of this century, but never previously displaced. From specimens I owe to the kindness of Dr. Neligan, there can be no doubt of the accuracy of his observation; so that druggists ought to be aware of the possible risk, even in this country, of so arising an error."
There are at Munich three admirable old pictures in the Pinakothek (Cabinet iii. Nos. 35, 36, 37), assigned in the catalogue to John Van Eyck, which a writer in the ‘Kunstblatt’ (1841, No. 5) has attributed to Roger van Bruges; there are three of celebrated compositions by Dusseldorf, which were removed in 1805 to Munich. Joseph and his son Frans, who had adopted engraving as his profession, remained thither at the same time, and in 1806 Frans BRUILLOT was appointed assistant keeper of the royal library. He took up the business of engraving and devoted himself entirely to the study of prints and the history of engraving, and in 1817 he published, at Munich, in 4to., a Dictionary of the Monograms, &c. of artists—Dictionnaire des Monogrammes, Chiffres, Lettres Initiales, &c., to which, in 1820, he commenced the publication, in the same form, of a supplementary work, entitled ‘Table Générale des Monogrammes, Chiffres,’ &c., but which was never completed. His great work did not appear until 1835. By this time, the whole of which time was exclusively devoted to it. He visited the principal collections of France, Germany, and Holland, to the same end, and his occupations as keeper of the prints of the king of Bavaria, to which post he had been appointed in 1812, were for some time a regular part of his work. The complete work was published in Munich in three volumes, in 1832, in 33-34, under the title ‘Dictionnaire des Monogrammes, Marques Figurées, Lettres Initiales, Noms Angélos, avec lesquels les Peintres, Démêilleurs, Gravure, et Sculpteurs ont désigné leurs Noms.’ It was a work of immense labour, is very accurate, and is incomparably the most perfect work of its kind. In vol. i., containing the monograms, there are 3902 articles; in vol. ii., containing the chifres and letters, there are 1818 articles; and the work contains also facsimiles, cut in wood, of all the marks and letters, treated of, amounting to many thousands. BRUILLOT did not long survive the publication of his work; he died of the cholera in 1836, at Munich.

BRUNONIA, a natural order of plants belonging to Leguminosae and comprised of composite Exogomes. This order was defined by Robert Brown, and has for its type a genus which was named after him. He placed it as a section of the natural order Goodeniaceae, but it is raised to the rank of a natural order by H. K. Brongniart and Lindley. It has an inferior calyx in 5 divisions, with four bracts at the base. The stamens are inserted on a monopetalous corolla, with a few stamens. The flower is anisodactylous, with a single stigma enclosed in a 5-valved calyx; a membranous fruit (a utricle) enclosed within the indurated tube of the calyx; a solitary erect seed without albumen; and is monoecious, with a minute inferior red stigma. This order has been placed with all of which there are two species. They are herbs, native of New Holland, having flowers of an azure blue, which are on scapes, collected in heads, and surrounded by elongated bracts. A close path by BRUNONIA in Goodeniaceae, Lindley thinks essentially from the order in the superior 1-celled ovary and capitulate flowers, thus approaching some species of Disoeae, but differing in that of an involucel, the erect red ovary, superior ovary, and hairy corolla. The fruit is an isochasium, in the formation of the corolla, in the remarkable joint or change of texture in the apex of its filaments, and in the structure of the ovary and seed. Brown remarks that in the opposite parietes of the ovary of Pappus, there are, it is true, a number of non-functional corolla, which are continued into the style where they become approximated and paralole. This structure, so nearly resembling that of Compositae, seems to strengthen the analytical argument in favour of the hypothesis advanced in the present paper of the compound nature of the plants in that order, and of its type in phanerogamous plants generally; BRUNONIA having an obvious and near affinity to Goodeniaceae, in the greatest part of whose genera the ovary has actually two cells, with one or an indefinite number of ovula in each; while in a few genera of the same order, as Dampiera, Dipsaces, and certain species of Scrophularia, it is equally reduced to one cell and a single ovulum.

(R. Brown, Trans. Ross. xlii. 132; Lindley, Natural System, 406.)

BRUSSA, BRUSA, or BRUSAS (pecies), a celebrated town in the ancient province of Bithynia, now Kgı-ılı, in Asia Minor, lies in 40° 11' N. lat., 29° 26' E. long., and is situated on the northern foot of the Bithynian Olympus, in a most picturesque and fertile country. BRUS indicates by a dedication of the temple of Mars and Minerva, to the Mysian Olympua, which is the same as the Bithynian: it must not be confounded with Prusa, the Prusis of Stephanus Byzantinus, formerly called Chus (Kirc, Strabo, p. 563, Cæs.), of which city Prusas ad Hyposym, two towns which were likewise situated in Bithynia. Strabo (p. 564) says that Prusias was founded by Prusias, who carried on war against Croesus, and his statement deserves more credit than that of Pliny (Hist. Nat., v. 92), who says that it was built by Hannibal, alluding to the time when he was staying at the court of Prusias, king of Bithynia. Strabo's account is also followed or confirmed by that of Stephanus Byzantinus (v. Poëde), who calls Prusa a small town. The town rose only to importance by its capture by the king of Macedon, the first of the anarchists, who, with the assistance of the Osmanlis, which took it by capitulation a few weeks before the death of his father, in A. H. 736 (A.D. 1326). Fruus surrendered after a blockade of ten years, effected by means of two castles which Osmanlı built in the immediate neighbourhood, and the castle of Bubanjik, is still standing. This event took place towards the end of the reign of the Greek emperor Andronicus II.

Prusa, or as we shall now write it, Brusa, became the residence of Orkhan, and this sultan, as well as Must, I., Bayzid I., and Mohammed I., and several Turkish princes were buried in the new capital. The count of Nevers, a French prince of royal blood, and many French nobles who were taken prisoners in the battle of Nicopolis, were confined here. The Turks, however, regarded the capture of the Turkish empire to the capture of Constantinople in 1453, though during the last twenty years previous to this event the sultans used to reside at Adrianople. During several centuries it was the principal seat of Turkish learning, and its divines were notorious for their prejudices and asceticism; but its inhabitants are now distinguished for their toleration and hospitality towards Europeans. The population is about 35,000; one quarter of the town is entirely covered by the Turkish mosques, and contains several very fine buildings, among which the great mosque is the most remarkable; in the mosque of Dave Monasteri, rather a small building, is the tomb of Sultan Orkhan. There is a considerable trade at Kusadasi, silk, saffron, Angora wool, and other products of the country, and its carpets are renowned all over Turkey. There are several permanent European residents, mostly agents of German and Italian merchants. The port of Brusa is at Misdile, at the mouth of the Dardanelles, and many of the envoys of Brusa baffle description, but the principal features of the town as well as the envoys are the hot springs. The chief source is about a mile and a half west of the town; it rises out of a calcareous tuff or tufa, and is in the formation of which is still going on in some places. Hamilton found the heat of the water to be 184 Fahrenheit; about a hundred yards farther west there is another spring, the temperature of which is 180 Fahrenheit; and a few more yards farther west are several more in the neighbourhood, in some of which there is a considerable escape of sulphured hydrogen gas. The water of the springs unites in a warm state of a temperature of 97 Fahrenheit, which is inhabited by the Melangiae hestes, a species of frequent occurrence in the rivers of Asia Minor, but which prefers warm water to cold. Baths have been built at the two principal sources, which are much frequented by the Turks, and are used by the men and women on alternate days. In later years these baths have been visited by European patients, mostly residents of Constantinople.
BRUSBORCH. [Roter Domeister, P. C. S.]

The fundamental characteristic of the whole group of brushes is the vast diversity of their forms and qualities, adapted for use with the most different, brushes may be here considered under a few well-defined classes, to one or the other of which every article of the brush kind may be assigned. The kinds, though different, may be very different kinds, is distinguished by an obvious character.

The first great distinction is that between what may be called simple brushes, which consist of a single bundle or tuft of bristles, hairs, or vegetable fibres, whether large or small, and tufts, or tangles, which consist of small bunches, or tufts, separately inserted in a stock, foundation, or handle, of wood or other material, so as to act in combination with each other, but to present a mass of hairs or fibres of less solidity, to have a projecting fin on each side of the bush, or of brushing surface. Of what we here term simple brushes, an illustration is afforded by the kind of small brush used by artists under the name of a pencil, whether of camel's hair, or any other hairs. This instrument consists of a small tuft or bundle of hairs, carefully laid with their taper ends all in one direction, and having the opposite or root ends bound round tightly with thread. In order the better to secure the cylindrical tuft of hair thus formed, and also to afford convenient means of holding it to a stock or handle for use, the tuft or pencil of hairs is passed through a quill tube of a slightly conical shape, which has been previously softened and enlarged by wetting; the points of the hairs being temporarily bound together and passed completely through the quill, from the root end, while the quill being narrower at the tuft end, being larger than the point end, remains firmly fixed in the smaller end of the quill, which, as it dries, contracts upon the hairs with considerable force. As the quill is considerably longer than the portion of tuft or pencil left in it, its larger end forms a tube or socket for the reception of the pencil-stick. When well made, the hairs of such a brush should, if wetted, adhere together and terminate in a fine point; but if these ends are not together, the hairs being too tightly compressed by the small end of the quill, they will nozzle to, and the pencil is rendered unfit for delicate work. Hair pencil of this kind are made of every variety of size, from the smallest pencil or crow quill to the largest quills of the goose, turkey, or swan; and as even the largest quills are not large enough for some kinds of brush or pencil, while in other cases quills are not sufficiently strong and durable, thin tubes are occasionally substituted for them, the handle or pencil-stick used in the latter case formed of the same kinds of pencil made of bristle, or of the harder kinds of hair, for oil-painting, are usually mounted with tin, and are known by the general name of tools. For some purposes tin-mounted tools are made flat instead of round, the hairs being glued on in a layer, and the tuft or card being the form. The larger kind of bristle tools are not inserted in tubes, but are bound round very tightly and tied to the end of a wooden stick or handle, which is cut into a forked shape, so as to have a projecting fin on each side of the bush of hairs. The tuft or pencil being laid in between these projecting pieces, the whole is very firmly and closely bound round with twine or thread, which is subsequently smeared over with glue, with which red-lead is occasionally mixed.

In all the cases above mentioned the brush may be said to be inserted in the handle. The next class of brushes to be mentioned comprise such as have the handle inserted in the tuft or bundle of bristles or hair. Among these are the large painting brushes used by house-painters to take the bristles of which are first tied or wrapped round, with the smaller end of the conical wooden handle in their centre. The brush is then placed upon a block of iron perforated with holes to receive the handle, with the points of the bristles uppermost, and the conical handle driven in with considerable force until the greater part of its length has passed through the bristles to form the handle, while the thicker end remains in the middle of the tied portion as a sort of core. Such brushes are made in hollow cylinders of bristles, although when new they appear solid, or nearly so; and, although they seem to be held together only by the quantity of string wrapped round them, they really owe their firmness to the compression resulting from being driven in; but once the wrapping is completed. Excepting in the peculiar mode of tightening the bush by the insertion of the handle, carpet-brooms and birch-brooms resemble, on a larger scale, this kind of brush, to which, to distinguish them from tools, the name of brush, with some prefix descriptive of size or quality, is especially applied.

Intermediate between what we have distinguished as simple and compound brushes are a kind used by brush-makers and stainers under the names of stock brushes, or whitewash and distemper brushes, which may be described as consisting of two, three, or more simple bristle brushes placed side by side, or, in some cases, two or more brushes being inserted separately in holes bored in a stock or back of wood or other materials, there are two principal classes, distinguished by the mode in which the knots are inserted and secured. The tools which receive the knots are, in both kinds, usually bored in a lathe contrived for the purpose, in which the mandril, or axis to which the boring tool is fixed, projects in a direct line from the operator, and forms a right angle with, instead of, as in the common lathe, lying parallel to, the front of the bench. The former practice, which is still occasionally resorted to in boring the beads or stocks of large brooms, was to bore the holes with a bit and brace, the stock being, during the operation, firmly secured in an apparatus attached to the bench. The holes bored in this manner are, however, very ill-proportioned, and although the bored holes may not be parallel with each other, they may all be at right angles with the surrounding surface of the stock. The mode of making and fixing the tufts or knots in the kind of brush the man of pan-work or set-work, is as follows:—In making these, the brushe-maker takes in his hand, and arranges by striking their ends on a board or piece of marble, usually termed a drawer, behind the other end of the bundle presents an angle of clearness with, for the sides of the bush or tuft which will just enter one of the holes in the stock. Grasping these firmly with the fingers near the end which has been struck even, he dips that end into a pan of melted pitch, which, when necessary, is tempered with tallow or oil, and then severs the superfusible pitch by passing the tuft across the edge of a metal scraper; an action which also tends, by momentarily opening or flattening the bundle of bristles, to make the pitch penetrate into the heart of the knot. He then takes a pair of strong tongs, called a fros (usually the tongs of the two or three inches in length of a weaver's warp-threads, which, being short, would be useless for any purpose in which more than a few inches of thread is required), and quickly and securely ties and binds it round the bundle of bristles, or laid across the edge of the pitch, after which it is inserted in its proper bale in the stock with a peculiar twisting or screwing motion, which, coupled with the almost instantaneous setting of the pitch, renders it firm and secure. In this way we manufacture brooms, bannister-brushes, hearth-brushes, and many other kinds of house-brush, and also many of the lighter kind of brushes, such as the dusting-brushes used for pictures and furniture, which are technically called setusters, to distinguish them from the house-painters' brushes above described.

In most of the brushes hitherto described the bristles are used of their full length; or, if not so, the points, or, to use the term employed in the trade, the flags of the bristles are clipped off. Such brushes are termed short-brushes, and in colouring, and foruting, the ends of the bristles and knots must be made short and cut at their ends to a square or even surface, and the root ends of the bristles must be brought to the surface as much as possible, instead of the flag or taper ends. Clothes-brushes and some other brushes of this character are sometimes or have been occasionally made by the process last described, which, for fine work, may be varied by the use of various kinds of cement in lieu of pitch; but by far the more usual and usual practice is to clips off the ends of the brush after the process of drawing, by which all kinds of brushes comprised in our remaining genus of compound brushes are massfactured.
BRUCE

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The stock of a drawn brush is bored in a similar manner to that of a set brush, excepting that, to enable the operator to bore the holes with greater accuracy, both as to their relative position and the angle they may be required to make with the surface of the wire, a convenient provision is made to enable him to proceed the more rapidly with his work. The stock is, during the operation, attached by clamps to a ready-bored pattern of hard wood, the holes in which, though somewhat larger than those required in the stock, are arranged precisely in the desired manner. The axis of the holes is in an inclined position, with the required degree of obliquity. This pattern, however, is not used for boring the holes for knots inserted in an oblique position on bevels formed upon the edge of the brush, which is worked by the eye, and from the stocks of set brushes. After each knot-hole has been thus bored into the stock just as far as the knot is intended to go, and no farther, a smaller boring instrument, called a bore-through-bit, is fixed in the lathe, and with it a small hole is bored completely through the stock, in continuation of each knot-hole. The brush-maker then, instead of taking in his hand as many bristles as will fill the hole, takes about half that number, and passes a portion of their root ends, of a length somewhat exceeding the intended length or projection of the tuft, through the hole or loop of a fine and flexible wire, which, with the other hand, he has passed double through the stock from the small hole which penetrates it. Having done this, he gives a smart pull to the wire, the effect of which is to open the knot or tuft of bristles which will allow it to come, the knot itself being, at the same time, drawn into a hight or double, which enters the hole in the stock, and is drawn in until stopped by the end of the wire, or stock, the latter being the bore and commencement of the smaller hole produced by the bore-through-bit. Passing his wire, which is almost as pliable as thread, through the next hole, the workman applies another knot in like manner, and so on until a row is completed, when he cuts the ends of the whole row off with a pair of powerful shears, to which is attached by screws a gauge to regulate the precise length of tuft to be left. If the drawing has been skillfully performed, the shears will take off little or nothing but the root ends. If, after the last cut off from the flag ends are, in many cases, long enough to form a fresh series of knots. As these are inferior in strength to the knots formed of the root ends, they are either used for interior brushes, or are worked up in a row of knots just within the edge of the brush, where, having the heart or centre of the brush on one side, and the outermost row of knots on the other side, of root-ends, to protect them, they are somewhat shielded from wear. As the drawing-wires at the present time are perfectly white, they are very liable to injury, it is usual to cover them, even in the commoner kinds of brushes, with a thin piece of wood as a veneer. In scrupling-brushes, which are much exposed to moisture, the wood is shell, which resembles the ivory, and is of great assistance in protecting the hair from this precaution; but if the drawing has been properly performed, the knots will be so tightly secured in their holes as not to give way, even after the destruction of the wire, unless the brush be allowed to get too dry, so that both the stock and the bristles shrink. Drawn brushes comprise, together with many other varieties of brush, all kinds of scratching-brushes, shoe-brushes, clothes-brushes, and tooth and nail-brushes, although, from their small size and the greater neatness required in their workship, the latter form a distinct branch of the manufacture. As veneering would be a difficult operation to perform upon tooth-brushes, these and other small brushes mounted in bone or ivory are frequently drawn with silver wire, which is either left visible, or sunk in fine gold, and the latter is afterwards filled up with a hard red cement; but in the best sort a very ingenious process called tempering is substituted for the ordinary mode of drawing. In tempered work the dressing of the stock is most conveniently done by applying to the stock, but are formed laterally in its thickness, from the end or sides, in such a way that after the dressing, which is then performed with thread or silk instead of wire, is completed, all traces of the operation can be concealed by filling up a few minute holes in an un conspicuous part of the stock with small plugs of bone or ivory.

The operation of drawing, in the larger and coarser kinds of work, requires great strength of hand and arm, and is performed either by one of the preceding processes, or by having the stock held fast in a vice, with both the left hand they gather up and apply the bristles, and with the right hand, which is protected from injury by a leather shield, they work and pull the wire. Some workmen use no vice, but hold the brush between their body and the front of the bench, but this is a most injurious, and, for short brushes, also a very incorrect method. But for the finest kinds of brushes, in scratching, in washing and picking the bristles, and in various cases connected with the manufacture of fancy brushes, women are extensively employed; and as the manufacture is one usually conducted upon rather a small scale, so as to partake of the character of a domestician manufacture, it may be well adapted for the employment of females and children.

There are a few other kinds of brush, such as bottle-brushes, which consist of tufts fixed so as to radiate from a stem of wood, or sometimes from a stem of ivory, as shown in figure Ure, in his 'Dictionary of Arts.' p. 190, describes a new mode of fixing the knots or tufts of brushes in dovetailed grooves formed in the stock, which was the subject of a patent granted in 1800 to Mr. Mason; but as the plan has not, so he believes, realized any decided advantage, it does not claim further notice here. More recently a patent has been obtained by Mr. Hancock for the manufacture of flexible back brushes, in which the knots are attached to yielding backs of leather instead of wooden stocks, and for some purposes such brushes seem to possess considerable advantages over those of the common construction.

Of the materials employed in the brush manufacture the most important are various kinds of bristles, of which a very large quantity is imported from China, Russia, and Persia. The bristles are plucked from the animal they consist of various colours intermixed, but before use, and in some cases before importation, they are sorted by hand into the several varieties of colour termed in the trade black, white, and yellow, the former being the lightest of all; but, excepting in the case of illices, a bundle of any one of these kinds will be found to contain many shades or varieties of colour, which are carefully intermixed in the process of dressing whenever it is intended to use them together. In dressing, the bundle is usually opened out, and combed with an instrument resembling a wool-comb, and, when a further separation of tints is not intended, the darker and lighter bristles are distributed as equally as possible among each other by hand. The process is continued until those operations the root-ends are carefully kept together, and in the dressing the bristles are separated into lots according to their length. If intended for fancy purposes requiring great neatness, the dressed hairs are subjected to the process of picking, which is performed either by children, in which every hair that differs much in colour from the mass is picked out by hand. Some bristles are also scorched or bleached, by which process they may be rendered almost without blemish, and the consequent appearance of the hair is often produced by the insertion, in one brush, of knots of picked bristles of various colours; and it is a common practice to put white or yellow bristles at the outside of a brush intended for ||

The genus BRYUM belongs to the natural order of Mosses. It has a terminal footstalk; double peristome, one of 16 teeth, inner one of a membrane cut into equal segments with filiform processes often placed between them; the calyptra dissimilis. The species of this genus are
exceedingly numerous. They are found in great abundance in Great Britain. They are all very small, produce a large number of capsules, and are found growing in wet places. The flowers of larger plants to miniature. In B. palustris are found terminal capitular bodies which resemble what are called the anthers of B. Androgynum; but in B. palustris they are considered parchment, and arise not only from the main stems, but also from the lateral ramifications.

(Loowon, Encyclopaedia of Plants.)

BUCKLANDIA, a lilaceous (?) fossil plant from the Stonesfield oolite.

BUDDLEIA, a genus of plants named after Adam Buddle, a botanist of the time of Ray, who contributed to Ray's 'Synopsis,' and whose Herbarium is now in the British Museum. Buddle belongs to the natural order Scrophulariaceae. It has a campanulate 5-tubed calyx; tubular corolla with the limb 4-lobed, equal, spreading; 4-5 stamens, the anther divided into two parallel distinct cells; the stigma clavate, 2-lobed; the capsule crustaceous with a dissection formed from the infixed edges of the valves, inserted in the thick spongy placenta; the seeds angular; testa loose, membranous; albumen fleshy. The species are shrubs, with mostly quadrangular branches, opposite leaves; terminal, capitate, spicate or panicked, usually orange-coloured flowers.

B. globosa has branches clothed with hairy tomentum, as well as the leaves. The flowers lanceolate, acuminate, petiolate, crenate; the heads terminal, globose, pedunculate. This plant, now so common in our gardens, is a native of Cibit.

B. Americana, branches clothed with hairy tomentum, lanceolate, acuminate, narrow at the base, crenate, rather pilose above, but clothed with a yellowish tomentum beneath; spike panicked, flowers glomerate. It is a native of the mountains of Peru, and also of the West Indies. Brown says that it is used in Jamaica as an emollient. Its properties however are not active. There are about sixty species of Buddleia, all of which are worth cultivating on account of their showy blossoms. B. Neomedia, a native of the peninsula of India, is said to be one of the most beautiful plants of that country. The B. globosa will bear with a little care our winters, as well as the B. salicifolia. All the flowers are sweet-scented. They growbest in a light rich soil. Cuttings will strike readily under a hood-glass. Those of the stone species require heat.

(Loudon, Encyclopaedia of Plants; G. Don, Gardener's Dictionary.)

BUOY LIGHT is a flame producing a strong illumination, and is now the means extensively employed in lighting churches and other great buildings. Originally it was obtained from an oil-lamp, the flame from which was acted on by a current of oxygen gas; subsequently oil-gas was substituted for this; but now the gas used for most of the streets of towns is employed to produce the flame, and the brilliancy is increased by a current of atmospheric air ingeniously introduced. This is designated the Atmospheric Buoy Light, and it is the result of numerous experiments made by Mr. Goldsworthy Gurney, of Buoy in Cornwall, who is also the inventor of the oxy-hydrogen light which is used with the microscope of that name.

The apparatus being suspended from the ceiling, the gas, either as it comes from the street or purified by chemical processes, passes up a number of short tubes into concentric annular receivers, the upper surfaces of which are pierced on the whole of their circumference with small holes. On issuing from the perforations the gas is ignited, and thus the gases of the cylinders are burned in the air. The gas in between while between and round the exterior of the cylinders the atmospheric air rises from below to support the combustion: a hollow frustum of a cone, of glass, open at both extremities and having the form of a truncated pyramid, forms the above mentioned; its lower part resting on the base of the framework within which they are suspended, and its upper part approaching very near the bottom of the flame, so that the atmospheric air rising in the conical form between the upper part of the cylinder and the flame. The distance between the cone and the rings, and between the rings themselves, are regulated by experiment so that the quantity of air may suffice to bring the temperature of the gas to an exactness necessary air cannot be obtained from the charcoal from the flame, as nearly as possible at the moment that the latter issue from the perforations: the flame from each interior ring serves to augment the heat of that which is on the exterior of it, by which means an increased intensity of light in each is produced; and almost the whole of the light which emanates from the interior rings passes through the flame, which, in turn, into the apartment.

A cylindrical glass chimney rests at its lower extremity on the margin of a circular aperture in the middle of a circular disk of iron, from 18 inches to 2 feet in diameter, the under surface of which serves as a reflector. A machine of this kind supersedes the employment of many separate lamps; and, being placed at a considerable height from the floor, it is possible to apply above the glass chimney a piper, which, by adjusting the screws, will conceal the upper extremities of the flame; and thus the latter presents the appearance of a brilliant zone of white light, which is from three inches to six inches high, according to the position of the gas.

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BUILDING, or the art of constructing edifices, is defined by the ancients as the art of doing, or containing several and different conceptions of architecture; but, without a previous explanation of the meaning of the term architecture, such a definition is imperfect, since, although building is necessarily included or involved in the consideration of all architectural works, many of the works produced by the architect and the architect's helpers would not be considered as architectural works. In the practice of civil architecture, the builder comes between the architect who designs the work and the artificers who execute it. In a large commercial point of view, between the party by whom the capital is provided on the one hand, and the merchants and manufacturers who provide the necessary materials, and the workmen whose offices it is to shape and unite them, on the other. For the temporary employment of his own capital and the exercise of his directing skill, he is usually remunerated by charging his employer for labour and materials at a higher rate than he has paid himself; and, for the mutual security of all parties, he generally works by contract, either undertaking to execute the building, with all contingent works, for a given gross sum, which is termed a lumping contract, or agreeing to perform the whole work at certain specified rates per yard, rod, foot, and as such, according to the nature of the work, the quantities being measured by the several ways of measuring.

An article upon the multifarious operations connected with building would not only require more space than is consistent with the plan of this work, but would also involve the repetition of matter contained in a preceding article. Such a general treatise is supplied in the long and elaborate article Building, in the new edition of the Encyclopædia Britannica, contributed by Mr. Hoekling; a treatise which may be consulted with advantage by those who wish to go very fully into the subject. Here we propose to do little more than give such an outline as may enable the reader to turn readily to those portions of the work in which the various branches of the general subject are treated of.

An abstract is given in the next article, to illustrate the present article. The subject of domestic architecture, which is it all-important for a builder to be well acquainted with, is treated at some length. From the last-mentioned article it will be evident that the attention of the builder should be directed rather to matters of utility and comfort than to such as relate to ornament; and the most beautiful walls that this world has seen, are those of the truest and most profound and religiously to cold winds. A good supply of water to the house, and sufficient fail to ensure perfect drainage, are essential; and as a general rule, the advantage of southern and western frontages should be secured as much as possible. The direction of the prevalent winds is a point to be carefully considered, in order that the openings of doors and windows may be so arranged as to avoid drafts and smoky chimneys, which are not unfrequently occasioned by want of due attention to the matter. [Smoke, P. C., 156.] Such points being duly considered, drawings of the intended building, showing not only its exterior form, but also its interior arrangements and the substance of its walls and partitions, as explained under Design, Architecture, and its parts, are necessary. It has been shown in which the actual construction commences by the preparation of a firm foundation for the structure, as described under Foundation, P. C., p. 383. The excavation formed for the foundation walls is about to the depth at which level must be produced by the removal of earth until an even surface is produced; the production of a level by filling up hollows with loose materials is extremely hazardous. For the mode of laying foundations under water see Cowperham, P. C., p. 410.

The articles Brickwork, P. C., p. 410, and Mortar, P. C., p. 419, contain information on the construction of brick walls, but the provisions of the new Metropolitan Buildings Act of 1875 require that such walls must be built of bricks, unless it is necessary to substitute for the directions given under Brickwork, relative to the thickness of walls, the following new regulations for the thickness of external and party walls of dwelling-houses. First-rate buildings, which are such as range from 70 to 85 feet in height, cover more than ten, and not more than fourteen squares, or areas of 100 superficial feet, or contain more than 700 square feet of the floor, are to have their external walls at least 17½ inches thick from the top of the footings of the foundation up to the under side of the floor next but three below the topmost floor, that is to say, in a seven-storey house, the full height of the basement floor, and the three floors above it. From the under side of the floor next below the topmost floor, a further height of three stories, the thickness is to be at least 17½ inches; and the remainder of the wall to the top at least 13 inches thick, in a house less than 100 feet long. In a house which is wider than 100 feet long, the party walls is precisely the same as that of the external walls; but in buildings exceeding 85 feet in height, covering more than fourteen squares, or containing more than seven stories (which buildings are considered as extra first-rate), the thickness of 21½ inches is to be carried up to the floor next but two below the topmost floor, and that of 17½ up from that point to the top of the building, in the external walls, and the party walls must be at least 21½ inches thick from the footing to the floor next but three below the topmost floor, 17½ inches from this point to the under side of the topmost floor, and 18 inches from the topmost floor to the top of the wall. Second-rate buildings, which are such as range from 52 to 70 feet in height, cover from six to ten squares, or contain from four to six stories, must have the external walls at least 17½ inches thick from the footing to the under side of the floor next but one below the topmost, and 18 inches above that point to the top. Third-rate buildings, or such as range from 38 to 52 feet in height, cover from three to four stories, or contain five stories, must have their external walls at least 17½ inches from the footing to the floor next but two below the topmost floor, and 18 inches thence to the top of the wall, and their party walls the same, excepting that from the topmost floor to the top of the wall, the thickness is not to be reduced to not less than 8½ inches. Fourth-rate buildings, or such as do not exceed 38 feet in height, do not cover more than four squares, or contain more than four stories, must have their external walls at least 13 inches thick from the footing to the under side of the floor next below the topmost, and at least 8½ inches thence to the top of the wall, while the party walls must be at least 15 inches up to the floor next but one below the topmost, and 8½ inches above that point. Thus a four-story house, if not more than 85 feet in height, or covering more than four squares, must have its external walls 13 inches thick for the full height of the basement story and the next story above it, while in the party walls the thickness is not to be reduced to less than 7 inches. Buildings of the second class are divided into four rates, according to their height; those exceeding 66 feet in height being deemed first-rate, those from 44 to 66 feet second-rate, those from 22 to 44 feet third-rate, and those not exceeding 22 feet fourth-rate. First-rate buildings of this class must have both the external and party walls at least 26 inches thick from the top of the footings to within 76 feet of the height of the topmost ceiling, 17½ inches thick from within 76 feet of the topmost ceiling, and 17½ inches above that point to the top of the wall if it be an external wall, though in the case of a party wall the thickness may be further reduced to 13 inches above the top of the floor next but one, or the second-rate must be, whether external or party walls, 21½ inches thick to within 58 feet of the topmost ceiling, 17½ inches to within 22 feet of the same, and 13 inches above that point. Those of the third-rate must have their external walls at least 28 feet of the topmost ceiling, and 13 inches above that point, and their party walls 13 inches thick above that point; the party walls being the same, excepting that above the level of the topmost ceiling they may be reduced to 8½ inches; and those of the fourth-rate must have their external walls 13 inches thick above that point, and the party walls of the same thickness to within 9 feet, and the party walls of the same thickness to within 16 feet of the topmost ceiling, the upper portion of the
wall, in each case, being at least 3½ inches thick. The substance of the trusses of the walls of buildings belonging to the third or public class is to be computed by reference to the rate of such buildings of either the first or second class as they may most nearly resemble, four inches being in every case added to the thickness directed for such first or second class. In the case of a small church or a large house, which may be placed in the middle of the street, the area is to be computed by reference to the house or building of the next larger class.

The Laing Act, Sir, provides, as the means of counteracting such advantages in the brickwork of the fingers, a flat piece of flag-stone in such a manner as to form a dipping-rose resembling that shown in Scaithorpe, Fig. 4, so that no water can escape until the wall is filled, and no air can pass the wall. This is, truly, the best method, and if dry is to allow it to pass under the edge of the dipping-rose.

As the erection proceeds, contrivances for supporting the workmen and materials are required, of which an account is given under Scaithorpe, P. C., p. 437. Under Watten, 248 P. C., p. 313, allusion is made to a very convenient apparatus invented by Dr. (there misprinted Mr.) Spurin, for lightening the labour of raising bricks and other materials to a second floor. In the basement story of a building, the partition wall as well as the external walls or part of it is generally formed wholly of brickwork, but in the upper stories they are generally of plaster and plasterer, on a framed and plastered foundation, or of what is technically called brick nogging; this does not prevent much timber being used for plaster and plasterer, but having the intermediate space between the timbers filled up with brickwork, thus forming a wall either 4½ or 5 inches thick, according to whether the exterior wall is 4½ or 5 inches thick.

The upright quarterings or timbers, the brickwork, being so close, should be strengthened or bonded further by the introduction of iron bars or rods, at intervals of not more than six courses, of horizontal iron bars called intees, or nogging-pieces, skew-called at each end to the quartering timbers, and thus, in the passage of half-brick, or 4½ inch, walls carefully built in cement, are strengthened with iron hooping, a plan which has the advantage of greater security from fire. Such partitions also check, more effectively than timber, the transmission of sound from one room to another. The joints of brickwork in internal walls, and in such external walls as are to be covered with plaster, stucco, or cement, are left rough, with the mortar projecting from the joints, because the inequality of surface thus produced admits greater ventilation of the walls than if all the mortar were made smooth. The beds of mortar between the bricks is not only injurious from the settlement thereby occasioned, but also because the compression of the mortar causes it to bulge out at the joints, and so to counteract the effect of drawing with the trowel. The mortar, instead of preserving the joints, absorbs both the moisture of the air and the rain which trickles down the wall, and when it freezes comes this absorbed moisture freezes and occasions the mortar to crumble away, thus involving the necessity of pointing, or filling in the joints with new mortar, to preserve the wall.

To do this, the old mortar must be scraped out to a depth of three-eighths of an inch, or further if needful, and the joints must be thoroughly cleansed and moistened before inserting the new mortar, which should be of the best quality. The heads and tails of the bricks are thus covered with a bed of good cement, and Forced ashes, which give it a blush tint, and renders it better to resist injury from weather. Cement is sometimes used for the purpose in lieu of mortar. If the work be required to be done in a narrow space, or between parallel ridge of fine white putty or mortar, made principally of bone-lime. In the application of this kind of pointing, which is termed buck-pointing, to an old wall it is usual to wash and colour the whole surface of the brickwork; and in narrow passages or walls of stone, a far better effect is produced if thin strips of red or blue mortar which should come in a line over each other, technically called the perpends, have been properly attended to, the misplaced joints may be filled up with brick-coloured putty, and the junctions made in the plain plaster. For mortar used in the setting, or internal plastering, of brick chimney flues is mixed with a little cow-dung, to prevent its peeling off from the heat. The top of a brick-wall, whenever it is not covered by the roof, must be protected by coping [Cowper, p. 501], which in single-brick walls is often formed simply
by a row of bricks set on edge in cement across the wall, and called a *bâche-course*, a name which is also given, with more propriety, to the projection of a row of lapper-tile. Bâche-Course, P. C., p. 450.] This kind of coping is very imperfect, because, as it has no projection or inclination, it does not tend to channel off rain, and may be washed off by waves, and hence the appearance and efficiency by laying underneath the bâche-course two double courses of plain tiles, with their joints broken, and their edges projecting about an inch and a half on each side of the wall, or by a similar application of paving-tiles, if the wall is of brick. The courses may be made of any width, and properly sloped or weathered and threated, is far better. For ornamental brickwork proper coping-bricks are made, which if well set in fine mortar or cement may be equal, if not preferable, to any other character. It may be remarked generally that brick walls often suffer injury in consequence of the insufficient projection of copings and cornices, which ought to throw off water as much as possible from the face of the wall.

The established mode of measuring brickwork is explained under *Brickwork, P. C.* Brick and tile paving, which are noticed under *Floor, P. C.*, are measured by the superficial yard of nine feet, and tiling, for which see *Roof, P. C.*, and *Tiles, P. C.*, p. 446, by the square of 100 superficial feet.

Of the use of stone in building some account has been given under *Masonry, P. C.*, p. 481; *Ashlar, P. C.*, p. 451; and *Rutified Work, P. C.*, p. 271. Rutified-work is more difficult and expensive than brick, and, above all, not equally durable, and, since there is great danger of trusting too much to the mortar. Unwrought stones, however irregular in shape, ought to be so laid together that the wall would stand if laid to a considerable height without mortar, but the joints should be so made as to be desirable to give the outside of a rubble wall as neat an appearance as possible; but care must be taken in doing so to bond the facing stones as thoroughly as possible with the centre of the wall, and not, for the sake of show, to expose the bed of the stone, or the flat surface formed by its sacrifice, in the face of the wall, as a stone so applied cannot be firmly bonded into the wall, and its flat surface is far more liable to injury from the action of the atmosphere than a surface cut at right angles to the flat. But it may be desirable to bond the wall by means of many stones extending partly through its thickness, alternately from each side, than to use a few thin, large, or stones reaching completely from face to face, and yet leave the greater part of the wall like two shells inclosing an irregular core of coarse rubble. Stone copings and some other kinds of stone-work are frequently cramped together with fastenings of iron or copper, run in with melted lead; but unless these metal fastenings, especially those which are wholly exposed to the effects of the atmosphere, are liable, from oxidation and the effect of changes of temperature, to produce much harm, and therefore it is better, if possible, to use tenons, dovels, joggles, or dovetails of stone or wood, protecting them also from the weather by means of building-up of roofing, as in the case of ornamental rustic-stones, is described under *Blackfriars Bridge, P. C.*, p. 485. The principal purposes for which stone is introduced in brick buildings are enumerated under *Masonry, P. C.*, to which we need only add that the setting of stone window and door sills is usually delayed as long as possible, to give the brickwork time to settle, because a very slight inequality in the settlement would cause them to break, being long and thin. The brittleness of stone, indeed, renders it necessary, with a plastered surface, to give it all possible of bearing, and very important to make the joints perfectly even. In the joining of columns, for example, the ends of the adjacent stones must not be worked hollow, with a view to be bedded directly into a bed of mortar, but, if so arranged, the best plan is to work them flat, and insert a thin sheet of lead between them, cut a little smaller than the column itself, thereby leaving a small open joint all round, to be filled up with fine putty. Stone walls are usually measured by the perch of 31 superficial feet, though this may be less, and a stone wall containing 314 cubic feet; but sometimes the rod is used as a measure, as in brickwork, assuming however a thickness of 18 inches instead of 13 inches, being 3d. in stone and earth. Houses built of flints, which can only be used to advantage in certain localities where that material abounds, necessarily depend much for the cohesion of their walls upon the strength of the mortar, and on the building of coursed work of brick or stone, and of quoins or angles of the same. When been well executed, the appearance of flint buildings is far from pleasing, but by little management of the contrast afforded by the white outside and black centre of the flints, may be made absolutely ornamental. Building with compressed earth, or building *en Pâé*, is a very old and simple and even elegantly managed, durable mode of building, which has been long and extensively practised in some parts of France, especially in the neighbourhood of Lyons, and has been adopted in this country not only in the construction of large rooms, but also in the constructing cabins with mud tempered with straw, and held together with wooden and timber framework, but also in lieu of regular brickwork. In vol. xxvii. of the Transactions of the Society of Arts, pp. 1797, is a minute description, illustrated by a plate of the apparatus employed in this improved mode of constructing this kind of work, invented by Mr. Robert Salmon, of Woburn. The foundations, and the walls to a short distance above the ground, are built of stone or brick, but all the upper part of the walls consists simply of earth, beaten or rammed into a compact mass between three and four feet thick, which is fastened in such a position that their inner surfaces correspond with the faces of the wall. The work proceeds in courses, and each course in portions of convenient length; the labourers underneath the course serve as a sort of dam by bolts that they may be readily separated from one another, and from the completed portion of wall, and put together again in the required position for forming another portion of wall. The walls were constructed with materials so small, that every portion may be very completely examined, and it is thrown in, a little is drawn away from the surface of the mould, and its place supplied by a facing composition, consisting of about one-fourth lime and three-fourths of the earth. For walling the doors and windows, the mortar, rather than the mortar, but allowed to dry and pulverize before it is rammed in this facing composition, which is applied about an inch thick, forms a cement-like face to the wall, which preserves the earth from the access of moisture. When made, this course of one course of earth has become hard before another is added to it, a little thick grout of lime and earth is added to facilitate the adhesion of the new and old work. Mr. Salmon observes that the earth for this work 'should be neither sand nor clay, but very gritty, 'to avoid the first, and to partake of both,' clay, he adds, being more durable, and much more compactible, as is also chalk or calcareous earth of any sort. Sand is also not proper, unless accompanied with some binding quality: the bolder and coarser the sort of earth the better. When used, it should retain no more moisture than just to make it adhere together under the pressure of the thumb and finger.' Earths containing a mixture of grit or fine gravel he considers generally the best. Bond-timbers, wall-plates, and all other pieces of wood inserted in the walls are, kept as thin as may be, to prevent the entrance of moisture in all cases, and the openings for windows may be conveniently formed by the insertion of temporary frames of stout planking, against which the earth is rammed as against the mould. In this description the reader is referred to *Building*. At Woburn, with labourers at 1s. 10d. per diem, Mr. Salmon found the expense of a 16-inch wall to be about 2s. 8d. per superficial yard if faced and finished on one side only, and 3s. 3d. per yard if faced and fastened on both sides; while the value of a superficial yard of brickwork, 14 inches thick, would have been more than 10s. at the same time and place.

The walls may be finished externally by limewashing, and, if intended to look very neat, wetting and rubbing the surface with a mixture of coarse sand, until it is smooth and even. A full account of the French mode of executing this kind of building is given in the sixteenth volume of the 'Dictionnaire Technologique' (Svo., Paris, 1829), art. 'Pâé, Pâé', and in a brief note in the *Dictionnaire de l'Industrie* (Svo., Paris, 1795), article 'Murs, Écluses, Économies,' are some remarks respecting the meaning of the term *Pâé*, or, as it is sometimes written, *Pâte*. If the projection of the roofs be sufficient, and other precautions are taken to keep the walls from being exposed to wind, this mode of construction of two or three stories in height, and they will prove very durable, many such buildings in France having stood more than a century without any symptom of decay. Respecting the means of preventing any kind of drawback, whether arising from the foundation or not, some information is given under *Asphalte, P. C.*, p. 144. Double walls, in which a space is left between the external brick or stone wall, and the lining of the room, of whatever kind it may be, are sometimes resorted to as a means of preventing the passage...
of dams, and a simple mode of producing the same effect, which answers well when great strength is not required, is accomplished by the use of bricks laid on their edges instead of their flat sides. In a single brick or 9-inch wall of the ordinary construction there are no hollow spaces, because, the bricks being laid with the width of the stretcher, being 4½ inches, it is equal to the length of the headers, that is, to say, 9 inches. If, however, the bricks be laid on edge, but otherwise disposed in the same way, while the headers are of course, of the same length, the width of the space between the edges of each brick at the face of the wall they will leave an intermediate space of 3 inches. Of course a lesser number of bricks will be required to produce an equal surface of wall by this than by the ordinary mode of laying.

Of the various departments of building relating to Carpenters and Joiners, brief notices will be given under those heads in P. C. S., with references to the various articles relating to them in P. C. Here it is only needful to observe that the portions of a building supplied by the carpenter should be so contrived as to strengthen and bind together the whole structure. The Roof, especially, of which a full account is given under that head in P. C., should contribute greatly to the solidity, as well as to the appearance of the principal portion of a house. In London houses, owing to the great value of space, slp., and rooms are very often formed in roofs; and in certain cases, when the ridge of the roof is made parallel to the front of the house in order to secure as much interior depth as possible, the front should be turned, that the back of the house is covered by a covered trough passing through the apartment formed in the roof, so that the fall of water from the roof may be equal towards the front and back, the pipe for conveying this water being made to pass safely under the roof, or to the fire. The provisions of the New Building Act respecting such rooms are alluded to in the next article. For the external covering of walls in which the brickwork is coated by a stoney-like composition, see Scarborough, p. 160; and for the lining of walls, the formation of ceilings, &c., see Plastering, P. C. S. Internal decorations are treated of under Painting, House, P. C., p. 145, and Paper Hangers, P. C., p. 215. More specific information respecting the various parts of a building will be found in such articles as Spacious, Door, Window, Arch, and Dome, in P. C., and Chimney, in P. C. S.; and under Fireproof Buildings, P. C. S., will be noticed some important deviations from the ordinary mode of building, in order to diminish the risk of fire.

BUILDING, ACT FOR REGULATING. Provisions for regulating the construction of buildings are generally introduced into acts for the improvement of towns. To permit buildings to be raised to a height and extent of streets, would be to sacrifice the public welfare to the caprice or convenience of individuals. There is no general measure ensuring uniformity of regulations for buildings throughout the country. In the session of 1843 the Marquis of Normanby, then a member of the government, moved for the better Drainage and Improvement of Buildings in large Towns and Villages, but it did not pass; and a bill of a similar nature was unsuccessful in the session of the following year. In the session of 1844, however, an act was passed (7 & 8 Vict. c. 84) entitled "An Act for Regulating the Construction and the Use of Buildings in the Metropolis and its Neighbourhood" and this measure, though applicable at present only to London, promises to be an important step towards the uniformity of regulations concerning certain modifications it will probably be extended to other places. The act came into operation on the 1st of January, 1845. London has had Building Acts ever since the reign of Queen Anne, but none of these were so complete as the present, and the provisions of it were calculated to check the spread of fire. The last Building Act, commonly called Sir Robert Taylor's Act (14 Geo. III. c. 78), was passed in 1774, "for the further and better regulation of buildings and party walls, and for the more efficient means of preventing and putting down fires, and for the placing of buildings of certain sizes within the Inns of Court and Westminster, and the liberties and other places within the bills of mortality, and to the parishes of St. Marylebone, Paddington, St. Pancras, and St. Luke's, Chelsea." The administration of the act was confided to district surveyors, each of whom had independent authority within his own district; but the magistrate at the nearest police-office might enforce or, not at his own discretion, the decisions of the surveyor. The technical regulations of this act were many of them, generally speaking, of so impracticable a nature that their evasion was connived at by the officers appointed to superintend the execution of the law; and it did but encourage the building of imperfect buildings in districts which have become a part of the metropolis since it was passed. Whether the new act (7 & 8 Vict. c. 84) contains regulations equally impracticable remains to be seen. Some of them probably are of this nature, as may be expected in attempts to legislate on technical matters of detail. However, the object of the act is excellent, and any defects in carrying it out may be corrected without much difficulty. The removal of sources of danger and disease in crowded neighbourhoods, and the enforcement of the provision for second tier in itself both wise and benevolent. The window tax will prove a great impediment to the act being fully carried out in several respects.

Some of the objects of the Metropolitan Buildings Act may be inferred from the preamble, which is as follows:—Whereas by the several acts mentioned in schedule (A.) to this act annexed provisions are made for regulating the construction of buildings in the metropolis, and the neighbourhood thereof, within certain limits, it is humbly suggested that plans have since been extended in nearly continuous lines or streets far beyond such limits, so that they do not now include all the places to which the provisions of such acts, according to the purposes thereof, ought to apply, and more such plans have been or are likely to be made; and whereas such plans and provisions for extending beyond such limits, and otherwise to amend such acts: and forasmuch as in many parts of the metropolis and the neighbourhood thereof, the drainage of the houses is so imperfect as to tend to make provision for facilitating and promoting the improvement of such drainage; and forasmuch as by reason of the narrowness of streets, lanes, and alleys, and the want of a thoroughfare in many places, the due ventilation of crowded neighbour- hoods is often impeded, and a host of the inhabitants thereby endangered, and from the close contiguity of the opposite houses the risk of accident by fire is extended, it is expedient to make provision with regard to the streets and other ways of access to the houses of the inhabitants, it is also expedient to regulate the height of buildings, forasmuch as by the carrying on in populous neighbourhoods of certain works, in which materials of an explosive or inflammable kind are used, the risk of accidents arising from such works is much increased, it is expedient to regulate not only the construction of the buildings, but such works as may also be permitted to be used either for habitation or for trade in populous neighbourhoods; and forasmuch as by the carrying on of certain works of a noisy, smoky, or offensive nature, or of such kind as are likely to produce wonder and abhorrence, the health and comfort of the inhabitants are extensively impaired and endangered, it is expedient to make provision for the adoption of all such expedients as either have existed, or shall be devised for carrying on such businesses, so as to render them as little noisome or deleterious as possible to the inhabitants of the neighbourhood; and if there be no such expedients, or if such expedients be not available in a sufficient degree, then for the carrying on of such works, as far as possible, they are prohibited, and forasmuch as great diversity of practice has obtained among the officers appointed in pursuance of the said acts to superintend the execution thereof, and for improvements in several districts which such acts apply, and the means at present provided for determining the numerous matters in question which constantly arise tend to promote such diversity, to increase the expense, and to retard the operations of persons engaged in building, it is expedient to provide for the appointment of officers to superintend the execution of this act throughout all the districts to which it is to apply, and also to determine in what manner and form such officers are to exercise in certain cases, and under certain checks and control, a discretion in the relaxation of the fixed rules, where the strict observance thereof is impracticable, or would defeat the object of this act, or would needlessly affect with injury to the course and operation of this branch of business: now for

* These acts are 4 Geo. III. c. 7, partly repealed; 80 Geo. III. c. 7, wholly repealed; and 3 & 4 Vict. c. 85, repealed so far as it relates to houses and buildings.
all the several purposes above mentioned, and for the purpose of consolidating the provisions of the law relating to the construction and the use of buildings in the metropolis and its neighbourhood, be it enacted, &c.

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may be made without a good and sufficient drain leading to it. A drain under any building lining must be made air-tight. Privies built in the yard or area of any building must have a door and be otherwise properly enclosed, screened, and fenced from public view.

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the building, and by the referees at quarter-sessions for other parts of the metropolis. In all cases of dispute or difficulty the official referees appointed by the Secretary of State and the Commissioners of Woods and Forests will determine the matter, in cases, however, in which such referees have not been appointed by the occupier of the land, the minister of the parish of Kensington; and to all such parts and places lying on the south side or right bank of the said river, as are within the exterior boundaries of the parishes of Woolwich, Charlton, Greenwich, and New London, and within the environs of the City of London, the Liberties of Westminster, St. Barth, Streatham, Tooting, and Wandsworth; and to all places lying within two hundred yards from the exterior boundary of the district hereby defined, except the eastern part of the said boundary, which is bounded by the river Lee.

But it is hereby enacted that no petition in council to extend the above limits to any limits within twelve miles of Charing Cross, notice of such extension being published in the 'London Gazette' one month previously.

The exclusive of any building or other place in which buildings in a ruinous state may be situated, are required to apply to the official referees to authorize a survey to be made thereof. A copy of the surveyor's certificate is to be forwarded to the overseers (or to the lord mayor and aldermen, if within the city of London), and they are required to cause such ruinous building to be securely shored or a sufficient board to be put up for the safety of all passengers; and they are also to give notice to the owner to repair or pull down the whole or part of the building, if the owner does not within twenty days from the receipt of the surveyor's certificate, or the receipt of the official referees, and if the owner refuses to repair or pull down premises certified to be in a ruinous state, this may be done by the overseers, or in the city by order of the lord mayor and aldermen; and the materials may be disposed of to pay the cost of the work; and it is hereby enacted, if any failure occurs; and if any surplus remains, it is to be paid to the owner. But if the proceeds from this sale of materials are not sufficient to cover the expenses, the deficiency is to be made up by the owner of the property, and may be levied under warrant of distress; and if there are no goods or chattels to levy, the occupier of the premises may be required to pay, and he can deduct the amount from his rent. The same course which the act directs as to buildings in a ruinous state may be pursued as to every building, yard, or space, of whatever description, so far as relates to repairing or making them secure. If the projection be from the front walls of any building and be in danger of falling, the occupier, or if not the occupier, the owner, may be required to take down or secure the same within thirty-six hours; and a penalty of five pounds is incurred for every day during which the projection complained of is allowed to remain unrepaired or in a dangerous state.

The subject of party walls, party fences, and intermixed buildings is regulated by §§ 20 to 29, and the following provisions are made as to their reparation, pulling down, or raising. If the consent of the adjoining owner is not obtained, notice must be given to him three months before the work is commenced, and a written application to the official referees for such a modification of the work as will render it suitable to his premises. If the consent of the adjoining owner cannot be obtained, the matter is to be referred to the surveyor, and the official referees may order or confirm his certificate, and award the proportion of expenses, &c. The decision of the official referees is to be final and conclusive.

The 51st clause provides for a proper drainage. Before the walls of any building shall have been built to the height of a line of four feet, drains must hereby be made and made good leading into the common sewer, or if there be no sewer within one hundred feet, then to the nearest practicable outlet. If there be a common sewer within fifty feet of a new building, the drains must be made good leading into it. A drain under any building lining must be made air-tight. Privies built in the yard or area of any building must have a door and be otherwise properly enclosed, screened, and fenced from public view.
other parts of the building, every room used as a separate dwelling must be of at least the height of seven feet from the floor to the ceiling. 

§§ 54 and 55. How the restraint and eventual removal from populous neighbourhoods of trades which are dangerous, noxious, or offensive. Businesses dangerous as fire must not be nearer than fifty feet to other buildings; and new businesses of this character must be forty feet from public ways. Permits to erect buildings to exist or newly carry on such businesses within fifty feet of other buildings or forty feet from public ways; and all such businesses now carried on within the distances limited by the act must be given up twenty years after passing of the act. A penalty of five shillings is imposed for building in the neighbourhood of any such businesses, and 50l. per day for carrying on businesses of a dangerous kind contrary to the act. The persons offending may be imprisoned for six months if the penalty be not paid. The businesses of a multidriller, bont-boiler, fellmonger, slaughterer of cattle, sheep, or horses, soap-boiler, tallow-melter, tripes-boiler, and any other business offensive or noxious, are subject to similar regulations as those deemed dangerous as to fire, and are to be discontinued at the end of thirty years after the passing of the act. Traders deemed nuisances may be removed by purchase at the public cost on memorial by two-thirds of the inhabitants, and on the issue of an order in council. Public gas-works, distilleries, and other works and the survey of the Excises are excepted from the operation of the provisions contained in §§ 54 and 55.

The whole number of clauses in the act is 118; and there are a large number of other matters. The most important of these is the limiting of the length and width of buildings, for which the French, Lydia, in Asia Minor, has the distinction of being the earliest painter on record. He was a distinguished painter at least as early as 720 years before Christ. Pliny (H. N. xiv. 34) tells the following and more about the Lydia painted a building at Ephesus, which Canaceus, king of Lydia, about 716 B.C., gave him either the weight of the picture in gold or as much gold coin as would cover it. Neither of these versions may be true, but it appears evident that the picture was purchased by Canaceus at a high price. Pliny in another part of his work (vii. 30) speaks of this picture as representing the destruction of Magnesia; and the late K. O. Müller has, in his 'Archeologia,' on this account rejected the tradition, because the representation of Magnesia took place, according to Archolochus, about forty years after the death of Canaceus, through Ardyss, the successor of Gyges. Pliny however in the first instance mentioned, where he treats more particularly of art, calls it a Battle of the Magnetids, 'in qua erat omne sculpturae artis et acuta et oblonga.' This may be an isolated incident, but it is not an isolated fact regarding the early existence of painting in Asia Minor. There is much evidence in ancient writers to show that painting was one of the greatest achievements of the Ionian Greeks, while at the same period in Greece itself there is scarcely any evidence of its existence.

('Dictionary of Greek and Roman Antiquities,' edited by W. Smith, Ph. D., article 'Painting.') BULLANT, JEAN. When one considers the few early French architects of modern times, or of the Renaissance period, whose names have acquired historical celebrity, is supposed by Callet to have been born at Ecouen, at which place he died, in 1681. It is shown how diligently he studied the art; but the birth must have been about 1595. All that is known of his origin is that he was a retainer of the Montmorency family; that he visited Italy in his early youth, and returned from Rome in 1644. For an adequate opportunity of displaying his talents, as well as of acquiring and perfecting his art, he went to England, and had not to wait long, having been employed the following year by the celebrated Constable Anne de Montmorency, to erect, conjointly with Jean Goujon, the Château d'Écouen, in which work he took especial part. The monument of that lady remained unaltered, and has its present dignity and imbibed its spirit, by parading the 'orders' in a variety of ways. Yet notwithstanding the 'purity' and 'correctness' of taste claimed for its decorations of that kind, the whole is a grotto mixture of the ancien, or retrace the styles of the grottos of the moderns. We learn and note other respects distinctly French in physiognomy, with immense roofs, large and fantastically ornamented lunettes, and other characteristics of that age and country. Nay, even the gothic or French-Gothic style of the period was allowed to flow itself externally and very conspicuously also in the two windows, which are placed in one wing of the entrance-hall, while the entrance itself formed in the main façade, is decorated with Doric and Ionic columns, and a third order at the terminus in half-length figures. The principal altar of the chapel (now removed to that at Chantilly) was entirely in the ancient style of the time, and has been considered Bullant's masterpiece, —supposing him to have designed the sculpture also. At the time of the Revolution (1796), and subsequently, such very great changes were made, that the present condition of this château affords little idea of the original design. Of the palace itself, Bullant was the architect for Catherine de Médicis (originally called L'Hôtel de la Reine, and afterwards L'Hôtel Soissons), not even so much remains — in fact, nothing save the astrological column which stood in a niche on the façade of the house, which occupies the site of what was Catherine's residence. For the same princess he also altered and enlarged the Château de Chenonceau — the scene of fêtes and revelries more magnificent than decorous. Another work attributed to him is the Hôtel de Carnavalet at Paris, but this is somewhat doubtful. It is certainly certain that he was employed upon the palace of the Tuileries (begun 1564), although it is not exactly known what was his share in the work, and what the dates of the various parts. A statement, that he was not only of Catherine, but of Henri II. and Henri III. (under both of whom he held the office of comptroller of the royal buildings), he found another patron in Henri IV., in which capacity he carried out a portion of the palace at Fontainebleau, after the death of Louis XII. The end next the Tuileries. Bullant was the author of the works, viz. 'Règles Générales d'Architecture,' 1553; 'Traité de Géométrie et Horlogerie,' 1567; the front which is regarded as the earliest authority in the language on the subject of the so-called order of B. (Callet, Notice de quelques Architectes Français du Sei- sième Siecle.)

BUMASTES, a genus of Trilobites, thus named by M. H. B. M., in honour of the Messrs. Bullant or Barr Trilobite, which occurs in the upper Silurian strata.

BUNIUM, a genus of plants belonging to the natural order Umbelliferae, the suborder Orthocephalum, and the true Ammineae. It has an oblong calyx; obcordate petals with a broad obtuse indurated point; an oblong fruit, the carpels with 5 filiform equal ridges; the stigmas with 3 or 3 'vittae.' The species are perennial herbs with usually taberone and globose roots, square stems, compound leaves, and white flowers.

B. bullata, has the general involucr of 13 leaves, partial more numerous; fruit oval, narrowing upwards, crowned with the elongated stigmata and erect stigmas, internas with 3 'vittae.' This species is the B. bullata umbellata of De Candolle: it is the type of a single genus for which, however, the name B. bullata is satisfac-

tory in Great Britain. It has a nearly globular root, of a black or chestnut colour on the outside and white inside. It has an aromatic sweet taste, and is frequently dug up and eaten by children. It is called in Latin attached to the B. bullata as earth-nut, az-nut, kiper-nut, haw-nut, jar-nut, earth chestnut, and ground-out. The synonyms are as numerous in the French and German languages. Figs are very fond of this nut, and get fat when they are allowed to feed on them when boiled they are a pleasant and nutritious food. Roasted, they are preferred by some people to chestnuts, and are often in this country and on the Continent added to soup or broth.

B. Bulbocastanum of Linnaeus is a different species from the last. It is a small plant, with a soft root, and which deposits. Partial involucres are composed of numerous leaves, the fruit oblong, crowned with the short stigmata and reflexed style, the stigmas with single 'vittae.' This plant has lately been dis-
covered in chalky fields in Cambridgeshire and Herts, and is probably more common than is supposed. The B. bulbocastanum in the 'Gardener's Dictionary' sixteen species of Bumian. (Babington, Manual of Brit. Bot.)

BUNTER SANDSTONE, the lowest arenaceous series at the base of the coal-measures, as understood in Germany (the lowest part of our Coal-measure series). The three parts are —

Keuper above, marly.
Muschelkalk in middle, calcareous, and alternated with sand, as anarenaceous.
Oxford clay, calcareous, and arkose.

This classification is applicable to England by retrenching the middle term. Mr. Murchison is of opinion that part of the
Bouter Sandstein (Grès hâgré de France) belongs to the
Paleoecic series, but no proof of this is yet published.

BUONARROTI, MICHEL-AGNOLI. The Younger, was
born at Florence. He was the son of Leonardo di Buonarroti, brother of the great Michel-
Agno1, or Michel-Angelo, as the name is now usually
written; his mother was Cassandra di Donato Ridolfi. The Riti della Lettera Greca (1618),
the theatre of the great Hall of the Offices (Sala degli Ufizi)
in Florence. It was never printed till 1726, when 'La Fiera'
and 'La Tancia' were published in folio, with copious explanatory
and philosophical notes, by the same author. The latter,
mediagenichelagnolobuonarruotiigiovaneeLaTancia,Commedia Rustica
del Medesimo, coll' Annotationi dell' Abate Antonia Maria Salvini, Gentiluomo Florentino e Letteratore
Grecia nello Studio Fiorentino.' The notes of
Salvini to both pieces are very useful, though somewhat
pedantic.

Two other dramatic pieces by Michel-Agno1 the Younger,
'Il Natale d'Eroso' and 'Il Giudice di Paride,' have been
reprinted; they are of the class called masques. The 'Cico-
rate' is printed in 'Prose Florentine.' He also was the
first publisher of the poetry of his uncle, 'Rime di Michel-
Agno1 Buonarruoti, raccolte da Michel-Agnolo suo Nipote,'
Florence, 4to. 1623. Many other works in MS. may be said to be
in the possession of the descendants of his family.

(Life annexed to Salvini's edition of 'La Fiera' and 'La Tancia.')

BUONINSENGA. [Duccio di Buoninsegna, P. C. S.]
BUOYANCY is the power which certain materials have
of being supported at the surface of a fluid so as to sink in
it as much only as a part of their depth or thickness; thus ice,
some woods, &c. are said to have buoyancy in water. Almost
all solid bodies being immersed, the expression for the
buoyancy of a body being used for the weight by which a
solid mass of wood, or a vessel of wood or metal, can be made
to sink in water at its upper surface is on a level with that of
the water, or till a horizontal section of the body, at a
given depth, is filled with water; and the difference from the upper or lower surface of the latter, is on that
time.

It is shown [HYDROSTATICS, P. C.] that, when a body
is immersed in a fluid, the weight of the body with whatever
it may carry is equal to the weight of as much of the fluid as is
equal in volume to the immersed part of the body. Hence, if the
specific gravity of a body and that of a fluid be known (the former
being less than the latter), the buoyancy may be found. Thus,
by the rules of mensuration, find in cube feet the volume of
the body, and then divide the weight of the body by the
part only which is to be under water, and multiply it by the
specific gravity of water (the weight of a cubic foot of
the fluid), the product will be the weight of the water displaced :
subtract from this product, the weight of the body; and the
result will be the required buoyancy, or the weight which it
will carry without sinking lower than the given depth. If the
body, suppose it to be a log of timber, cannot be actually
weighed, the product of its volume by its specific gravity
will express its weight.

If it be required to find the volume of a rectangular mass of
timber, of given depth, which will support a given weight,
the following equation may be formed:

Let \( l \) be the length of a horizontal section through
the mass of timber, and consequently the horizontal surface
of the displaced water. Let \( d \) be the given depth of
the mass of wood and \( df \) the given depth to which it is to be
immersed. Let \( g \) be the specific gravity of the wood and \( g' \) that
of the water; also let \( W \) be the given weight which is to be
supported:

\[
\text{Then } s \times d \times g \times W = s \times d' \times g' \times W \]

whence \( s = \frac{d'g'}{dg} \)

this value of \( s \) being multiplied by \( d \), will give the required
volume.

In a similar manner may the buoyancy of casks or other
vessels be found, or the number of vessels which would be
required to lift any given weight; the volume of each is
found by the rules of mensuration, and the weight of a vessel by
experiment or by the volume and specific gravity of its solid
part.

This proposition is useful in determining the amount of
volume which would have buoyancy sufficient to raise a sunken
ship, or in determining the dimensions of a floating
bridge which may support a given weight of troops or artillery.

BUOYS AND LIFE-PRESERVERS. Many ingeni-
ous plans, more or less practicable, have been proposed
within the last few centuries for the preservation of life
in peril by shipwreck or otherwise. In Lords
Bray, P. C., several contrivances are noticed, which up to that
time had been suggested for this purpose, such as those of
Lukin, Greathead, Wilson, Brummet, Bray, Gordon, Ansell, &c.
Among these last, the so-called 'bronzard' may be grouped
under three headings, according as they relate to
boats, buoys, or garments.
Safety-Boats.—In 1859 Mr. Mackintosh of New York took out a patent for a sort of temporary life-boat. It consists of canvas rendered impervious to water by being saturated with a solution of caoutchouc. A square piece of this canvas is sewn to the lower edge of the boat, and then filled with air, when filled with air, may act as a buoyant cell or air-chamber. The opposite edges of the piece of canvas are partially sewn together, so as to give to it the semblance of a boat; the sewn edges being cemented with caoutchouc to make them water-tight. The stop-cock attached to it, furnishes the means of filling the sewn tubes with air from the mouth. The views of the inventor are, that if the air-tubes, forming a sort of gunwale to the boat, be of moderate size and not too close at any point, there will be support a person who might get into it on a sudden emergency. Water-tight coverings may be placed over the boat if necessary; and by making loops of thongs in the edge of the boat, oars might be used to propel it. The notion of the inventor seems to be, that a boat, capable of being folded up like a piece of cloth when not in use, may thus be made available in the water when necessary; and he also suggests certain modes of bringing the ship's mattresses to aid in the construction of a boat of larger size.

Mr. Adams, shortly after this time, contrived a form of safety-boat of more substantial construction. It has two bows, so that both ends are alike, thereby enabling the rowers to change their course without moving the head of the boat round. The boat is about seven feet long, and two steerers with oars is its instead of a rudder. The dimensions are recommended by the inventor to be about thirty feet long, nearly six wide, and rather more than two deep in the middle. The upper surface is lined with cork, and the total weight of the air-tight vessel, capable of containing from thirty to fifty gallons, made of tin-plate, copper, or India-rubber cloth, is fitted under the decks at each end; or else a large bulk of cork is used instead. When made of such dimensions, it is supposed that, with twenty persons in the boat, it would not sink even if filled with water.

In 1841 Mr. Salt of Shrewsbury described, in the 'Mechanics' Magazine,' a life-boat, the principle of which depends mainly on being able to make it water-tight. The boat is about six feet long by seven or eight wide; it has hanging-doors to let off the water; iron paddle-wheels to be worked by hand; and has ballast enough to sink it to the depth of about eighteen inches.

In the next following year a contrivance was introduced at New York, called the 'Man-over-Board Boat,' being intended to be thrown hastily into the sea to save any one who might have fallen overboard. It was, in a course of experiments, suspended from the yard-arm of a ship, at heights of thirty, forty, and sixty feet, and the end of the line was in the water; when let go, it descended into the water, but righted itself instantly; and the idea seems to be that such a boat might be made available with great quickness, in case of accident.

A life or safety-boat, also of recent origin, has some peculiarities about it, on account of its portability. It is formed of a skeleton frame, easily detached and folded into one-sixth of the space which it occupies as a boat. The frame is covered with layers or folds of strong canvas saturated with India-rubber; and in various parts are cases or air-cells, partitioned off one from another. The thickness of the canvas is increased according to the size of the boat, so as to give it a great degree of toughness, and at the same time an elasticity fitted to yield to any sudden shock without fracture. The portability of the boat is brought about by having the framework hinged to the keel, so that the sides close together like a portfolio; various minor arrangements being made to give fixation to it in the boat. The invention consists of a French one, but patented both in England and France. As an example of strength, lightness, and portability, a large boat in this form was tried in France in 1841. It was more than a hundred feet long; and, although formed of canvas sails, was carried with ease by a single man. The boat contained a shallow and almost interrupted stream. It was then taken to pieces in three or four minutes, and all the materials packed in a light bag, and sent by road to Auxerre. The invention of the life-boat by Mr. Taylor, of Leeds, was a kind of deck-chair, twenty-eight inches long by eighteen broad: it is capable of being quickly converted into a water-tight boat-shaped vessel, nearly as long, and capable of holding and supporting one person.

A number of other recent contrivances bear more or less on this matter; such as Captain Dansey's kite (1840) and Mr. Carter's rocket (1841) for carrying a rope to a wrecked or stranded ship; but most of these are similar to some or other of the contrivances proposed earlier.

Safety-Garments.—Corks and air-bags, attached in some way to the person, have often been regarded as a probable means of saving lives in case of shipwreck. These have given a new form to such contrivances. The upper part of the crown of the hat is made air-tight and water-proof, so that in the event of the wearer falling into the water, its buoyancy may (according to the intention of the inventor) save him from being drowned. The lining of the hat is capable of being loosened, and the vacant space expanded by air being blown into it, so as to form a buoy capable of being grasped by any one immersed in the water, instead of the hat itself. Mears, Macintosh have introduced a "life-clock" or cape, differing but little in appearance from those which are frequently worn in the streets; but capable, by the introduction of air through a stop-cock into a vacuum formed by a double thickness of the material of the cape; in case of being cast into the sea, by a description of this cape, it is stated that the inventor adopted three modes of testing its efficiency. First, that he calculated the volume of air which would support 15 lb. in the water—equal to the tenth part of the weight of an individual of about 10 stone; and therefore would keep the head and neck
Mr. Reece, in 1843, introduced a contrivance in which floating and respiration are both attended to. There is an inflated pad or cushion of India-rubber attached to the back to enable the wearer to float in water with his face uppermost; and the London Missionary Society have sent him a number of nostrils, sufficient to admit air for respiration, but to repel water. Another contrivance, that of Mr. Synington, consists of a peculiarly formed jacket or belt, capable of being quickly bound round the waist, and having buoyancy enough to keep the body afloat. BUPALUS, an early Greek sculptor of the island of Chios, and of a family long celebrated as statuiers, was the son of Anthermus mentioned by Pliny, and the brother of Athenis, and lived about the sixtieth Olympiad, or 340 a.c. He is better known for the eminence between him and the poet Hippoxanx than for his works, though both Pliny and Pausanias notice several of them. The quarrel between Bupalus and Hippoxanx is supposed to have originated in the sculptor refusing to give his daughter in marriage to the poet; who accordingly used his well-known satirical weapons against him; upon which the sculptor retaliated by executing a ridiculous statue of Hippoxanx, which, it seems, from some particularities of his work, led to his bad name. This plastic satire was revenged by the poet by some satirical iambics upon Bupalus, of so sanguine a nature, according to a report, no doubt false, as to make the sculptor hang himself. The story seems to have been common centuries after the time of Bupalus, for Horace, in the second satire on June the 23rd, makes one of his characters address himself to his friend Bupalus as a sufficient indication of Hippoxanx. Pliny (Hist. Nat., xxxvi. 5) speaks of works by the brothers Bupalus and Athenis, at Chios, Lesbos, Delos, and at Rome. Their father Anthermus was the son of Micles, who was the son of Malas. Upon some of their works at Delos they wrote, "Chios is not to be celebrated for its vines only, but also for the works of the sons of Anthermus." There is a sitting naked Venus in the Vatican, with Bupalus as the name; but it is evidently from its fully developed style, of a much later period than that of the subject of this notice. (Museo Pio Clementino, i. tab. 10.)

(Burleigh, Catalogus Artificum; Sillig, Catalogus Artificum; Thierry, Époques des Étendards-Kunst, 4to.)

BURLEUMER, from Stoe, oz. and παρθενος, side, a genus of plants belonging to the natural order Umbelliferae, the suborder Orithospermeae, the tribe Ammimenes. It has an oblong calyx; entire, roundish petals, with a closely involute, broad, clefted style; carpels with equal winged or filiform and sharp or oblong ridges; stigmas with or without vitre; stylopodium depressed. The species are quite smooth, herbs or shrubs. The leaves are roundish, in most instances being quite entire, in others from their pinnate or palmate or palmatifid form: they are composed entirely of the petioles, and are in fact phyllidia. The flowers are yellow.

There are about fifty species of Burleumera. They are natives of temperate climates in most parts of the world. They are known by the common name of Hare's-tail. When eaten by cattle they are supposed to injure them and cause dis- tension of the abdomen; hence the generic name. B. rosmarinifolium is a beautiful species of Burleumera. It has a branched stem with flat perfoliate leaves, and the fruit with astrate insectivores. It was supposed to possess especial virtues as a vulnerary, but there is no notice now that wounds are better without any such applications. There are three other British species, B. tenaxfruticum, B. aristatum, and B. folax. The species are sometimes cultivated in gardens. The annual species only require to be sown in the open ground early in the spring. The perennial may be increased by dividing their roots; the shrub by cuttings.

D. D. (Museum D. D., Mem. of Brit. Bot.)

BUPRESTIS (Fossil). The elytra of beetles found at Stonesfield have been referred to this genus.

BURBURY. [Bradbury, F. C. S.)

Bradbury was born in London on the 25th of May, or, according to the New Style shortly afterwards, introduced the 6th of June, 1752. As he showed an early taste for drawing, he was placed under the tuition of an artist named Isaac Taylor. About 1776 he became a student to the Royal Academy; and shortly afterwards he began to

preach, and at length determined to relinquish his profession, and to devote himself wholly to the Christian ministry. In 1778 he became pastor of a Congregational or Independent church at Lancaster; in 1783 he removed to Coventry, during his residence in which city he took an active part in the formation of the London Missionary Society; and in 1787 he waited a conspicuous call to the pastorial of the Congregational church at Fetter Lane, London, his removal to the metropolis being further urged by a request to undertake the offices of secretary to the London Missionary Society, and editor of the London Missionary Magazine, then vacant by the death of the Rev. John Eyre. The duties of these offices were performed by Burbury with much zeal and peculiar talent, until increasing years and infirmities compelled him to resign them; and, during a period of more than twenty years, after his removal from Coventry, he took a prominent part in the various religious movements of the body with which he was connected, and of which he was one of the most influential and universally respected members. Burbury died at the age of eighty, on the 29th of May, 1832. His publications, which were numerous and exceedingly useful, consisted chiefly of religious essays and sermons of a peculiarly simple character, which have gained a high reputation far beyond the limits of his own religious denomination. Of these the best are his three volumes published at various times between 1779 and 1819, and which have been repeatedly reprinted, and translated into several European languages, are perhaps the best known. Of forty-eight "Sermons," "Four Great Sermons," "Evangelical and Reformed" (from Detmold), "Words of Life," "Pastoral and Practical Homilies," "Old Age," written for the Religious Tract Society, the aggregate circulation during his life amounted to little short of a million copies. Among his other publications were, 'Evangelical Truth Defended,' 8vo., 1788: an abridgment of Dr. Green's "Preliminary Discourses," edited by Symington; "The Pilgrim's Progress," 8vo., 1791; "The Christian Portal," 8vo., 1792; and "The Pilgrim's Progress," 8vo., 1793; or, A Collection of Papers respecting a people whose ancestors emigrated from Wales to America in 1717, with Prince Madoc, and who are said now to inhabit a beautiful country on the west side of the Mississipi River, which ibo, My autobiography Sermons, 12mo., 1810; and a new edition, revised and considerably extended, of the Rev. Laurence Howell's 'History of the Bible,' in three volumes, 8vo. and 12mo., 1807. Burbury also edited Bunyan's 'Pilgrim's Progress' and 'Holy War,' and Matthew Henry's 'Commentary,' and published several other works, some of which are mentioned in an obituary notice in the 'Gentleman's Magazine' for July, 1793, and in the 'Memorials' published in 1853 by his eldest son, Henry Forster Burdett, D. D., water Burdett, D. D., and Geographical. There is also a pretty full account of Burdett in Dr. Morison's 'Fathers and Founders of the London Missionary Society.'

BURDETT, Sir Francis, Bart., was born on the 1st of January, 1770, and was the third son of Francis Burdette, second son of Sir Robert Burdett, Bart., of Bramcote, Warwickshire. His mother was Eleanor, daughter and co-heiress of William Jones, Esq., of Ramsbury, in Wilts. Before the death of her husband, Sir Robert Burdett, he had attempted to fit himself for the bar; but, on his grandfather's death, his father became the title; the subject of the present notice had lost both his father and his two elder brothers; and, his father's elder brother having previously died, he became baronet. His father had died in 1784; and Sidney, the last of his two elder brothers, had been drowned, along with Lord Montague, in 1793, in attempting to cross the falls of the Rhine at Schaffhausen in a small boat. The baronetess had been conferred in 1618 upon his great-great-grandfather, Sir Francis, said to be the son of the ancient lineal descendant, Hugh de Burdett, who came over with the Conqueror. Thomas Burdett, who was put to death in the reign of Edward IV., for wishing that the man who had moved the king to kill a favourite white buck in his park at Yarow had the horns in his belly, was an ancestor of the baronet. Sir Francis was educated at Westminster School, and afterwards spent some years on the Continent. In 1798 he married Sophia, youngest daughter of the late Thomas Coutts, Esq., banker. In 1796, being still Mr. Burdett, was, by the consent of the Directors of the Bank of England, sent to Yorkshire, his colleague being Sir John Scott, afterwards Earl of Eldon and Lord Chancellor. A few years subsequent to this, on succeeding to the estates of his mother's brother in addition to his own, Sir Francis assumed the name of Jones, which however he soon afterwards resigned. From his first entry into parliament Sir Francis had followed an extreme course of popular politics, opposing the government and the war, advocating a reform in the representation, and especially distinguishing himself by an inquiry
which he got set on foot into the abuses of the Cold Bath Fields and other prisons. This led to his being brought forward in the election for Westminster in 1802 as a candidate in the representation of Middlesex, in opposition to Mr. Mainwaring, who was chairman of the County Sessions, and had been the person by whom the investigation into the prison abuses was chiefly resisted, and impeded in Westminster. The public excitement which this contest occasioned was unprecedented. It ended on the 15th day by giving Sir Francis a majority of 371 votes over his opponent; but a committee afterwards declared the election void, and the proceedings altogether at a cost Sir Francis had paid above a hundred thousand pounds. At the next general election, in 1806, he was again proposed for the county; but this time he only polled 1197 votes, and Mr. Mellish was returned. In May, 1807, a duel took place between Sir Francis and Mr. James Paul, a lawyer, who supported Mr. D'Ewes as his candidate. Westminster the year before: they fought at Combe Wood near Wimbledon Common, and at the second exchange of shots both were severely wounded. While they lay ill, both were put under the recommendation of Liborius, the name of the new general election; and the result was that, after a contest of fifteen days, Sir Francis was brought in at the head of the poll, having obtained 5134 votes (his colleague Lord Cochrane only polling 3708), and that Faul had left fifth, and at the bottom, with only 295. At the preceding election Faul had obtained 4365 votes, being only 277 under Mr. Sheridan, the successful candidate. Sir Francis continued to sit for Westminster from this time for nearly thirty years. The great event of his subsequent career is his connection with the Tower, by the House of Commons, in March, 1810, for a letter to his constituents denying the power of the House to imprison delinquents, which was published in Cobbett's 'Political Register,' and which the House voted to be libellous and scandalous. He attempted to resist the Speaker's warrant, and some lives were lost in a street contest between the military and the people; but he was eventually surrendered, of course, and was layed in prison from the 9th of April till the prerogation of pardons. Sir Francis was continued to sit for Westminster to the popular side in politics till some time after the appointment of the Melbourne ministry, in April, 1835, when he went into opposition against his old friends in the government, on the ground principally of the court being charged them with perjury, and his friends in the court against the Irish established church. In these circumstances he declined standing for Westminster at the general election in July, 1837; but he was returned for Wiltshire, and he sat for that county till his death, which took place on the 2d of January, 1844. Lady Burdett had died only a few days before.

(Burgharlary, vol. v.; Beaton's Chronological Register of Parliaments; Annual Register; Parliaments and History; Biographical Index to House of Commons; &c., &c.)

BURDIE HOUSE, a locality near Edinburgh, where a thin band of carboniferous limestone, remarkably rich in En
tomographical insects, spiders, and other land plants, occurs. It has been described by Dury, in the Catalogue of the Royal Soc. of Edinburgh.

BURGAGE HOLDING, one of the forms of feudal tenure in Scotland. The holders of the fiefs under the charters of the feudal barons and the landholders under the curia

crown, returning service by watching and warding. The return is now merely nominal, but the holding is still of the crown, though the investiture is given by the magistrates of the burgh. The personal service of the baron character is now

preserved in modern practice the important distinction, while other descriptions of landed property may be sublet at minimum, a burgage holding can only be transferred from one crown vassal to another, who comes in his place. All transfers, to constitute real rights, must be followed by saisine recorded in the books of the sheriff clerk of the burgh. All rents are paid to the baillie, who is appointed by the burgh by burgage tenure. The community may, like an individual, obtain feu rights and grant subinfeudations; the proper bur

gage holding is applicable only to those lands to which

other granting burgal privileges for the usual return, applies.

BURGMAIR, HANS, a celebrated old German painter and wood-engraver, born at Augsburg in 1472. He lived some time in Nuremberg, and was the contemporary, and by some accounts the pupil, of Burkhard Hartmann. A new view of the monastery was first published in 1505. Dürer was directly or indirectly the source of everything excellent in art that was produced in his own time and country.

There are still several excellent paintings in oil, for their period, by Burgmair, preserved in the galleries of Vienna, Munich, and Schleissheim; and there are others at Nuremberg and at Berlin. He painted also in fresco and in distemper, and he illuminated manuscripts; but he is better known for his woodcuts, or at least those cut from his designs, which amount to thousands altogether, and are the best wood-engraving of the Emperor Maximilian I., in 156 large cuts, with a description by the emperor, is one of his chief works; it was executed in 1519, the year of Maximilian's death, chiefly by Burgmair; some of the prints are marked with his name, and others with the name of his son-in-law, with assistance, another series of cuts in commemoration of the same emperor, entitled Der Weisse Kunig (The Wise King), of which there are 237 large cuts, being illustrations of the deeds of Maximilian, from the description of H. Sauerwein. The emperor is said to have superintended the work himself. The blocks are still preserved in the library of Vienna. There is also by Burgmair an equestrian portr

tait of Maximilian, in chiaroscuro, dated 1518. He cut also an excellent portrait of Johann Baumgarten, dated 1512, and a picture of St. George on horseback, both in chiaroscuro.

On Burgkain's prints in chiaroscuro another name occurs beside his own—Jost de Neger, to whom probably the execution of the chiaroscuro is due. Besides these and many other woodcuts, there are several etchings and two engravings attributed to Burgmair. His paintings are carefully and solidly executed, but are Gothic in taste; there are ten in the Pinkasothek at Munich, of which that of the three sain

Liborius, Eustace, and Roch, is strikingly excellent in its style (Cabinet ii. No. 24). In the gallery of the Belvedere at Vienna there is a picture by Burgmair of himself and his wife, with their ages inscribed upon it, dated May 10, 1528. The painting is five feet high and ten broad, but it is supposed to have been 1559. Sandrart has given a portrait of Burgmair in his 'Teutsche Academie,' &c., and there is a print by G. K. Killian, of the Vienna portrait of Burgmair and his wife.

BURLANDI, ANTONIO, a 3-celled, 3-branched sterile

BURLANDI, ANTONIO, a natural order of plants belonging to Lindley's group of epigynous Endogenae. It was first con

stituted by Sprengel as a separate order, and in somen-

times made a section of Asaridaceae. The species of plants be-

longing to this order are herbs, with alternately toothed leaves, or none at all, with terminal flowers, which are sessile upon a 2- or 3-branched rachis, or solitary. The flowers are hermaphrodite; the perianth tubular, superior, coloured, mec

branous at the base, the stamens as many, the ovary large with a wing or keel at the back; the stigma 3, in

serted in the tube opposite the petals, with sessile 2-celled anthers opening transversely with a flabby connective, and sometimes 3 sterile stamens alternate with them; the ovary superior, and the fruit globose, though often longent with the wings of the perianth; the style single; the stigma 3-lobed, petaloid; the capsules covered by the withered perianth or 5-celled, bursting irregularly; the seeds being numerous, minute, striated with an aril, fleshy albums, and minutely arillate.

The genus Burmannia, on which this order has been founded, is variously assigned by different botanists. Jussie

placed it in Brunallaeae, Brown in Junceae, Von Marta
in Hydrocharaceae, Blume places it between Juncaceae and Irídeacéae, Lindley near Hémadalzaceae, and there can be little doubt of the propriety of constituting it a distinct order. The species are natives of Asia, Africa, and America. The genus refers to this order are Burman, Triptérella, Gomphtheros, Gynacodíseum, Apocynum. The have not very conspicuous properties; the Apteris sectae is said by Nutall to possess tonic and attritious properties. Triptérella cerasul is also said to have a flavour very similar to that of wine.

(Lindley, *Natural System*; Burnett, *Outlines of Botany*.)

**Burnes, Sir Alexander**, born May 16, 1805, at Montrose, in Scotland. His father was an active magistrate of Forfarshire, and he early successively the chief official situation. The oldest son of Montrose, the brother of William Burnes, father of the poet Burns, who was the first to omit the letter e from the family. Alexander Burnes was educated at the Montrose Academy, in which he greatly distinguished himself. Having obtained a cadetship in the Bombay army, he left school at the age of sixteen, and arrived at Bombay Oct. 31, 1821. On the 25th of December, 1822, he was appointed interpreter in Hindustanee to the 1st extra battalion at Surat, and, on the account of his proficiency in the Persian language, the Judges of the Sudder Adlánaut appointed him, without solicitation, to the office of translator of the Persian documents of that court.

In consequence of disturbances in Cutch, the regiment was sent on a voluntary expedition not only to Bokhara, but also to Persia, where he was second in command, and, having been ordered to Bhojó, he joined it there in April, 1825. He was soon afterwards made quarter-master of brigade, and in November, 1825, when he was only twenty, was appointed Persian interpreter to force of eight thousand men, and accompany the invasion of Scinde. In April, 1826, he was confirmed on the general staff as deputy-assistant-quarter-master-general.

At this period he drew up an elaborate paper on the statistics of Wagir, for which, in 1827, Licut, Burnes received the thanks of the Bombay government and the special commendation of the Hon. Mountstuart Elphinstone, the governor; and he obtained similar testimonies of approbation in 1828 for a memoir on the eastern boundary of the Indus. Burnes was present in the battle of Baluchistan, on March 18, 1826, and in Sept., 1829, was appointed assistant to the political agent in Cutch, in procession of the survey of the north-west frontier. (He has given an account of this survey in the Transactions of the Royal Geographical Society for 1834.) He soon afterwards made a journey into Rajpo- tana, from which however he was recalled; and in 1830 was appointed by the Indian government to proceed to Lahore, where he had managed Bannerman, the son of the king of England to Russia, and was the head of the Punjab. The details of this expedition are given in the third volume of his Travels into Bokhara. The mission was directed to proceed by the devier route of Scinde; the secret object being to obtain first-hand knowledge of the Kootali, and Cutch, and to make the acquaintance of the Indian and Central Asian deputies, with letters to the Ameers, and, the better to obviate suspicion, he took with him a guard of wild Beloochees. The mission sailed from Mandavi in Cutch, Jan. 21, 1831, and on the 28th reached the western mouth of the Indus. After a long and tedious negotiation with the rulers of Scinde, Burnes received their full sanction to proceed by water from the mouth of the Indus. The delay however had been too account. Burnes bad made a complete survey of the mouths of the river, and a map of the country for himself of course. After spending a week at Tatta, they set sail up the river, April 12th, and reached Hyderabad on the 18th, where he was received with great cordiality by the Ameers. The mission remained at Hyderabad till the 22nd of April, when they re-embarked on the Indus, and after visiting all the places of importance along the banks, on the 18th of July they arrived at Lahore, where their reception was magnificent, a deputation of nobles conducting the envoy and his suite to the door of the palace of Runjeet, when, as Burnes himself says, 900 camels and 100 bullocks, or ‘stoooping,’ says Burnes, ‘to remove my shoes at the threshold, I suddenly found myself in the arms and tight embrace of a diminutive old-looking man, the great maharaja Runjeet Singh, who conducted me the hand to the interior of the court, and introduced me to all that was proper to do as a guest.’

After remaining till the middle of August with Runjeet Singh, who treated Burnes with the familiarity of a friend, the mission left Lahore, crossed the Sutlej, and proceeded to Loodiana, a frontier station of the Indian government, where Burnes became acquainted with the ex-mogul of Cabool, Shah Zeman and Shah Sabjojah, who were living there under the protection of the British government. From Loodiana the mission proceeded to Simla, where Burnes met the governor-general, Lord William Bentinck, who without delay entered into negotiations for laying open the navigation of the Indus to the commerce of the world.

After his return from his mission, Lieutenant Burnes proposed to Lord William Bentinck an expedition into Central Asia, which received from his lordship the most liberal encouragement.

The sanction of the Indian government having been obtained, the journey was commenced in January, 1833. Lieutenant Burnes was well provided with instruments, and made his journey a kind of flying survey. Arrowsmith’s map, compiled from his labours and every other available source, is probably the most perfect now existing of the countries which it embraces.

Burnes left Delhi, accompanied by Mr. James Gerard, surgeon of the Bengal army, Dec. 23, 1831, and proceeded by express to Loodiana. Previous to entering on his journey, it was deemed necessary to obtain the sanction of Runjeet Singh to pass through Scinde. He descended the Sutlej, and reached Lahore Jan. 17, 1832, and was received by the maharaja with all his former affability. Their departure was delayed till the 11th of February, when, after crossing a number of the greatest mountains, they arrived at Bumbay for the night. The close doors, beds, boxes, tables, and chairs, were all dis- carded for a flowing robe, a coarse carpet, and a blanket; and their now diminished wardrobe, with the necessary books and instruments, were deposited in their saddle-bags, and thrown across horses’ necks, as a precaution against their horses’ being dispersed and lost.

The troops of Runjeet Singh escorted them across the Chenab and the Jelum to their frontier, about three miles beyond Attock, where they met the Afganis, and proceeded with them to Acora, where they remained several days. They crossed the Oxus, and entered Persia, where they joined the Russian army, by which they left April 19, under the protection of one of Mohammed Khan’s officers; and passing through Jallalabad, reached Cabool by the Latabund Pass, April 31. They departed from Cabool May 15, and leaving Ghuznee on the south, advanced northward direct to Kabul, which they reached on the 25th. They then crossed the mountainous border of the Huazar, and ascended the pass of Hageceguk, 12,400 feet high, May 22. The snow bore their horses, and the thermometer fell to 4° Fahrenheit at the base of the mountain, or 57° above sea-level; and they ascended the pass of Kaloo, 1000 higher than that of Hageceguk, but were hindered by the snow, and passed round its shoulder, but were unable to continue their route on horseback, and on foot.

After stopping a day to examine the wonderful excavations and remains of the ancient city of Ghoolgoola, they crossed the pass of Acrobat, which separates the dominions of modern Cabool from Turkestan, or Tartary. After crossing the Dunand Shikan, or Toothbreaker, and the Cabool river, on the 28th, the Russian army, under their last march among the mountains of the Indian Caucasus, and descended into the plains of Tartary at Khoooloom, the frontier town of Mordé Beg, the chief of Khoooloom, and there delayed by the strange appearance of the presence, at the village of Kaumabaud, about fifty miles distant. Burnes as- sumed the character of a poor Armenian watchmaker journeying from Lucknow to Bokhara, and in his torn and threadbare garments happily escaped detection, received a pass of safe conduct, and was conducted to the town by a Russian officer (who accompanied him), and on the 7th of June rejoined his friend Mr. Gerard, who had been left at Khoooloom.

On the 6th of June they again set forward, and reached Bokhara on the 15th, where they spent some time in exploring the ruins of that ancient and once magnificent city, on the 12th they set forward at midnight on camels bearing panniers which held one person on each side. On the 14th they entered the desert, and on the 16th reached the bank of the Kara, or Bokhara river, 110 miles wide, 2000 feet wide, crossed in boat, each drawn by two horses, which swam across the stream.

On the 27th of June the party reached the great eastern capital of Bokhara, where they remained six days. They then waited in the neighbourhood of Karakool till the 16th of August, when they accompanied a caravan, consisting of about 80 camels and 150 persons, some in panniers on camels, some on horses, and some on ass. In this manner they passed the great desert by Merv, and reached Meshid on the 14th of September. On the 17th they reached Koo-
B U R N E T T, GILBERT THOMAS, was born in Marseilles, on the 15th of April, 1800. He was educated for the medical profession, and paid the usual visit to India. He commenced lecturing on botany at the Hunterian theatre in Windmill-street, and afterwards lectured at the St. George's School of Medicine. On the foundation of King's College, he was appointed the first professor of the science. In 1833 he became lecturer to the Society of Apothecaries, and delivered two courses at their gardens at Chelsea. In the same year he published his 'Outlines of Botany,' in 2 vols. 8vo. This work extended an outline of the author's lectures on botany in King's College, 1833, and contained a complete and practical catalogue of facts relating to the history and uses of plants. There is another feature also which has rendered it of great assistance to the student of botany: it contains a very extended introduction to the study of crypto-phyllous plants. The author, however, was too fond of mere verbal classification, and has overlaid the whole work with divisions and sub-divisions that make confusion rather than facilitate the student to discover the valuable matter which the work otherwise contains.

Mr. Burnett was latterly engaged with the bringing out this great work to devote himself to original research. That he was capable of this is however proved by his papers published from time to time in the 'Journal of Science and Art.' These papers are on various departments of natural history, comparative anatomy, and zoology, as well as botany. The most important are those devoted to physiological botany. In one of these he endeavoured to prove that what had been called the respiration of plants, viz., the taking in of carbonic acid and the giving out of oxygen, was truly the digestive process of vegetables. He also endeavoured to prove that there was a true respiratory process carried on in plants; that they not only took in carbonic acid and gave up oxygen, but that they also took up oxygen and gave up carbonic acid. This theory has been adopted by many continental chemists and botanists, but it appears that the most rational explanation of the phenomena of plants giving oxygen in the day, and taking carbonic acid in the night, is not that it is really a respiratory process, but from the giving out of carbonic acid, which, being taken in by the roots, is not decomposed for the want of the light of the sun. He also contributed several papers on medical subjects to the 'Lancet' and Medical Gazette,' and was an active member of the Westminster Medical and the Medicinal-Botanical Societies.

As a lecturer, Professor Burnett was remarkable for his fluent and graceful style, and his amiable manner was very acceptable to his pupils. He removed to his new apartment in the summer of 1835, of pulmonary consumption. He continued his lectures till within a few days of his death. A besotted by Bohnes, and subscribed for by his pupils, has been erected to his memory at King's College.

B U T E A , a genus of plants belonging to the natural order Leguminosae, named after John, Earl of Bute, a great lover of botanists. It has a campanulate calyx, 5-toothed, the two outer petals longest and longest. It has 1 seed in the pod, which is attached in the manner of the capsule to the peduncle, the valves opening. The true flowers are umbellately disposed, the flowers being solitary and the fruit a pod-like capsule, containing 10 to 20 seeds, each of which is provided with a wing or beak, and which develops from the fleshy ovary of the true flower after it has been fertilized by the pollen from the stamens. The fruit is ovoid, the pericarp thin, and the seeds large, yellow, and oblong. The leaves are alternate, simple, and entire. The flowers are small, white, and fragrant. The whole plant is covered with down, and the stem is branched. The leaves are entire, and the flowers are in clusters. The fruit is a pod-like capsule, containing 2 to 10 seeds, each of which is provided with a wing or beak, and which develops from the fleshy ovary of the true flower after it has been fertilized by the pollen from the stamens. The fruit is ovoid, the pericarp thin, and the seeds large, yellow, and oblong. The leaves are alternate, simple, and entire. The flowers are small, white, and fragrant. The whole plant is covered with down, and the stem is branched.
;

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BUT

BUX

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amarginate leaflets, velvety beneath ; the corolla four times
the length of the calyx ; the calycine teeth rather acute. It
red juice
is a native of mountainous districts in Hindustan.
flows from this tree, which when evaporated is found to consist principally of tannin, and is brought into the market under
the name of East India Kino. The juice of the common
flowers, which in this species are too inches long, gives to
This prowater a bright yellow colour similar to gamboge.
'The lac insects
perty is also possessed by the dried petals.
are frequently found upon the smaller branches of the tree,
bat whether the natural juices of its bark contribute to improve their red colouring matter has not been determined.'

A

become a standard book on the subject, and produced large
; but it is not a work of much value.' It certainly is not
and the two Atlases which the author afterwards published to
be used along with it may be described in the same terms. Dr.
Butler's other chief publications on classical literature were an
8vo. volume, which he produced in 1797, entitled M. Musuri
profits

'

Carmen

Platonem,

Casauboni in Jos. Scaligerum Ode
accedunt Poemata et Exercitationes utri usque Linguae ;' and
Praxis on the Latin Prepositions,' 8vo. 1823 (afterwards
three times reprinted).
He wrote the Latin language rather
fluently than well.
He also translated Lucien Bonaparte's
poem of ' Charlemagne,' in conjunction with the Rev. F.
Hodgson and he published sundry single sermons at divers
(G. Don.)
B. superba has glabrous branches ; roundish ovate, obtuse times. Dr. Butler left a valuable collection of Aldine edileaflets, velvety beneath
the corolla four times the length of tions, and also of Greek and Latin MSS.
BUXBAUMIA, a genus of plants belonging to the nathe calyx calyx teeth acute. It grows on the mountains of
Coromandel. It resembles the last species, but is larger in all tural order of Mosses. It was named in honour of J. C. Bux'ts parts.
There are two baura, a German botanist, and author of a catalogue of plants
It yields the same kind of juice.
of the environs of Halle, and who first detected this moss in
other species described.
(G. Don, Gardener's Dictionary; Lindley, Natural Russia. Buxbaumia has an oblique gibbous capsule a double
System.)
peristome, the outer consisting of numerous filiform, erect,
BUTLER, SAMUEL, D.D., late Bishop of Lichfield, jointlcss teeth, the inner a plaited membranous cone ; a
was born at Kenilworth, Warwickshire, 30th of January, minute mitriform calyptra. There is but one species of this
1774.
His father was Mr. William Butler, a respectable singular genus, the B. aphylia. This plant is destitute of
inhabitant of the village.
His grandfather had been for apparent leaves, and looks more like a fungus than a moss.
many years steward on the estates of Lord Hyde and Lord The ascending axis of the plant is in fact reduced to a little
Leigh. He was educated at Rugby School, and in 1792 was conical bulb, which is clothed with minute scales, and these
His University Mr. Robert Brown pointed out as its leaves.
From the bulb
entered at St. John's College, Cambridge.
career was very successful : besides obtaining three of Sir arises a red tuberculated seta bearing the reproductive organs,
William Browne's medals, two for the Latin ode and one for which is about an inch high. It is a very rare plant. It was
the Greek ode, he was elected in 1793 to the Craven Uni- first discovered in Great Britain at Sproughton near Norwich
versity scholarship, and, after taking his bachelor's degree, he It has also been found in three or four localities in Scotland.
(Smith's English Flora, vol. v.)
gained the first or the Chancellor's two gold medals that are
annually given for classical scholarship ; and both in 1797 and
FOWELL, was tan on
BUXTON, SIR
1798 he carried off the Members' prize for the best Latin the 1st of April, 1786, at Earl's Colne, in Essex, the resiEssay by Bachelors of Arts.
In 1797 he had been elected dence of his father Thomas Fowell Buxton, who died while
a Fell ow of his College, and in 1798 he accepted the ap- his children, three sons and two daughters, were young.
pointment of head master of Shrewsbury School. In 1802 Thomas Fowell, who was the eldest son, was sent by
he was presented by the Earl of Clarendon to the vicarage of his mother, who was the daughter of Mr. Hanbury, of
Kenilworth ; in 1807, by Bishop Cornwallis, to a prebendal CoggeshaU, in Essex, to the school of Dr. Charles Burney,
stall in Lichfield Cathedral
and in 1822 he was made arch- at Greenwich, son of Charles Burney, Mus. Doc., and brother
deacon of Derby. He had taken his degree of D.D. in 181 1
of Madame D'Arblay.
He was afterwards intrusted to th«
Under Dr. Butler Shrewsbury School, the reputation of which private tuition of a clergyman in Ireland, and subsequently
had fallen very low, gradually rose to eminence, and he con- became an under-graduate of the University of Dublin. He
tinued to preside over it till he was promoted, in 1836, to the left the university at the age of twenty-one, and on the 13th
see of Lichfield and Coventry, or, as it is now entitled, of of May, 1807, married Hannah, the fifth daughter of the late
Lichfield, the archdeaconry of Coventry having been annexed John Gurney, of Earlham Hall, near Norwich, by whom,
the same year to the diocese of Worcester. But from that besides other children, he had a son, born in 1812, who has
time his health rapidly gave way, and his death took place at succeeded to the baronetcy.
Eccleshall Castle, Staffordshire, the episcopal residence, on
When he was about twenty-six years of age, he made a speech
the 4th of December, 1839.
He had married, in 1798, at the Mansion-House, London, before a large meeting assemHarriet, fifth daughter of the Rev. Dr. Apthorp, vicar of bled to inquire into the best means of relieving the extreme
Croydon and rector of St. Mary-le-Bow ; and he left a son distress of the population of Spitalfields. About the same
and two daughters.
time he distinguished himself by a speech at one of the
Dr. Butler is stated to have been much beloved in private earliest of the public meetings of the Norfolk and Norwich
life ; his public distinction was derived from his able conduct
Auxiliary Bible Society. His attention was next directed to
of his school and his steady profession of liberal or Whig the state of prison discipline ; he inspected many prisons, and
politics.
Of his literary works the most considerable is his before he was thirty had written and published an Inquiry
edition of Aeschylus, which he was selected to superintend into the subject, illustrated by descriptions of several gaols,
by the Syndics of the Cambridge University Press about the and an account of the proceedings of the Ladies' Committee
time when he removed to Shrewsbury, and the first of the four in Newgate, the most active of whom was Mrs. Elizabeth
4to. volumes of which appeared in 1809, the last in 1816. It Fry, his sister-in-law.
is also printed in 8 vols. 8vo.
This edition, in which the
In 1818 Mr. Buxton was elected member of parliament for
text is that of Stanley, has not much reputation.
The first the borough of Weymouth, after a severe contest; and in
volume soon after its appearance was made the subject of an 1819 he took a prominent part in the debates in the House of
article in the ' Edinburgh Review,' which immediately drew Commons, on prison discipline, the amelioration of the crifrom Butler '
Letter to C. J. Blomfield, containing Re- minal law, and: the suppression of lotteries. About the same
marks on the Edinburgh Review of the Cambridge Aeschylus,' time be devoted his efforts towards the abolition of the bar8vo. 1810. The article is in the Edinburgh Review, No. 29 barous practice of burning widows in India. He continued
(for October, 1809), pp. 152-163.
more elaborate cri- to represent the borough of Weymouth for nearly twenty
ticism on the second volume appeared in the same work, No. years, during which period he was assiduous in the perform38 (for February, 1812), pp. 477-608. The writer of a very ance of his parliamentary duties (few members so frequently
laudatory memoir of Dr. Butler in the ' Gentleman's Maga- addressed the House), nor did he ever slacken or deviate in
zine* for February, 1840, to which we are indebted for the the assertion and working out of those benevolent principles
facts of his life, states that he had long cherished a design of with which he started in public life.
re -editing Aeschylus, and had collected MSS. for that purOn the 16th of May, 1823, Mr. Buxton brought forward
pose. The new edition, it is added, would, no doubt, have a resolution condemning slavery ' as repugnant to the prinbeen &r superior to the former one.' Dr. Butler's best known ciples of the British constitution and to Christianity.' Soon
work is his Sketch of Modern and Ancient Geography, for afterwards he supported the motion of Sir James Mackintosh
the use of Schools,' 8vo., which originally appeared at Shrews- for mitigating the rigour of the criminal law. In 1833,
bury in 1818. His laudatory biographer in the ' Gentleman's when Lord Stanley brought forward a motion for the abolition
Magnane' describes this performance with singular candour in of slavery, he bore a prominent part la the discussions.
tb» 'following term* :—' Since frequently reprinted, having
In 1837 he lost his election for Weymouth, and from that
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THOMAS

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time refused to be again put in nomination for that or any other borough. In 1840 the crown conferred on him the dignity of a baronet. Though afflicted with ill-health, he did not cease his benevolent exertions and was one of the chief promoters of the well-meant but disastrous expedition to the Niger in 1841. He died on the 19th of February, 1845, at his residence North-Repe Hall, near Alysham, in Norfolk, at the age of fifty-nine.

Sir Henry Buxton was a man of singularly commanding person; he was more than six feet four inches in height, and of a fine expression of countenance. As a speaker, he was somewhat heavy both in style and delivery, but in the exercise of his profession from his altered character always commanded a respectful attention. He had no great reach of intellect or imagination, and little of the fervour of an orator, but in collecting facts his industry was untiring, and in exhibiting and commenting upon them, he was zealous to peruse and make one of his recent inventions was the pendulum which revolutionised the practice of horology, by regulating the rate of the clock. He had not only the knowledge of the properties of the numbers called logarithms, but furthermore, with the aid of logarithmic computations, he was able to form a table of those for every degree of the circumference. It is remarkable that Kepler, who himself computed a table of logarithmic numbers, does not mention Byrgius's discovery as the most useful that had been made since numbers were known. If then, the by epochs, and of his intelligence, Napier was not the first to have been used in mathematics and astronomical instruments. He is said to have invented a instrument similar to that which is now called logarithmic compases; and to have constructed a pendulum clock in the year 1675, which was above fifty years before the application of a pendulum to an instrument for measuring time was made by Huyghens. He executed for the landgrave a celestial globe and orrery, which was afterwards purchased by the emperor Rudolph II, who appointed him his instrument-maker.

His brother-in-law Brunier states that on the death of the landgrave he went to reside at Prague; and that in 1692 he returned to Casell, where he died in the following year. Dithmarus, who designates himself a pupil of Byrgius, observes that the latter had studied neither Latin nor Greek; and Kepler describes him as an indolent and reserved man, who withheld his discoveries from the public.

Dithmarus ascribes his tutor the discovery of two rules for resolving spherical triangles; one, when the three sides, and the other, when two sides and the angle contained between them are given; and he considers them as much more simple than any which had been used before that time. He states also that Byrgius had discovered a method of dividing any given angle into equal parts, or in other words having given the relations to one another; and he adds that by such means he could compute with great facility a table of sines, either in natural or in logarithmic numbers. These last are supposed to be a species of logarithms, and as the work of Dithmarus was published in 1588, or twenty-six years before the Canon of Napier (Napier, P. C.), it is possible that Byrgius may have preceded the latter in the time of the discovery. This is directly asserted by Kepler, who refers to the Rudolphine Tables, in which it is observed that the Logistic Indices (the accents by which minutes, seconds, thirds, &c. of a degree are designated in sexagesimal arithmetic) led Byrgius to the discovery of logarithms similar to those of Napier. If the latter had not been acquainted with Dithmarus's work, it may, in fact, have been formed by the means obscurely indicated in the work of Dithmarus, two series of numbers, one series in an increasing arithmetical progression, and the other in a decreasing geometrical progression; like those denominations above alluded to, and as in the original table of logarithms computed by Napier.

From Montucla ('Histoire des Mathématiques,' tom. 2) we learn that there is a passage in a work on Perspective by the Belgian artist, Van Campen, which is said to have been published in 1630, a table containing two series, one in arithmetical and the other in geometrical progression; it is added, that he entertained the idea of publishing such a table, and committed it to paper every two seconds of the quadrant, and that the distance occasioned by the Thirty Years' War prevented the design from being put in execution. An imperfect copy of the tables first mentioned was in the possession of M. Kistner, and from this it was found that the logarithmic numbers begin with zero, and increased constantly by 10, while the natural numbers begin with 1, and form an increasing geometrical progression. Brunier infers from the publication of this table, that his brother-in-law was in possession of logarithms long before Napier had made the discovery; but, as the 'Catus Mirificus' was published six years earlier than that table, his inference is not sustained. It must be remembered that the circumstances mentioned by Dithmarus, that twenty-six years before the publication of Napier's book, Byrgius had knowledge of the properties of the numbers called logarithmic, are in strict accordance with the circumstances mentioned by Dithmarus, that twenty-six years before the publication of Napier's book, Byrgius had knowledge of the properties of the numbers called logarithms similar to those of Napier. Previously to the time he always spoke of Napier as the inventor, and of his discovery as the most useful that had been made since numbers were known. If therefore it is said that Napier had knowledge of the discoveries of Byrgius from the work of Dithmarus, it cannot be supposed that the latter had found its way to Scotland, or that its obscure indications guided Napier to his discovery which has immortalized his name.

Byrgius is designated as the discoverer of a species of logarithms, known as the logarithmica, by E. J. G. Linnuces, belonging to the family of Brythridae as defined by Leach. The beetles composing it are more or less globose, very convex, and sericeous; the club of their antenna is frequently composed of a series of long pointed segments, arising concentrically, and enveloping the larva, which is covered with a layer of thin silvery or whitish dotal, and the porion, which is composed of the terminal segments smaller than the others. Seven British species of Brythridus are enumerated by Mr. A. H. Haliday in his 'Systematic Catalogue of British Beetles.'

An account of the family see Westwood's 'Introduction to Entomology.'

BYSSA/CÉ/ÉE, a tribe of Cryptogamic plants, raised by some botanists to the importance of a distinct order, others refer it either to the Lichenes or to the Fungi, and distribute its genera amongst the various orders of Cryptogamia.

Fries places this group of plants in the natural order of Lichens, with the following definition:—Aerial, perennial, constantly growing, with a filamentous texture; consisting of solid fibres (either few, or several glued together, with a common bark), unchanged and permanent. Fruitication homogeneous, growing externally and naked. Many of the species of plants referred to are of great importance in the chemistry of vegetable and animal matter have undoubtedly been described as plants, and placed amongst them. These forms of matter, whatever they may be, are not less interesting to the naturalist than if they came under his notice as the fortunate offspring of a plant.

The genus Rhizomorpha (Rhizomorpha, P. C.) is referred by most botanists to Byssaceae. Some authors have decided their specific vegetable character. The various forms are found on decaying wood and on vegetable matter, in the coal-mines of Dresden they form objects of great interest on account of their phosphorescence. Mr. Erndt, quoted by Burnett in his 'Outlines of Botany,' gives the following account of this phenomenon, in one of the Dresden mines, 'when the sun is shapely, the plants are seen to be most beautiful: the impression produced by the spectacle shall never be forgotten. It appeared, on descending into the mine, as if we were entering an enchanted castle. The atmosphere was pure, the plants were green, the walls and the pillars were entirely covered with them, and the beautiful light they cast around almost dazzled the eye. The light they give out is like faint moonshine, so that two persons near each other could readily distinguish their bodies.' Another species, 'Rhizomorpha cinchonarum,' is an evident of the subpercutent state of the barks on which it is found. 'Racodium' is a genus referred by Fries to this group of plants. The R. collare is a common plant in winter.
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Cellars, where it forms a kind of tapestry on the walls and roof, investing the casks and bottles with a tunic resembling in colour and appearance the skin of a mouse. Hypocnus is a genus found on the decaying bark of trees. When found on bare black mould, the species should be rejected as unfit for use, as this plant indicates incipient decay.

The genera Monilia and Aspergillus are sometimes referred to fungi. The species of these genera, with many others, form what is known by the name of mould on various substances. [Mouldiness, P. C.]

Monilia penicillata is commonly found on plants in herbaria. The various forms of Aspergillus are found on all kinds of decaying substances. A. penicillus is the blue mould which forms on fragrant substances, it should be rejected as unfit for use, as this plant indicates incipient decay.

Most of the species of the old genus Byssus are distributed amongst other genera. B. Iolathus, the violet-scented byssus, is found of a deep red colour on boarded buildings, old pales, and trunks of trees, on rocks in mountainous countries, and on walls. It is now called Lepraria. It is not less remarkable for its violet scent than its red colour. [Seyou, Rax, P. C.]

There is another plant, Ceroplesis Iolathus, which was included under the Byssus Iolathus of older writers.

Byssus cryptorus forms the genus Tophora of recent writers. Several species of Tophora have been named. They do not however produce spores, and by some they are supposed to arise from the germination of these so-called forms and moses arrested in the rudimental state. The Lepraria are sometimes referred to Byssaceae, but they seem to be the commencing point of the organization of true lichens. They have a thallus resembling a scurf which is formed from spores. They are very common on decaying timber of all kinds.

The cells of the leaves of many plants during decay assume a variety of forms which have been described as cryptogamic plants under the genera Phyllostrium, Erinaceum, Gynopopodium, Topharia, Tophus, &c. Many of these so-called plants are meteoric productions; ‘on one occasion they are said to have suddenly overrun all the leaves of pines on the side next the wind in the neighbourhood of Dresden; on another, on the 10th of August, 1830, to have spread over the sails and masts of a ship at Stockholm; and Fries is disposed to consider the cobweb-like matter that overruns the grass in the mornings of spring and autumn of this nature, and not of animal origin.’ (Lindley.)

[Lindley, Natural System; Burnett, Outlines; Smith, English Flora.]

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Note.—Since the article Bawren was printed off, two or three errors have been pointed out by one of his pupils. In line 5 of the article, for ‘off mi town,’ in col. 2, line 11, read thus: ‘In 1797 Thomas published the first volume of his “History of British Birds”’ and add, at the end of the paragraph, ‘The second volume was published in 1804.’ In col. 2, line 18, for ‘by his son Robert and other able pupils,’ read ‘by his pupils.’ Robert was not engraver on wood. In col. 2, line 28, for ‘and his “British Fishes,”’ read ‘and vignette for his “British Fishes,” which work was never published.’
CAB, or CABRIOLET. [HACKET-COACH, P. C. S.]

CA'CCIA, GUGLIELMO, commonly called MON- 
CALVIO, born from Moncalvo in Piedmont, was 
born at Montabone in 1568. He was one of the best 
provincial painters of the seventeenth century, and is one of 
the most celebrated of the Piedmontese painters. There are 
still several of his works in Milan, Pavia, Turin, Novara, 
Moncalvo, Casale, and other cities of that province. The 
church de' Conventuali alone, at Moncalvo, contains almost 
a gallery of Caccia's works in oil; they are very light in 
colour, but faint in effect, and in design frequently remind us 
that they were executed by Bernardino Campi, another of his 
brothers, and are also superior to that art, notwithstanding that 
Holy Families and such pieces. He is reported to have 
studied with the Carracci, a fact which Lanzi considers very 
probable, and he says that if Caccia studied in Bologna at 
all, it must have been from the works of L. Bartolini, prior 
to the Carracci; but he accounts for his similarity of style 
with that master, from a picture by Soleri in Ca’sele, from which 
he may have acquired it, as their styles are very similar. 
Bernardino Campi also painted in a very similar style. Caccia's 
best works, being copies of those by his brother, were executed 
at Milan, and in San Paolo at Novara. His masterpiece in oil 
is considered the Deposition from the Cross, in the church of 
San Gaudenzio at Novara: there are also two excellent altar-
pieces by his brother, in the same church at San Gaudenzio; for such 
works Caccia set up at Turin, and two others in a chapel of San 
Domenico at Chieri. Some of his landscape backgrounds are in 
the style of Paul Bril: he died about 1625.

Caccia instructed two of his daughters in painting; Osola 
Maddalena and Francesca, by whom there are many works in 
Moncalvo and the vicinity: the pictures of the elder, Osola, 
are marked with a flower; those of Francesca with a bird. 
Osola founded the Conservatorio delle Orelle (Urasilina) 
in Milan, and lived there till she was about twenty years 
older: she died aged fifty-seven.

Orlandi, A. Barcelli, Bellori, Lanzi, Storia Pittorica, &c.

CAGNOLLA, LUIGI, the most distinguished Italian 
architect of the present century, his fame having been 
extended through Europe by his most celebrated works in modern 
times, the magnificent Arco della Pace at Milan, was born in 
that city in 1769, of an antient patrician family, one of whose 
ancestors, Aripandro Cagnola, was consul of Milan in 1117. 
At the age of fourteen, Ioliet was sent by his father, the 
Marchese Gaetano Cagnola, to the Clementine College at 
Rome, where he applied himself entirely to the study of 
architecture, in consequence of the impression made upon him by 
the ancient edifices of that city. On being recalled home, 
he was sent to the university of Pavia in 1781, in order 
to study jurisprudence; but, although he was so far from 
neglecting his studies that he obtained honorary prizes, his 
passion for architecture was insuperable, and he resolved to 
devote himself exclusively to that art, notwithstanding that 
professional practice in it was deemed somewhat derogatory 
in one of his rank and station. In this determination he was 
confirmed by finding that a better taste in architecture was begin-
ning to prevail at Milan, where it had been introduced by Pier-
marini [Piémart, P. C. S.], Polacchi, and Cantoni [Cas-
toni, P. C. S.].

Cagnola at first accepted some official post under Count 
Willez, then governor of Milan, but did not continue in it 
in a provincial capacity, by the high rank of his father, to 
take upon himself the chief management of the family affairs. 
After that he filled for two years the office of Viro Probo, a 
sort of alevship in the civil government of Milan. At that 
period he ventured to put to the test three designs for the 
Porta Vercellina, but the two upper were rejected at Milan, and of which Pier-
marini had been appointed architect by the Archduke Ferdi-
nand, at that time governor of the city. At the archduke's re-
quest Cagnola's designs were submitted to him; yet, though 
the two upper were approved, that by Piermarini was adopted, as being 
more economical. He now engaged the services of a very clever 
perspective draftsman and water-colour artist, Ugo Auleggio, 
and undertook a series of illustrations of the ancient baths of 
Maximilian at Monza, called, at the instance of Antichith Lombardico-Milanese; and he was 
appointed by the government (1812) to secure 
from further ruin the sixteen noble Corinthian marble columns 
which constitute the chief remains of that monument of 
antiquity. The death of his father, in 1795, devolved upon 
Cagnola an important station in public life, when he was 
being one of the state council, he was attached to the army-
commission in the Austrian service, which office he dis-
pached with prudence as well as ability. On the change 
of the government by the establishment of the Cisalpine Republic, 
having withdrawn from the Austrian service, he went to 
Venezia, where he found sufficient and congenial 
opportunity in studying the architectural treasures of those 
cities. Soon after his return, he erected in 1802 a noble 
villa at Milan, and the brothers of the Societa de' 
Giovanni were employed to the works, when it was 
progress was nearly destroyed by an earthquake that did great 
damage throughout the district; but he repaired the mischief 
done to the works with so much skill and promptitude as 
thereby to acquire increased fame. It was about the same 
period that he designed the magnificent catafalque for 
the funeral obsequies of Archbishop Vincenzo, the Patriarch Gamberi, and Count Anguissola, published in folio, 1802. On 
the marriage of the Vicerey Eugenio Beauharnois with the Princess 
Anemone of Bavaria, he was commissioned to design and 
execute another grand temporary structure, which, like the preceding 
one, would now be known only by engravings, had it not 
prevented the Rovigo to be his most celebrated achievement in 
his later years. Cagnola's designs were all constructed of 
wood on that occasion, it was determined to perpetuate it in marble. Accordingly, the first stone of the Porta 
del Seminario, for, as it is now called, the Arco della Pace, 
was laid October 14, 1807. The political changes which 
 afterwards took place threatened to put a stop to the work alto-
er, when it was not advanced beyond the piers of the arches.
Almost the idea of its being ever completed had been 
abandoned; when, on his visit to Milan, the late emperor (Francis 
I. of Austria) resolved the work to be resumed; and from 
that time they were prosecuted without interruption, so that 
Cagnola saw the whole structure terminated, or very nearly so, 
before his death, exclusively of some of the decorative sculpt-
ure and bronze figures. With the single exception of the 
arch de' Enotri at Paris, the Arco della Pace is by far the 
largest as well as most magnificent structure of the kind 
in modern times, and in its general mass it is equal to, even if 
it does not somewhat exceed, the largest of the ancient—
the Arch of Constantine; it is 78 feet wide and, as many 
high, and about 27 feet deep.

Another public monument by him at Milan, which is 
greatly admired, is the Porta Ticinense, an Ionic propylaeum, whose two fronts 
consist of a distyle in antis, consequently of three open inter-
columns, and the two sides or ends are filled in with an open 
arch. Nothing can be more simple or even severe in character 
than this structure, for it is one of the very few things in 
Italian architecture which decidedly approach the style 
of Grecian antiquity; but not even the desire of novelty could 
induce Cagnola, any more than the rest of his countrymen, to 
shake off his allegiance to Vitruvius and Palladio. Compared 
with Athenian examples his Ionic capitals look meagre and 
insignificant, and seem at all events to require a necking, which, 
by adding to the mass of the capitals, would have reduced 
the lankness of the shafts.

The Campanile at Urgnano in the Bergamasca territory, 
begun in 1834 and finished in 1849, he was called upon to 
execute the design and composition than the preceding. It is a circular tower of three 
orders, Doric, Ionic, and Corinthian, upon a square rusticated 
basis, each order consisting of eight half-columns, and 
between those of the Corinthian order are as many intermediary 
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CAL is not specified. The interior had sixteen columns of the same order. Besides those which were carried into execution, Cagnola produced a great number of designs and projects, in several of which he gave such free scope to his invention and grandezza of ideas, as to render their adoption hopeless; such, for instance, was that for an Hospital on the summit of Mount Cenis, with no fewer than one hundred and ten columns, eleven English feet in diameter—whereby it may be added his designs for a senate-house and a magnificent triumphant bridge. In fact, he derived no insuperable share from his celebrity: from his designs of that kind; wherefore it is greatly to be regretted that he neither edited them himself, nor directed by his will that both they and those of all the buildings he executed should be given to the world in the form of a general publication of his Gifts, with a memoir of that would have made them universally known. However, he indulged his taste without regard to cost in improving or nearly rebuilding his villa at Inverigo near Milan, which occupied him during the last years of his life, and which he directed to be completed by his widow. One noble interior feature of this palatial villa is a magnificent central rotunda erected on what was originally an inner court. Cagnola died of apoplexy, August 14th, 1833, at the age of seventy-five, and is a portrait of him in his 'Beitrage' for 1838, with an accompanying memoir, to which we are indebted for some of the particulars in this article. Among those of Cagnola's pupils who have since distinguished themselves are Peverelli, Bianchi (architect of the church of San Pasquale da di Naple), Vergani, Galiardi, and Dordonce. CAKILE, a genus of plants belonging to the natural order Cruciferae, to the suborder Lomatuceae and the tribe Cakilinae. It is a monotypic genus, and the tribe, it has an angular pouch composed of two 1-seeded indehiscent joints, the upper joint deciduous with an erect seed, the lower one persistent, seedless, or with a pendent seed. The species are smooth, fleshy, glaucous, annual branched herbs, with pinnately compound leaves. For the species opposite the leaves, and terminal with silicaceous bracteole petals. C. aralis, Purple Sea-rocket, has the joints of the pouch 2-edged, the upper one with two teeth at the base, the leaves entire, pinnate, somewhat toothed. The flower tube is of a purplish colour. It is a native of Europe, along the sea-coast from Sweden and Lapland to Gibraltar: it is also found on both sides of the Mediterranean. It is a native of Great Britain, on the sea-coast. This plant had at one time a reputation as a cathartic, but it is not employed at the present day. There are three other species of Cakile named as: C. Euphytis, C. Americana, C. equisata. They are all pretty annuals, and may be easily cultivated. The seeds may be sown in spring or autumn, and they should be treated as other hardy annuals.

(Babington, Manual; Don, Gard. Dict.)

CALYDUM, a genus of plants belonging to the natural order Araceae, and to the tribe Caladiinae. The flowers are monoecious, the pistil and stamens. The flowers have many-celled peltate anthers, disposed in a spike at the end of the spadix; the female flowers have the ovaries inserted at the base of the spadix, no style; the fruit is a 1-celled berry with many seeds. A great number of species of this genus have been described. They are frequently cultivated in this country for the sake of their spotted stems and next green leaves, which are rarely disfigured by any of the accidents which affect other stave-plants. They have the same uses as the species which belong to the Arum, and also resemble them in physical and chemical properties. C. Seguinum, Dumb-cane, is a caulescent suberect plant with oblong capitate leaves, and the spadix shorter than the oblanceolate leaves. This plant is a native of South America and the West Indies. It grows to a height of five or six feet. It secretes an acrid poison, so that when any part of the plant is chewed the tongue swells and the power of speech is lost. It is in this account called Dumb-cane. Sir William Hooker, in his 'Flora of New Zealand,' has compared the caule with a painter who has ti

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CALAMIS, a very celebrated Greek sculptor, of the fifth century before Christ. Neither his native place nor the exact period of his career is known; he was however contemporary with Phidias, but probably his senior in years, as according to Cicero and Quintilian, who probably expressed the general opinion, notwithstanding the general excellence of his work, he was the first craftsman in Rome who undertook the whole work of a temple. He was of various styles, in marble, bronze, and ivory, and as an engraver in gold. He was also very famous for his horses, in which, Pliny says, he was without a rival.

Most of his works by Calamis are mentioned in ancient writers, Greek and Latin; but one in particular claims attention. This is the Apollo of the Servilien gardens at Rome, mentioned by Pliny, and by some supposed to be the Apollo Belvedere of the same name which abacus similarly completed sets aside the criticisms of Cicero and Quintilian as to the style of Calamis, for this work, so far from being hard, would be effeminately delicate for any male character below a divinity.

Calamis made two other statues of Apollo: the Apollo Alemisthakos (Deliverer from Evil), which Pausanias saw at Athens; and the colossal Apollo, made for the city of Apollonia in Illyricum, and which, according to Strabo, was brought to Rome by Loculus, and placed in the Capitol. Juinus and Harduin supposed that Pliny and Pausanias speak of the same work; but it is not at all probable that a work which was in Rome in Pliny's time would be in Athens in the time of Pausanias. This inconsistency has been pointed out before; but they have been maintained by the opinion, and it seems to have suggested the idea which Visconti and Flixman have adopted, that the Apollo Belvedere and the Apollo Alemisthakos of Calamis are the same, or at least that the former is a marble copy of the monumental Calamite which is supposed that the same situation mentioned by Pausanias must have been of bronze, because it was placed in the open air; this does not follow however, as many of the ancient Greek marbles were placed in the open air. It was dedicated in honour of Apollo after the delivery of Athens, in Ol. 87, 4 (429 B.C.), during the Peloponnesian war. It is the latest work by Calamis mentioned, and must have been made at least three or four years after the death of Phidias. His earliest altar was a cylinder-shaped altar mounted by boys, for the triumphal car of Olympus placed by Deinomenes, the son of Hiero, at Olympia, in Ol. 78, 3 (467 B.C.), in commemoration of Hiero's victory at the Olympic games, twelve years after the battle of Marathon.

Lucian also, in his description of Panthæus has recourse to the aid of Calamis. He takes some of Panthæus's charms from a statue of Sosandra by Calamis, which he mentions also in his "Heteræan Colloquies" as a paragon of beauty. Many other works by Calamis are mentioned by ancient writers, such as Col. Cæs., Victores, Eligius, Baccius and a Mercury at Tanagra, a Venus at Athens, Jupiter Ammon at Theba, Hermione at Delphi, &c. (Pliny, Hist. Nat. xxxii. 12; xxxiii. 8; xxxvi. 4; Pausanias,iii. 19, 20; Vitruvius, vii. 3, 4; Calamites, 18; Quintilian, Inst. Orat., xii. 10; Strabo, vi; 491; Juinus, Catal. Artifices; Sillig, Catal. Artifices; Thiersch, Epochen der Bildenden Kunst, &c.)

CALAMITES, one of the most frequent and characteristic genera of fossil plants. It is found abundantly, but not exclusively, in the carboniferous system of strata, and generally in the sandstones and shales which alternate with coal. Calamites Buckovi occurs in most European and American coal measures. We have found traces of a calamites in the red marl series of Worcestershire.

CALAMITES: (Coal-plants, P. C.)

CALAMO/pora, the generic title applied by Goldfuss to many Palseacine corals, for which of which Lamarck employed the name of Favosites.

CALCAIRE GROSSIER, the coarse calcareous building-stone of Paris, which, geologically speaking, is coeval with the clay of those of London, and contains many identical shells. These constitute the types of the Eocene tertiary series of Mr. Lyell.

CALCICOLIA, an extinct genus of Brachiopoda, which occurs in the Palseacine strata, and especially in the midlithon of the Salamanca sandstone. The shells of the Pausanias sandstone and in the Eifel and in South Devon.

CALCULATING-MACHINES. Before computers had attained great proficiency in performing arithmetical operations in the pen, machines by which the results of such operations could be obtained by inspection were in almost constant use: the Roman abacus, which continued to be employed in the south of Europe till the end of the fifteenth century, and, in England, to a later period, consisted of counters moveable in parallel grooves or on parallel wires, and having the different denominations units, tens, hundreds, &c., according to the grooves in which they were placed. Thus a counter in the first groove represented 1, while a counter in a groove corresponding to it represented 5; and a counter in each of these expressed together 6. A counter in the second groove denoted 10, while one in a groove corresponding to it denoted 50, and one in each expressed together 60; and so on. The Romans had also machines of the like kind which were applicable to duodecimal arithmetic. The form and use of such machines is thus described under ABACUS, P. C. An account of the arithmetical rods invented by Napier for the performance of arithmetical operations is given under NAPIER'S BONES, P. C.; the nature and use of the logarithmic scales, under SLIDING RULE, P. C.; and under SANDIFERSON, P. C., is a short account of the machine invented by that mathematician for enabling the blind to make computations.

The celebrated Pascal constructed, it is said, when only 19 years of age, a machine for executing the ordinary operations of arithmetic; and as it has a resemblance, though slight, to the machine invented by Mr. Babbage, it may be proper to give a brief description of it in this place.

It was an assemblage of wheels and cylinders, and on the convex surfaces of these were the numbers by which the operations were to be performed: these operations consisted chiefly in the addition and subtraction of sums of money having the denominations of livres, sous, and deniers, for which may be substituted periods of shillings, and pence, and to those denominations the numbers were adapted. Extending round the convex surface of the first cylinder on the right hand of the machine, and one above the other, were the two series.

0, 1, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1
0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10;

the first of which served for the subtraction and the other for the addition of pence; the cylinder being turned in the same direction for both operations. Upon the surface of the next cylinder, on the left, were the two series.

0, 19, 18, 17, 16 . . . 1
19, 0, 1, 2, 3, 4, 5, 6, 7, 8,

serving for the like operations on shillings: and on the left of this last were several cylinders, about each of which were the two series.

0, 9, 8, 7, 6, 5, 4, 3, 2, 1
9, 0, 1, 2, 3, 4, 5, 6, 7, 8,

and these were used for operations with pounds, or with any numbers in the series.

Attached to the axes of the first cylinder was a wheel having on its circumference 12 teeth, on that of the second, one having 20 teeth, and on the axe of each of the other cylinders was a wheel with 10 teeth. When the operation commenced, the zeros of the numbers in the first or second series above, on all the wheels, were brought by hand to the front of the machine.

As an example of the method of using the machine, let it be required to add together the following sums of money:

£ 8 9s. 6d.

Be means of a pointer the wheel connected with the first cylinder on the right is to be turned till the eighth tooth, and after it the number of the cylinder is brought to the front; in like manner the number 9 on the second cylinder and 8 on the third are brought to the front: thus the series of numbers in the fronts of all the cylinders exhibits the first of the above sums of money. Then, by means of the pointer, the first wheel and cylinder on the right hand are to be turned till the sixth tooth (after the eighth) comes to the front, when the cylinder having, from its first position, performed on its axe one revolution and 2 operations on its axle one revolution and 2 of another, the number

2

2, representing 12-4, or 1s. 2d., appears in front. Now, the construction of the machine shows that the revolution of the first wheel and cylinder on the right hand causes the wheel and cylinder on its left to turn one-twentieth part of a revolution; by which means, in this example, the number 9 being already in front of the latter cylinder, the number 10 is now there: thus the one shilling obtained by the addition
The machine accomplishes these additions by the movement of a number of cylinders having on the convex surfaces of each the series of numbers 1, 2, 3, 4, 5, 7, 8, 9, 6; and the operations are thus distributed: by the first, the additions are made; and by the second, this is increased, which should be carried to the ten's place every time that the sum of two numbers is greater than 10.

Let it be imagined that there are several vertical axles, each of which are several cylinders one above another; at that the machine is operated, the cylinders are turned by work-wheel, so that any one of the ten figures may be made to stand on the face of the machine, and immediately under a fixed index. Let it be further imagined, that, with the above axles, the second machine (the hand or wheel of a winch) has made one quarter of a revolution, the first, the fifth, &c. axles may turn, causing the cylinders on them to make parts of a revolution or allowing them to remain at rest. The case may be, while all the cylinders on the same, fourth, &c. axles remain at rest. Again, when the moving power has made the second quarter of a revolution, let it be imagined that one, only, of the cylinders on the first, third, fifth, &c. axles make one-tenth of a revolution, so that whatever figure be under the index of each of these same cylinders, the next figure, in increasing order, may be brought under that index, the cylinders on the second, fourth, &c. still remaining at rest. Let it then be imagined, that, when the moving power describes the quarter of a revolution, the cylinders on the second, fourth, &c., are made to move described as a revolution or remain at rest, the cylinders on the other side being unmoved; and lastly, when the moving power is described the fourth quarter of a revolution, let certain cylinders only, on the second, fourth, &c., make a revolution, the other cylinders remaining at rest. The it may be understood that by the first and third of these names, numbers are added together; while, by the second and fourth, 1 is carried to each figure which ought to be increased a consequence of a sum of two figures being greater than 10.

As an example, let it be required to obtain the number in the series in the first column above, beginning with 3125.

Let the figures composing the number be under the index in front of the cylinders on the first vertical axis, towards the left hand; and the figures composing the several orders of differences in front of the cylinders on the other axis, towards the right, as in this second table. Then the moving power being turned one quarter of a revolution, each cylinder is the first, third, and fifth vertical columns will be turned through as many tenths of a revolution as are expressed by the order of the number in front of its own column. Thus, if the cylinder having 3 in front (at the top of the first vertical column) will move through four-tenths of a revolution, and the number 7 will be brought under its index in front. The cylinder having 1 in front (in the first vertical column) will be turned through six-tenths of a revolution, which will bring 7 under its index in front; and so on.

The numbers in front of the whole machine will now stand thus:

Now it is evident that, having any one of the numbers in the first column, and the number corresponding to it in the second column of differences; all the succeeding numbers of the series may be found by more additions. It may happen however that, in the vertical column of the original cylinder, the numbers in some of the columns of difference may decrease; and then, in forming the terms of the series, subtractions might take place: in such a case, the arithmetical comprehension and calculation to be made, being in the order of a revolution, the cylinders on the second and fourth axis by the addition (in the preceding table) of 6 in the third column to 8 in the fourth, there should be produced 14, whereas 8 only appears under the index of the cylinder (the third column of the present table), therefore 1 must be carried. The operation of carrying is performed by the action of the moving power in the second quadrant of its revolution; and, in the present example, this does not move the cylinder having 8 in front (at the top of the first vertical column) through one-tenth of a revolution, which brings 4 to the front of that cylinder. The reader may now imagine the 3 to be effaced, and the number 4 introduced in its place. No further operations being necessary, the machine having being turned one quarter of a revolution, the cylinders on the second and fourth axis
are made to turn through as many tens of a revolution as are expressed by the figures on the cylinders immediately on their right hand; these figures on the cylinder marked $a$ in the second column of the last table will turn through four-tenths, and this movement will bring to its front the number 8; the cylinder marked 6 will be turned through three-tenths of a revolution, which will bring to its front the figure 9, and so on.

The numbers in front of the machine will now stand thus:

<table>
<thead>
<tr>
<th>N</th>
<th>$\Delta^1$</th>
<th>$\Delta^2$</th>
<th>$\Delta^3$</th>
<th>$\Delta^4$</th>
<th>$\Delta^5$</th>
</tr>
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<tbody>
<tr>
<td>7</td>
<td>8</td>
<td>4</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>8</td>
<td>9</td>
<td>3</td>
<td>5</td>
<td>7</td>
<td>1</td>
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<tr>
<td>8</td>
<td>5</td>
<td>8</td>
<td>6</td>
<td>2</td>
<td>2</td>
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<tr>
<td>7</td>
<td>6</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

The moving power turning through the fourth quadrant will perform the operations of carrying; and, in the present example, the cylinder marked 9 will turn one-tenth, which brings 0 (for 10) to its front; this causes another carrying, and the cylinder marked 8, in the same column, will turn one-tenth; which brings 9 to its front. The cylinder marked 1 in the fourth column will turn one-tenth on account of the carrying from the cylinder 5 below it, which brings 2 to its front; and the machine will stand thus:

<table>
<thead>
<tr>
<th>N</th>
<th>$\Delta^1$</th>
<th>$\Delta^2$</th>
<th>$\Delta^3$</th>
<th>$\Delta^4$</th>
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</tr>
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<tbody>
<tr>
<td>7</td>
<td>9</td>
<td>3</td>
<td>5</td>
<td>7</td>
<td>1</td>
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<tr>
<td>7</td>
<td>4</td>
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<tr>
<td>6</td>
<td>1</td>
<td>0</td>
<td>0</td>
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</table>

The operation is now completed: the number succeeding 3155 in the series is 7776; and the like operations being performed with the instrument in the present state, the next number will be obtained in the first column. It has been supposed that the instrument has only six axles carrying cylinders; but it is evident that, if a number consisting of more than four places of figures were given, or were to be produced, a greater number of axles would be necessary.

We have it not in our power to do more than give the following very general notion of the mechanism by which these remarkable movements are produced. Immediately behind each column of the cylinders $D$ carrying the figures, and in a vertical plane perpendicular to the front of the machine, is a vertical axle $X$ which carries, opposite to each cylinder, two small iron wheels $A$ and $B$, and between them a movable bolt $C$, also in a horizontal position: these two wheels are capable of being connected with or disconnected from the axle, so that they may or may not turn with the latter. The upper wheel $A$ is furnished with teeth, standing out horizontally from the rim, and these work in the like teeth formed about the cylinder $D$ carrying the figures, so that the wheel $A$, when it turns with its axle, may be said to drive the cylinder. It is also furnished with teeth which it turns perpendicular to its lower surface in the manner of an inverted crown wheel. The bolt $C$, which is under this wheel, and passes through the axle, is capable of being moved a short distance horizontally; it is provided, near its extremity, with a pin or tooth $a$ standing perpendicular above its upper surface, and with a pin $b$ perpendicular below its inferior surface. And the lower wheel $B$ carries a wedge or inclined plane $c$.

Behind the wheels on the axle $X$ is another axle $Y$, which is also in a vertical position: this carries a projecting bar or point which revolves around the center of the machine to turn by the action of the moving power. During its revolution, it meets, at a proper place, one extremity of a lever $a$ which is capable of turning on a pivot at $p$: that extremity being displaced, the extremity of the opposite arm presses against the end of a bolt $C$ in the cylinder $D$ and causes it to turn on its proper axis $Z$. Such is the nature of the mechanism that, while the moving power describes the first and the third quadrants of its revolution, the cylinder $D$ might make a complete revolution; but, in general, the cylinder is to make only as many tenths of a revolution as are expressed by the figure in front of the next cylinder on its right hand; and therefore the bolt is to be withdrawn from the crown-wheel when such part of a revolution has been performed. This is accomplished by the pin $b$, which, moving along the wedge or inclined plane $c$, draws the bolt back so that the pin $a$ above is removed from between the teeth of the crown-wheel; the latter is thus disengaged from its axle and ceases to revolve: at the same time the cylinder $D$, with which it is connected by the teeth of its horizontal axis, continues to revolve.

The cylinder remains then at rest till it is moved at a subsequent step in the process. If the cylinder is not to turn while the moving power describes the first and third quadrants, an apparatus provided for the purpose removes out of its place the lever which should press against the end of the bolt.

For every vertical axle carrying cylinders in front of the machine, there is an axle carrying wheels and bolts, and an axle carrying the fingers which lock the bolts: and behind every cylinder is its proper apparatus, consisting of wheels, bolt, and finger.

The process of carrying, which takes place when the moving power is describing the second and fourth quadrants of its revolution, is accomplished thus:—the lever or finger revolves on the axle of the lowest cylinder $D$, for example, in the first vertical column on the left; and, at a proper time, comes against the extremity of a claw which then engages itself between the teeth of a ratchet-wheel connected with the next cylinder above it; both the wheel and cylinder are thus made to turn, but the length and position of the claw are such that the cylinder can only make one-tenth of a revolution, and thus bring to the front a figure greater by unity than that which was there before. When a cylinder has made the movement just indicated, a projecting pin, called a thumb, on the axle of the lower cylinder, touches a trigger which raises, out of a notch in the claw, a hook which retained the latter: a spiral spring then draws back the claw; and the bolt, with the teeth of the ratchet-wheel without creating any movement in the cylinder; and the apparatus is thus prepared for the next carrying operation which is to take place.

A very ingenious contrivance is also provided in order to produce an equalization of the action through the machine during an operation: this consists in having the fingers by which the bolts and claws are moved placed spirally on the several axles, so that they do not act during the time that the moving power describes a quadrant of its revolution: and the fingers which cause the bolts to enter between the teeth of the crown-wheels are disposed so that the shooting of a bolt may take place immediately after the obstruction of the finger by which the carrying is accomplished. The carrying process, by which means a carrying is allowed to take place when the previous process of carrying has already caused a cylinder, in moving one-tenth of a revolution, to bring 9 (for 10) to the front.

The most remarkable circumstance in this machine is the provision which may be made in it for avoiding errors arising from inaccuracies in the original construction, or from accidental derangements; but as the means of obtaining this end have not yet, we believe, been put in execution, nothing can be said concerning them.

It is proposed by the inventor to apply to the machine an apparatus by which the numbers obtained from the cylinders in the left-hand column may be immediately reduced by proper operation of the apparatus to plates of copper, in order that the results given by the machine might be printed without a possibility of error. A curvilinear bar of metal is to act on an arm of a lever so as to raise it to ten different heights corres
responding to the ten figures on the surface of a cylinder; and the opposite arm of the lever is to move an arch carrying two needles, one having on them the characters 1, 2, 3, &c., in relief. The plate of copper being below, a bent lever is to press the punch upon the plate, and produce the impression of the figure. The different figures in front of the first column of cylinders are supposed to be indefinitely transferred to a copeplaque; and the arch and plate being shifted, the set of figures brought in front of the cylinders in the same column at the next operation with the machine, may be transferred in like manner.

Note: Be aware that the cause that the construction of this superfluous machine is suspended, the circumstance cannot fail to be a subject of great regret. The portion which has been already executed is now in the library of King's College, London; and the machine is noted that it is capable of producing any number of cylinders, and the powers and roots of numbers not exceeding beyond eight places of figures.

A great improvement on the machine above described is contemplated by the inventor; who, with reference to the purposes to which the improved machine can be applied, designates it an Analytical Engine. In Taylor's 'Scientific Memoirs' (vol. iii. art. xxi.) there is given, by M. Menabrea of Turin, a sketch of the properties of the engine; and in the same 'Memoirs' by the Translator of the above-fortune paper is the following summary of the operations which can be performed by it:

It will perform the several operations of simple arithmetic on any numbers whatever. It can combine the quantities algorithmically, especially in an arithmetical analysis. It can use algebraic signs according to their proper laws, and develop the consequences of these laws. It can arbitrarily substitute any formula for any other, effecting the first transformation of the second, and making the second appear in its stead. And lastly, it can effect processes of differentiation and integration on functions in which the operations take place by successive steps. It is further stated that the engine is particularly fitted for the operations of the combinatorial analysis, for computing the numbers of Bernoulli, &c.

C A L D E R A R I , O T T O N E , a nobleman of Vicenza (where he was born in 1750), to whom that city is indebted for many important public works, especially for the building of the Palazzo Dal Zoppo, or of any of his buildings either at Vicenza or elsewhere, although he is rather particular in his notices of those by Palladio in that city: neither does Wightwick in his 'Sketches by a Travelling Architect' (in 'Library of Fine Arts,' 3 vols., 1820) mention a building in his 'Architectural Encyclopedia' Gwilt preserves the same complete silence, neither inserting his name in the list of architects, nor the large and beautifully executed folio work of his 'Designs' in that of architectural publications. The only testimony to the merits of Calderari which we have met with in any English publication, excepting Creasy's translation of Milizia's 'Lives,' is in a paper in the Quarterly Review, No. 2, on the Palladian Architecture of Italy, where it is said: 'One of the most eminent architects of that school is the celebrated Calderari. His name is particularly distinguished for his simplicity and elegance, and his knowledge of the true principles on which the beauty of Grecian (Greco-Italian) architecture depends. The Loschi and Besaro palaces at Vicenza, and the Basilica at Verona, are noble specimens of his skill'—and likewise of his taste.

Instead of apologising for remarks that will at all events not diminish the interest of this notice, we have to regret that scarcely anything amounting to biography can be collected from the works of Calderari. His name is not the subject of any biographical sketch. No reference is made by any of the editors of his 'Designs,' in the 'Eloge' prefixed to that work, where he styles him 'Il Immortale Calderari.' His enthusiasm for architecture is said to have been first excited by viewing the Basiliica of Vicenza by night, which made so powerful an impression upon him that he therefor devoted himself to the study, and became, like Burlington, more than a mere 'dabbling amateur' in it, since his renown eclipsed that of many of his professional contemporaries. One of his earliest recorded works was the casino erected by him near Vicenza, in 1772, for the Count Anti-Sola, which has a very extended front towards the gardens, with terraces leading from the house to the wings. In 1773 he built the small Palazzo Bonini at Vicenza, whose façade has two orders, Doric and Tonic (of five intercolumns), surmounted by an attic, and so arranged as to deserve the admiration of every inquisitive mind. In 1776 the Casino Too, and also the Palazzi Quinto and Salvi, in the same city. Nor was Vicenza alone the scene of his architectural labours, for he designed the beautiful atrium of the Seminario at Verona, and the Villa Cayra, at Marano, and the Casa Cozzolani in the Mantuan territory.

Count Calderari belonged to the principal academies and societies in Europe, and was elected by the French Institute, London, to a chair of architecture. He was expressly invited to come over to France; and it was then clearly intimated that it was his last wishes so to go. This project was, however, never carried into effect; and in 1781 he died, at Vicenza, January 22nd, respecting which date, nor can it be denied that he is entitled to be considered as the admiration of those who hold Palladio to be a pattern of excellence. He died at Vicenza, October 26, 1803, and his will was pronounced by Diedo, secretary to the Academy of Fine Arts, on the 18th February, 1804. His tomb stands in the 'Cimitero,' and has the dates 1750 and 1803. The portrait of him prefixed to that work, there is one in Gamba's 'Galleria de Letterati,' &c., Venice, 1824.

C A L D E R A R I , OTTON E. (vols., 1820), 'Architectura,' &c. 2 vols., folio, 1808-17. Though there is no portrait of him prefixed to that work, there is one in Gamba's 'Galleria de Letterati,' &c., Venice, 1824.

The common smoothing-iron affords the simplest illustration of the process of calendering, and the mangle, which is so frequently employed as a substitute for the smoothing-iron, presents another, the operation of which is identical with that of the earlier calender or calendering machines, in the common mangle, as in the old calenders constructed on the same principle, the cloths to be smoothed are rolled upon smooth wooden rollers, and laid between two hard flat surfaces, the lower one of which is immovable, while the upper, which is formed by the bottom of a large box, is capable of being moved backwards and forwards in the direction of its length, thereby causing the cloth-covered rollers to roll backwards and forwards until every part of the cloth wrapped upon them has passed over the rollers. Though the action is the same, the alternate motion of the pressing-box, which is usually loaded with stones, is produced by turning a winch-handle, which alternately winds and unwinds ropes extending from the ends of the box to a drum or cylinder fixed over it. To establish this nomenclature, in his 'Travelling Architect,' in the direction of the motion required, various ingenious devices have been resorted to, by which the alternating motion of the loaded box is produced by a continued motion of the winch-handle in one direction, by moving larger and heavier than common mangles, the old calenders made on the same principle were often worked by a horse-wheel, or some other moving power. The process of calendering was greatly improved by the invention of a machine in which the pressure is produced by the combined action of a cylinder and flat surfaces, and in which, consequently, the alternating motion is got rid of; and, also, it is easier to give a uniform and equal pressure. According to the writer of the article 'Calendering' in the 'Encyclopædia Britannica,' the cylindrical calendering engine was introduced into this country from Flanders and Holland by the Huguenots who were driven to England by persecution. The rollers or cylinders were formerly made of wood; but, as it was found impossible to combine an iron calender with a wooden frame, they are now usually made either of paper or of cast-iron. The paper cylinders, which form the most remarkable feature of a modern calender, are formed in the following manner. The axis of the cylinder is a strong metal rod, and the body of the cylinder consists of a great number of circular pieces of stout pasteboard, each of which has a square hole in the centre to receive the axis, and six smaller round holes at equal distances from each other, near the periphery, A
Kensington, This belongs, his and immediately Propter rather Calen- found He wrought-iron, composed weighted-native

bale, it is a native of these islands, and has been introduced from the south of Europe. This plant is a great favourite in gar- dens, and continues to blossom till the approach of winter. It is often grown in churchyards in this country, and in France, but this plant does not appear to be connected with any superstition. There are various varieties of this plant found in gardens, as the orange-coloured, the lemon-coloured, and the double. It formerly had numerous virtues attributed to it, but independent of the bitterness of the tribe to which it belongs, and a rather more powerful volatile oil than is found in other species of the order, it possesses no active properties. The flowers are used in some parts of the country to give a yellow colour to cheese. In

The Clock of Flora Linn. is set ten in the morning and to close them at three in the after- noon. C. pluricola has been named from its flowers closing at the approach of rain. The petals of these plants are some- times employed for marking the saffron.

(Calendula, Encyclopedia of Plants; Koch, Flora Germanica.)

CALLCOTT, JOHN WALL, one of the brightest orna- ments, in every sense of the term, of English Music, was born in 1765, at Kensington, where he had carried on a business of a builder. At the age of seven he was entered as day-boarder in a neighbouring school, where he made such progress that he commenced reading the Greek Testament in his twelfth year. He afterwards, by the supersti- cion of his removal, from which time, great and various as were his requirements, he was self-educated, a circumstance to which, probably, the vigour of his unshackled mind may be ascribed. Miss Haydn, his aunt, who, in the meanwhile, had come his profession, instead of surgery, for which he was pre- pared to qualify himself, when the sight of a severe operation so powerfully acted on nerves of remarkable sensibility, that he at once abandoned all hope of succeeding in the healing art, and devoted himself to that of harmony, the study of which he prosecuted without any master; though by a con- stant attendance at the Chapel Royal, at Westminster Abbey, and many concerts, together with the friendly hints, given in the wide universe, by Drs. Cooke and Arnold, he, no doubt, profited very largely.

He commenced his professional career in the subordinate capacity of deputy-organist of St. George the Martyr, Queen Square; and at about the same time made his first attempt in the composition of church music. His first attempt, the Gloria in excelsis, in 1755, when only nineteen years of age, he appeared as a can- didate for the prizes annually given by the Catch Club, and obtained three out of the four gold medals. Among the suc- cessful pieces was that, latterly composition. 'Oh! sovereign of the willing soul.' Thus encouraged, he followed up with ardour and industry the course so auspiciously begun, and in the following ten years, twenty medals of the same most distinguished and laudable character were awarded to him. We may, however, add, that some of his best productions were either not candidates for prizes, or unduly appreciated by the dispensers of those musical honours.

In 1785, at the early age of nineteen, Mr. Callcott was elected by the University of Oxford. In 1787 he assisted in forming the Glee-Club. In 1790 he took advantage of the arrival of Haydn in this country, and de- rected considerable knowledge in the higher branch of instru- mental music from that illustrious musician. He ad- vanced to the degree of doctor-in-music at Oxford, in 1790; his exercise was a Latin motet, selected from Isaiah, beginning "Propter Sion non tacebo." His 'Musical Grammar' ap- peared in 1806. About the year 1808 he began to deliver lectures on music at the Royal Institution, a task to most of all others suited to his studies and gratifying to his ambition: but the very anxiety he felt to execute the duty in a manner worthy of himself, rendered his hopes futile, and his efforts unavailing. His mind, too, overworked, and under the burthens he had so unsparingly laid on it, and he became incompetent to the fulfilment of any of his engage-
menta.' After a succession of five years, he rallied for a time, and by avoiding all severe study or exciting occupation, afforded hopes to his friends that his mental powers were permanently restored. This gleam, however, lasted but three years, when he was once more assailed by the most woful of human trials, which he bore with equanimity.

The productions of this original and ingenious composer are too numerous, and indeed too well known, to be particularized here: the choicest of them were, in 1824, collected and published in two handsome volumes, by his son-in-law, Mr. H. L. Craun. To a third he contributed, one of the compositions of the composer, engraved from a painting by his brother (henceforward Sir Augustus Callcott, R.A.), a remarkably strong likeness, in which the ingeniousness and felicity of his disposition, and the reach and quickness of his intellect, are very happily depicted.

Dr. Callcott left a widow, eight daughters, and two sons. One of the latter has already attained considerable distinction in his father's art.

(Horsey's Memoir of Dr. C.; and Harmonicon, i. 53.)

CALLCOTT, SIR AUGUSTUS WALL. This very distinguished landscape painter, frequently styled the English Claude, was born at Kensington in 1779, and died in the same house in the year 1840. He was the brother of the distinguished composer, Dr. Callcott, and he himself in early life officiated for several years in the choir of Westminster Abbey under Dr. Coke. He however preferred painting to music, and for some time pursued both studies. He had not quite gained the success he had hoped, when he was painted upon the tuition of Hoppner, in 1798, and which he exhibited, led him to the final choice of painting as his profession. Very little experience, however, showed him that of the most promising if in 1803 he devoted himself exclusively to the study of landscape painting. Richard Wilson had adopted a similar course, but notwithstanding his great ability, with very different success.

Callcott was elected an associate of the Royal Academy in 1807, and a member in 1810. He presented a beautiful painting called 'Morning;' in 1837 he was knighted by the Queen; and at the death of Mr. Seguer in 1844, he was appointed his successor as Conservator of the Royal pictures, an office which he held for a very short time, and of no great emolument, yet honourable, and sufficiently valuable to be of very great importance to the venerable painter, who was so enfeebled by long illness, that in the last few years of his life he was unable to undergo the ordinary exertions of his profession. He was buried on the 30th of November in Kensal Green Cemetery, where his wife, Lady Callcott, had been buried two years previously.

Lady Callcott was the widow of Captain Graham, R.N., and was married to Sir Augustus in 1827. She was born in 1788; married in 1804; and was the daughter of Captain Dundas, and was married early in life to Captain Graham, with whom she went to India in 1809. She remained in India two years, and visited during that period many of the most remarkable places in the country, and also listed an account of her travels after her return home. She published at a later period two works relating to India, where she dwelt for some time,—'Three Months in the Environs of Rome,' and 'Memoirs of Fussian.' In 1821 she embarked with her husband for South America, but Captain Graham died during the voyage, and was buried at Valparaiso.

After her second marriage she paid another visit to Italy, in the company of Sir Augustus, and turned her attention particularly to the history of art. In 1830 she published her last historical work, under the title—'Essays towards the History of Painting,' which, notwithstanding an unfortunate corruption of names, partly due to the old translation of Philyrion Holland, and a few other inaccuracies, is a very creditable performance, and considering that it is the only popular work on ancient painting that has hitherto appeared in English, it is a useful contribution to the library of the young student in art.

It is not intended, in this notice, to give a list of Callcott's pictures, nor even a view of his labours. He was for many years a steady and large contributor to the exhibitions of the Royal Academy. His landscapes were generally of small dimensions, and all very similar in style; but most of them are extensive as it is, and the best quiet, and strongly truthful as a class. He was less extensive in his distances than Claude, being more defined, and, certainly to the true lovers of nature, more pleasing; in his foro-grounds he was more correct and natural than Claude, except in the foliage, especially of large trees: in colour he was perfectly true and natural. His works are perhaps more frequently characteristic pictures of certain scenery, as 'Italy,' 'Morning,' 'Evening,' &c., than mere views of particular localities. Many of his pictures also have their titles from the occupancy; as 'Market,' and 'Waiting for the Passage-boat,' 'The Ferry,' &c.; he painted also some marine pieces. In 1833 he exhibited in the exhibition a beautiful picture called 'Harvest in the Highlands,' in which the figures were painted by E. Las, the son of the late Mr. R. A.

In 1837 he exhibited a picture from the possession of Mr. G. A. Cal, a remarkably strong likeness, in which the ingeniousness and felicity of his disposition, and the reach and quickness of his intellect, are very happily depicted.

Dr. Callcott left a widow, eight daughters, and two sons. One of the latter has already attained considerable distinction in his father's art.

(Art-Union Journal, 1843-1845; Catalogues of the Exhibitions of the Royal Academy; Wasing, Kunstdere und Künstler in England.)

CALLIMACHUS (Καλλιμάχος), a celebrated Greek sculptor of uncertain age, but probably of about the time of Phidias. He was apparently an Athenian, though some think him the son of Callimachus of Samos. He was the inventor of the Corinthian capital. Callimachus is, as the other hand, supposed to have been of Athens, from a report noticed by Vitruvius, and in part by Pliny, and Pausanias, but the Athenian is said to have been Callimachus and Callimachus, according to the emendation of Sillig, which agrees just, signifying one who weakens or effeminates an art, in relation to the excessive finish by which he greatly injured the effect and value of his works. Pliny calls him the culminating of himself, and says that he never knew when to leave off linking his works; the same fault was found with Protagoras.

If Callimachus invented the Corinthian capital, this circumstance enables us, as Winckelmann has observed, to see degree to fix his time. It must have been before the Olympic games in 400 B.C. for Sophocles an temple of Minerva, according to Pausanias, with columns of the Corinthian order at Tegae; and he cannot have been much earlier than that date, as his style was so elaborately and finished.

Dionysius of Halicarnassus and Calamis on the origins of Lyons, on account of their finian and neatness. Callimachus is also said to have used the drill in working marble, a fact attested by several modern critics, who suggest that he may have invented the drill in use, but cannot have been the first to use it in working marble, as it has evidently been used in the hair of some of the most antient statues, which, from the other evidence concerning Callimachus, must have been executed long before his time.

There is a bas-relief in the capitol at Rome, with καλλιμάχος engraved upon it, which represents a dance of three hecctas and a fawn; and some have supposed this to be the same work which Pliny notices as a dance of two girls by Callimachus. This perhaps signifies the inscription to be a forgery, or that there must have been some other Callimachus, who lived later than the subject of the notice. The characters of the inscription are, according to him, of the subjects of the work itself are too insignificant to have been singled out by Pliny or his authority as a production worthy of record. According to Pausanias Callimachus was not an artist of the highest merit. (Dio, 43. 12.; Vitruvius, ii., 4.; Pausanias, ii. 20.; Winckelmann, Werke, vol. v.; Sillig, Catalogue Artificum; Thiersch, Epochen der Bildenden Kunst, &c.)

CALLIPERS. (CALLIPERS, P. C.)

CALLISTRATUS, a Roman jurist, who was writing...
under the joint reign of Severus and Antoninus (1. tit. 19. e. 3; 49. tit. 14. s. 3), by whom are meant Septimius Severus and his son Caracalla. Some, however, believe that 1. Lampridius (Alexander Severus, 68), mentions a Callistratus as one of the Council of the Emperor Alexander Severus; and this may be the Callistratus who was writing under Severus and Antoninus.

Callistratus is one of the Jurists from whose writings Justinian's Digest was compiled [JUSTINIAN'S LEGISLATION, P. C.]: the works of Callistratus from which the excerpts in the Digest are taken were six books Do Cognitionibus; six books of the Edictum Monimentorum; four books of the Jus Fisci; three books of the Digesta, and one book of the Cognationes. It appears from Institutions being mentioned as one of the works of Callistratus, that he was one of those Roman Jurists who worked on institutional treatises, such as Gaius.

A genus of plants belonging to the natural order Callitrichaceae. The flowers are without calyx or corolla, with two bracts at their base; one stamen; two ovaries, each lobed and imperfectly 2-celled; the styles 5, subulate; the fruit dry, separating into 4 indehiscent carpels. Kützing has figured a decided calyx belonging to this genus. Five species have been described. Four of these are natives of Great Britain. They are water-plants with smooth leaves, and are known by the name of Water-starworts. C. berna is common in fresh water, snow-white flowers. C. platycarpa is found on mud or in shallow water; seldom, and then apparently by accident, in deep water. C. pedunculata is found in marshes; and Babington has described a variety, C. p. sessilis, which is found in lakes. C. subulata is found in streams, bordering watersides.

(Babington, Manual of British Botany.)

Callithrix. [Thuea, P. C.]

CALLUNA (from castlow, to make beautiful), a genus of plants belonging to the natural order Ericaceae. It has a 4-parted, menziesiform coloured calyx, longer than the 4-cleft, campanulate corolla, surrounded by four green bracts; 8 stamens, with dilated filaments; the capsule 4-celled, the dissections adhering to the axis; the valves opening at the three-fourths, white flowers, and a greenish-ochraceous fruit. This species of this genus, the common heath (C. vulgaris). It is a low-tufted shrub with small, sessile, closely imbricated, keeled leaves, arranged in four rows, each leaf having two small spars at the base, and nearly or quite smooth. The colour of the flowers varies from a deep red to white, and numerous varieties have been named. This plant is common on every heath in Great Britain. The varieties are ornamental when planted in the garden. They should be grown in a place exposed to the sun, may be propagated by layers or cuttings under a bell-glass.

(Babington, Manual of British Botany.)

Calligorgia, ANGELO, born at Fudio in 1599, of a family originally from Corfu, studied at Venice, and entered at the age of 28 into the Oard, a religious order founded by St. Basil, which belonged to the order of the Camaldulenses. After having taken his vows, he was sent to Ravenna to teach theology, and there finding a rich library at his disposal, and a well-informed and well-disposed librarian, he acquired a large store of varied literary knowledge. At Ravenna he made acquaintance with the learned Queirini, afterwards cardinal. Calligorgia, after some years, returned to his monastery of St. Michele, where he spent the greater part of his remaining life in his favourite literary studies. He was induced to compile an annual selection from the numerous papers which were read in the various scientific and philological academies scattered about Italy, and which, for want of a common journal, remained buried and forgotten. So they respectively are. Calligorgia undertook the task, in which he was assisted by Pia Caterino Zeno, Facciolati, Valliniari, Muratori, Manni, and other learned contemporaries. He began to publish in 1728; at Venice, the Raccolta d'Opuscoli Scientifici e Filologici, which continued to appear periodically till 1757, when the series closed by its fifty-first volume, which contains an index of the whole collection. He resumed it, however, in 1754, under the title of Nuova Raccolta d'Opuscoli Scientifici e Filologici, which he carried on to the time of his death, in 1774. The work was continued by his son, Antonio Mandelli till 1784, when the forty-first and last volume of this second series appeared. The two series constitute an ample store of Italian learning during the 18th century. Amidst the great number of learned men of that period in Italy there are many others who are truly valuable, and which could not be found anywhere else. Calligorgia wrote also a kind of literary journal entitled 'Memorie per servire alle Storie Letterarie'; he wrote with Apostol Zeno in the journal 'Storia Minerva', and he also contributed to a new edition of the 'Biblioteca Gallica' of Cinelli. Calligorgia was appointed in 1780 Revisor or book Censor for the Venetian State. He left a voluminous correspondence, which is inedited.

(Lombardi, Storia della letteratura italiana nel Setecentro.)

Calophyllum (from kalos, beautiful, and phiavlo, leaf), a genus of plants belonging to the natural order Guttiferae. It has a bracteate calyx consisting of 2-4 unequal calyces, usually 4-seriate sepals; 4 petals, purple, oblong, indefinite stamens, free or connected at the base, filaments short, anthers inserted by their base, 2-celled, bursting longitudinally; the style twisted, crowned by a large capitate stigmas; the fruit, a globose, globose or egg-shaped, 1-celled, 1-seeded; the seeds large; the fruits are tree, the leaves of which have numerous transverse parallel veins, which give them a very beautiful appearance.

C. Inophyllum has oblong or obovate obtuse leaves, usually emarginate, round branches, long acuminate flowers, racemes axillary, 1-flowered, usually opposite peduncles. This tree is a native of the East Indies, and often attains a height of 90 or 100 feet. It has large handsome leaves like those of a water-lily, an egg-shaped fruit, and a fruit about the size of a walnut. When the trunk is wounded, it exudes a yellow viscid juice, which frequently hardens to the consistence of a gum. It is a common plant in Malabar, where it yields fruit twice a year, in March and September, and frequently attains the age of three hundred years. The nuts afford a fixed oil, which is expressed, and used for burning in lamps, for making ointment, &c. This tree is cultivated in Java for the sake of its shade and the fragrance of its flowers. The bark and the exudation are used for medicinal purposes.

C. Caloche, Caloche tree has oblong or obovate, obtuse or emarginate leaves; hermaphrodite or male flowers; lateral, very short racemes. This plant is a tree 60 feet in height, and is a native of the Caribbean islands. It has white sweet-scented flowers, and a round or oblong berry, which contains a white solid kernel. An oil is expressed from the seed for domestic uses and for burning in lamps. The timber is used for various purposes, especially for staves and cask-headings. Lindley says 'that the true East Indian Tacamahaca is produced by Calophyllum Caloche.' There are however several gourds brought into the market under the name of Tacamahaca, of which formerly more was used than at the present day. The Tacamahaca seu Rosina Tacamahaca is one of the ornamental plants of the old Pharmacopoeias, and is used for producing the Elelphrium tomentosum and E. ecolomum, plants belonging to the natural order Amerylideae. It is described as a resin of a brown yellow colour, spotted with white, easily broken into pieces, which have a shining fracture, burning and having no medicinal virtues. It says that it was not employed in his day 'as an internal medicine, and as an external I cannot perceive its virtue.' It was used for making plasters as a counter-irritant, for which there are forms in the continental Pharmacopoeias at the present day. There is however another form of Tacamahaca brought to Europe, called Tacamahaca in herbs. It got this name from being collected in little ground-shells. This is the true East Indian Tacamahaca, which is collected from C. Inophyllum in the East India islands, and from C. Tacamahaca in Madagascar and the Mauritius.

(Bischoff, Medicinisch-pharmaceutische Botanik, Loullon, Encyclopedie; Don, Gard. Diet.; Lindley, Nat. Syst.)

Calotype. [Photography, P. C. S.]

Calvert, DENIS, sometimes called FLAMMINGO, a distinguished painter in his time, especially in landscape, was born at Antwerp about 1558. He settled early in Bologna, and studied under Fontana, and afterwards with Sabbatini, with whom he visited Rome and assisted in some works there. Sabbatini had more influence upon the style of Calvert than Fontana, who however taught him the value of perspective, in which he excelled. In 1584, Calvert visited some scenes in Parme. Calvert returned to Bologna and opened a school there, which became very celebrated and was numerous attended; he is said to have taught 437 painters. His school was unrivalled in Bologna until the establishment of the Carracci, with whom he was undoubtedly, through his painting, a pupil of the Carracci, who had a special interest in him.

Some of the greatest scholars however of the Carracci had been students in the school of Calvert, as
Domenichino, Guido, and Albani, three of the most famous of the Bolognese painters.

Calvert died at Bologna in 1619. He is spoken of with great respect by Malvasia and other Italian historians of art. There is nothing particularly Flemish in his style; his pictures, of which there are still several in Bologna, are generally well coloured, and strictly in an Italian style of design: in landscape he was superior to that of his Bolognese contemporaries.

His father, Mr. Thompson, was a St. Michael in the Church of San Petronio, and a Purgatory seel Graziu.

(Malvasia, Feuille Pittorie, Lanzi, Storia Pittorica, &c.)

CALYCEPHYLLEUM (from ελυξ, calyx, and φίλλος, leaf) is a genus of Mints belonging to the natural order Cinchona.

It has the limb of the calyx truncate or bluntly 5-toothed, one of the teeth expanded into a petaloid coloured membraneous leaf; the corolla campanulate or funnel-shaped with a 5-petalled limb; five anthers, the filament rising from the throat of the corolla; the anther oval, exerted; the style ending in 2 reflexed stigmas; the capsule dehiscing at the apex, oblong, 2-celled, many seeded; the seeds fixed to the linear placenta, imbricate, oblong, girded by a very narrow membranous wing. The species are small smooth trees, with opposite glabrous leaves, short stipules, and flowers disposed in axillary and terminal dichotomous corymb.

One of the most remarkable species of this genus has been lately described by Sir Robert Schomburgk as a native of British Guiana. There are several genera closely allied to Calycophyllum, as Mussandra Pinkeya, &c., in which one of the teeth expands into a petaloid and coloured leaf of a membraneous nature; but the species discovered in the Guiana the like expansion of the calyx, has a rose colour, and as the flowers are very numerous the whole tree assumes the colour of the rose. In describing the discovery of this plant, Sir Robert Schomburgk says, that the garden of nature in Guiana, clothed in tropical luxuriance; and among those productions of a congenial sun and fertile soil, figure to yourself trees from forty to fifty feet high presenting a mass of leaves the colour of our favourite flower, from a deep pink to the lightest rose; and perhaps your fancy will assist you to form some idea of the picture I beheld at one of the valleys of the river Rapununci, where a high mountain on the river's left bank turns its bed boldly to the east. The banks of the stream and the steep side of the hill were afevered with trees clothed with rose-coloured leaves; and only on a near approach could the shining green leaves and the spikes of flowers of a velvety blue be discovered.

This plant is called by its discoverer after Lord Stanley, theuke, Calycophyllum Stanlyanae. The beauty of the tree is very hard. It is very bitter to the taste, and, like the rest of the order, is probably febrifugal.

(Hooker: London Journal of Botany, 1644.)

C. alpina, the generic the Linnean's classification of Tribolites, for the species of Crustacea allied to the well known Dudley fossil Calymene Blumenbachii. (Tatlow, P. C.)

CALYSTEGIA (from καλυστής, calyx, and εγγύς, to cover) 1, a genus of plants composed of species formerly included under Convolvulus. It is distinguished by two large bracts which enclose the flower. It has 5-parted calyx, a campanulate 5-plicate corolla, one style, a 2-lobed stigma, globose or terete lobes, a 2-celled ovary with 2 ovules; the capsule only 1-celled from the shortness of the dissepiment.

The species are laticeous, glabrous, twining or prostrate herbs, with solitary 1-flowered peduncles.

C. sepium, Great Bindweed, has sagittate or cordate, very acute, acuminate, entire, cordate, keeled; acute bracts longer than the calyx, but one half shorter than the corolla; the peduncles square, sepal acute. This is the Convolvulus sepium of older botanists. The genus Calystegia is not respect by Malvasia, and is called Gemma Silicium. In the description of 20 or 30 grains it has been recommended as a hydropugous cathartic in dropsy, by Mason Good.

C. soldanella, Sea Bindweed, has trailing, glabrous, rather fresh green, ovate, or a little broader, angular, wings, angled large, ovate, blunt, mucronate, generally shorter than the calyx. It is a native of many parts of Europe on the sea-coast, and also some parts of Asia. The young stalks are sometimes eaten pickled. The juice of the mature plant is however a cathartic.

Several other species of this genus are described. Like the Convolvulus, they are elegant in growth, and most easy culture. They may be propagated by pieces of the root or by seeds. The C. Soldanella should now and then be watered with salt water.

(See Linnean's Dictionary)

CAMBIA/SO, LUCA, sometimes called LUCIETTO DA GENOVA, a very celebrated Italian painter in fresco and oil, was born at Monalea near Genoa, on St. Luke's day, in 1527. He was instructed by his father Giovanni, a painter of Genoa, and distinguished himself as an artist when a boy, and though he is not known to have visited Rome in his youth, his best works have many of the qualities of the great Roman masters. After a long and honorable residence in Genoa, where he did not receive a rival, he was, in 1583, to Spain, with his son Ondan and L. Cano, one of his pupils, to assist him in some works which Philip II. had commissioned him to execute in the Escorial. Cambiaso was invited to Spain by Philip II. to supply the place of his old friend and follower George de Gemme, who died in Madrid in 1579. Cambiaso and his brother executed several paintings together in Genoa.

Cambiaso executed several works in the Escorial, the largest of which was an immense fresco of Paradise, consisting of a vast number of figures, arranged as the monks stand on the ceiling of the choir of the church of St. Leocastro. He received 12,000 ducats for this picture, yet it occupied him only fifteen months; it was however in the opinion of many the best of his works in Genoa; the composition is formal and bad, but for this the monks must be held responsible. The oil painting of John the Baptist preaching in the Wilderness, also in the Escorial, is the best of his Spanish works. He died at the Escorial in 1584, and Philip greatly regretted his loss. He was called Cagio by the Spaniards. He was a painter of surprising facility and power; Armenini compared him with Tintoretto. He painted however latterly with great negligence, a stream of works which once promise to a disappointment is seen. The story is this: his wife died, and Cambiaso invited her sister to keep house for him and take care of his children; he however soon became desperately in love with her, so he could not marry her by the law of the Roman church, he set out for Rome to pray the Pope Gregory XIII. for dispensation. He took two pictures with him as presents for his holiness, which were accepted, but his prayer was disavowed, and he was ordered to remove the lady from his house;柬此, he could not marry her by the law of the Roman church, for dispensation is seen. He was called Cagio by the Spaniards. He was a painter of surprising facility and power; Armenini compared him with Tintoretto. He painted however latterly with great negligence, a stream of works which once promise to a disappointment is seen. The story is this: his wife died, and Cambiaso invited her sister to keep house for him and take care of his children; he however soon became desperately in love with her, so he could not marry her by the law of the Roman church, he set out for Rome to pray the Pope Gregory XIII. for dispensation. He took two pictures with him as presents for his holiness, which were accepted, but his prayer was disavowed, and he was ordered to remove the lady from his house; \n
CAMBRIAN ROCKS. Professor Sedgwick has a long establishment in North Wales, beyond a doubt, the important fact, that beneath the strata and flags of Denbighshire, the Cambrian strata are almost entirely covered by deep sediments, the surface being broken by numerous small basins, which are filled up with a variety of rocks and clays. The Cambrian rocks are consequently very imperfectly known to the geologist. The geologists of North Wales are therefore enabled to present the subjoined view of the formations separately proposed by Sedgwick and Murchison, in connection with the terms used in this work:
campanella was sent Viceroy to Naples by Philip III., and a fresh tax on 'fuci (hearts), or families, was imposed. Dis-

satisfaction became loud all over the country. In August, 1699, a citadine of Catanaro revealed the plan of a conspiracy, in which Campanella, his brother, and natives of Nicestra, were leaders. It was said that their object was to proclaim a republic, and that they relied upon the Turks for assistance, and had carried on a correspondence with Ci-

casa Pasha, a Turkish emissary, but his plan was frustrated, and the leaders, who were then scouring the neighbouring sea with his squadron. Such a plan may have been conceived by some person, but that a man of so much information and judgment as Campanella, who had spent many days in his works, a monk, and an advocate for a universal Christian monarchy, could have concocted a republic in Calabria by means of 'Turkish assistance and against the power of the Spanish monarchy, is incredible, and the sequel tends to disprove the charge. The probability is, he was impeached of perjury and false accusation, and himself indignantly against the oppression of the viceregal government, and that his historical information supplied him with comparisons unfavourable to it. Campanella and Dionisio Fonzie were arrested, together with many more, and sent to Naples, where several of the conspirators, having confessed under torture, were executed. Campanella remained in a dungeon for years; he was put to the torture seven times, five times his trial was begun afresh, but he confessed nothing, and was never brought to trial. After some time his imprison-

ment was mitigated, and he was allowed to see his friends. Charges of heresy were mixed up with political charges against him; he was even accused of being the author of the book published on Tribus Imperii, wherein Campanella had been published thirty years before he was born. The Calabrian Giannone asserts that Campanella was really a leader of the Great conspiracy, which he says was concocted chiefly by monks; but Giannone, like most Neapolitan jurists, was pre-


dered against monks and churchmen in general, and be-

lieved the insinuations of the viceregal lawyers. He says that he had seen a copy of the proceedings against Campanella and his fellow-conspirators, but we know what the forms of the trial was, and the extent of the continuance; and the continuation to Giucicardini, has followed Giannone implicitly. A search has been lately made in the archives of Naples for the papers relative to Campanella's imprisonment and trial, but nothing has been found. Most of the documents existing of the viceregal judicial administration are of a later date than Campanella's trial; the previous records of the sixteenth and begin-

ning of the seventeenth century are missing. Antonio Serra, a Calabrian, and one of the earliest writers on political economy, was one of the individual judges who were tried before Campanella, and he also was tortured and kept in prison. [POLITICAL ECONOMY, P. C.] Campanella enjoyed at one time a glimpse of favour from the viceroy Duke of Osuna, who loved to converse with him on politics; but when this viceroy was succeeded, on the return of the Spanish, he tended to assume supreme power at Naples, Campanella became the object of fresh suspicions, and his captivity was made more rigorous. At last, in 1626, he was released from his prison at the pressing request of Pope Urban VII., but, probably in order to obtain his release, urged that as the prisoner had been charged with heresy and was moreover an ecclesiastic, he ought to appear before the tribunal of the Inquisition. Campanella was therefore sent to Rome, and lodged in the building of the Holy Ofce, where previously he was a prisoner at large, and was treated with considerate attention. After three years more, making in all thirty years of confinement, he was allowed his full freedom. He remained for several years under the favour of the court, and was also received at Rome, but his papers were seized on the road, and it seems that they found their way to the archives of the Inquisition at Rome; but the author remained un molested for the present. From Rome Campanella returned to his native country, where he liv'd for some time at Stilo, the selling of his books adorning him, and leading to his admission into the Confiscation of Italy, at the request of a senator of Venice, on the question, whether the foreign ambassadors at Venice should be allowed to arrange the Senate in their respective language. The Senate was not in any way interfered with, and Campanella returned to Padua, where he finished the writing of his universal treatise on the state of the world, which he called 'Vomero; and it is said that he was sent to the Spanish Inquisition, and that his book was burnt at Rome, that the text was destroyed, and that the Inquisition was not satisfied.
made them cry aloud against the protection granted by the pope to a turbulent friar, whom they compared to Luther. Campanella stood evidently in danger, even in the midst of Rome; so great was then the dread of the Spanish power in Italy, that the pope himself appeared to be deemed insufficient, and Nollius proposed to Campanella to take refuge in France, and he sent him off in his own carriage, disguised as one of his attendants, and with letters of recommendation to the minister Cardinal Richelieu. Campanella arrived safely at Mars- sen in March 1634; he sat at the learned Pwder, who treated him most kindly and provided him with necessi- ties for the remainder of his journey. At Paris he had a very favourable reception from Richelieu, who conversed with him for hours together, and introduced him to Louis XIII., who granted him a pension. Campanella, worn out by his sufferings, retired to the conven of his or- der, the afterwards famous Convent of the Jacobins in the Rue St. Honoré, where he died, in 1669.

The works of Campanella are very numerous. The Do- minican bibliographers Echard and Quetif, "Scriptor Ord. Prud.," give a long catalogue of his inedited works. Among those that have been published, the following are deserving of notice.—1. "Prediconum Philosophiae Insanum, seu de Natura Rerum, cum Praefatione ad Philosophos Germaniae," Frankfort, 1617. The preface is by Tobias Adami, a learned German, who became acquainted with Campanella in his con- fession at Rome. Campanella intrusted him with several of his works 2. "De Fato Sibi et De Sensu Nullius Dominum Mundum esse Del vivum statum beneque cognoscentem; omnes illius partes sensa donatas esse, quacumque ipsarum conservatio sufficit; et fere omnium naturae aque- ronum, "Frankfort, 1629. 3. ", another work, was composed, as well as several others, by Campanella during his Neapolitan captivity, and was published in Germany by Adami, but the author published a second edition of it at Paris in 1636, which he dedicated to Cardinal Richelieu. Father Mesenne wrote to refute the book as heretical, and Athanasius of Constantinople wrote against it his "Anti-Cam- panella," Paris, 1655. 3. "Realis Philosophiae Epilogistico Partes IV.," tobi Adami Annotationibus, accedit Ap- pareniis hominm eruditorum, Tito: Ch. Sola, seu Libri Philosophici," Frankfort, 1650. The "Civilis Sola's" has been often reprinted separately, and translated into various languages. 4. "Apologia pro Galileo, ubi discutitur urano radio philosophandu quam Galileus celebret favrat Scripturae sacris an adversatur," Frankfort, 1662. 5. "Astrologiae Rerum Libri VI.," Lyon, 1622. A second edition was published at Frankfort in 1630, with the addition of a seventh book, "De Fato Sideral viando." Campanella had faith in astrology; 6. "De Evagrypho, seu omnibus, cum comprobatur, non cognitum in Rome, 1631; and a second edition, with additions, Paris, 1636. 7. "De Predestinatione, Electione, Reproduction, exullius Divinae Gratiae, Cento Thomisticum," Paris, 1636. The author discusses some of the opinions of Thomas Aquinas, and defends Aristotle against the Irish and the English. 8. "Germanicam Metaphysicurn Rerum Libri XVIII.," Paris, 1638. 9. "Philosophiae Rationalis Partes Quinque," 10. "De Gentilismo Non Reditendo Quaestio unica," Paris, 1636. The ques- tion proposed is, whether it is lawful to contradict Aristotle. The following works of Campanella were published after the death of the author. 11. "De Libris propriis et recta Ratione Studendi," Paris, 1642, in which the author speaks of himself, his studies, and his works. It was edited by Nollius, who knew Campanella during his imprisonment in his "Considerations Politiques sur les Coupe d'Etats," 12. "De Monarchia Hispanica Discursus," Amsterdam, 1640. This, perhaps the most remarkable work of Campanella, was written after his confidential stay in Naples. It is an ab- solute sketch of the political world of that time, and with reference to the Spanish monarchy, which was then the preponderating power, it showed how that preponderance could be increased. The author has been com- pared to Machiavel, but there is no apparent difference between them, that although Campanella is not very scrupulous as to sincerity and faith in political transactions, yet he reproves cruelty and persecution, and prefers milder and more humane manners. In fact his age was different from Machiaveli's, and such barefaced atrocities as those of Borgia would not have been tolerated. In many respects the advice which Cam- panella gives to the King of Spain, especially concerning the in-ternal administration, is very sound. This work made great noise at the time; it was reprinted several times, and was translated into English, and published during Cromwell's

Protectorate : "A Discourse touching the Spanish Monarchy, wherein we have a political glass representing each partic- ular country, province, kingdom, and empire of the world, with ways of government by which they are kept in obedience, written by Thomas Campanella, a Spaniard, in the learned Pwder of Paris, for attaining the Universal Monarchy of the World, prima- rily concerning England, Scotland, and Ireland, how to rise division between King and Parliament, to alter the govern- ment, and form a Commonwealth. And introduction to Holland and other seafaring countries, &c., with a preface by William Prynne of Lincoln's Inn." The following same will serve to give some idea of the tenor of the work, which was written towards the end of Elizabeth's reign—by opinion is that the King of Spain should do well to retire under hand some certain merchants of Florence that are sly and subtle persons, and that traffick at Antwerp, who (be- cause they are not so much hated by the English as the Spaniards) are treated with some such of the English as are some- way or other descended from some of the former kings at England, and should promise each of them severally (so of them knowing anything of what is said to the other) in the possible aid that can be from Spain, for the resisting the adventurers plot, and the change of the King's person to King James of Scotland, and promise him that he will assist him to the utmost of his power in his getting possession of the kingdom of England, upon this condition, that he will neither send in the English as conquerors, nor as aforesaid, but that he shall not annoy or any way disturb the Spanish from the West Indies. Again, on the other side, let the Eng- landers under labour with the English peers, and other chief of the Parliament, and egge them on to moderate their own people, and to abandon from the kingdom of England, either in the form of a republic, or else make it into a king- dom of itself, throwing off all obedience to England, with promising aids to each of them in particular, and that so much the rather, because in that kingdom or island the Catholics, and especially the friars that are in the order of St. Francis, are very greatly esteemed and beloved. There is also not greater agreement and correspondence between the Spanish and the Irish than betwixt them and the English, whither to be, might be very advantageous to them, and which is also the reason of the elime, and the nearness of these two countries one to the other. There are also in Ireland many voluntary persons, and such as have fled their countries, being men that are most impatient of government, and yet are good people, and the philosophy of this kind, as it hath been shown already. But this sort of men is not very rare to be found, either in England or Scotland also. (Special Monarchy, chap. 25.)
CAMPANULA (diminutive of Campana, on account of the bell-shaped flowers) is the common name of a genus of plants belonging to the Campanulaceae order. C. pulchella, the campanula, is an elegant plant with flowers in a terminal raceme. C. rapunculus, the radish plant, is a member of this genus.

C. canina, the foxglove, is a species of C. pulchella. Its flowers are blue or white, and it is often cultivated for its ornamental value.

C. nemoralis, the meadow saxifrage, is a species of C. pulchella that is found in Europe. Its flowers are white and are often used in gardens.

C. grandiflora, the great bellflower, is a species of C. pulchella that is found in Europe. Its flowers are large and white, and it is often cultivated for its ornamental value.

C. impatiens, the touch-me-not, is a species of C. pulchella that is found in Europe. Its flowers are purple or pink, and it is often used as a garden plant.

C. acaulis, the small bellflower, is a species of C. pulchella that is found in Europe. Its flowers are small and white, and it is often used in gardens.

C. palustris, the marsh bellflower, is a species of C. pulchella that is found in Europe. Its flowers are white and are often used in gardens.

C. matricaria, the matricaria, is a species of C. pulchella that is found in Europe. Its flowers are blue and are often used in gardens.

C. muralis, the wallflower, is a species of C. pulchella that is found in Europe. Its flowers are orange or red, and it is often used as a garden plant.

C. nana, the dwarf bellflower, is a species of C. pulchella that is found in Europe. Its flowers are small and white, and it is often used in gardens.
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CAMP, THOMAS, was born July 27, 1777, at Glasgow, where his father, who was the youngest son of a Highland laird, Campbell of Kerness, and had then attained the age of sixty, had spent his life as a merchant, but was now out of business. Thomas was the youngest of a family of ten sons and daughters. At the university of his native city, where he was educated, he appears to have divided his time between the usual exercises and many of which his general industry and proficency. It is related that a translation (into verse, we suppose) of the Clouds of Aristophanes, for which he obtained a prize in the Greek class, was pronounced by the professor, the late learned and eccentric Professor Young, to be the best exercise ever given in any student of the university. Others of his performances of this date were, several poetical translations from Sophocles, Tyrtaeus, and other Greek writers, some of which are still preserved, and which, if the university papers, and had been for a short space resident in Edinburgh, when he published there, in April, 1799, his Pleasures of Hope, which brought him at once to notice. Few first poems indeed have ever made so great a sensation; and it has come to pass that a great number of the world, who, perhaps, never saw Campbell before, or had been conversant with the most popular with readers will not rest principally upon this juvenile work. It is, to be sure, in subject, form, and extent, the work of greatest pretension that he has left us. Yet, with all its imposing declamatory splendour, and the true poet's glow that animates it, it betrays, both in execution and in substance, the raw and unskilful mind of youth, and it will probably not be the production on which its author's more enduring fame will stand. It was a poem of extraordinary promise however for a first production; of which almost before any other young writer has shown in our more recent literature. Certainly at least it could not be considered as a mere clever imitation of any reigning model or other previous poetry; taken all in all, in its faults as well as its beauties, its manner and spirit were its own. It is said that the profits he derived from the sale of the Pleasures of Hope enabled Campbell to visit the Continent, which he did in the latter part of the year 1800. He saw part of Germany, and having proceeded along the rest of the Rhine, he reached the safe distance of the battle of Hohenlinden, fought in December of that year. He was stopped in attempting to pass into Italy, and returned to England by the way of Hamburg. A severe cold, he says, destroyed his health, and obliged him to return to Edinburgh; with other poems, among which were his noble verses on the battle of Hohenlinden; his spirited and stirring song, Ye Mariners of England, written at Hamburg on the prospect of war with Denmark, his Exile of Erin, also written there; and his Lochiel's Warning, which had been written at Edinburgh since his return. After being nearly two years in Edinburgh, he came to London in 1803; and having in the autumn of that year married his cousin, Miss Matilda Sinclair, he appears to have continued in earnest the pursuit of literature as a profession. Among the works which he produced in the course of the next five or six years, was a compilation, published anonymously at Edinburgh in 1807, in three volumes, 8vo., entitled Annals of Great Britain, from the Accession of George III. to the Peace of Amiens. He also contributed several articles to the Edinburgh Encyclopaedia, begun in 1808, under the superintendence of Dr. (now Sir David) Brewster. Meanwhile, in 1806, he had received from the Marquis of Hartfort penance for 2000. a-year, which he enjoyed while he lived. With the exception of a few occasional short pieces, he published no more poetry till his Gertrude of Wyoming appeared in 1814, accompanied in the first edition by Lord Ullin's Daughter' and his Battle, though it is perhaps the finest lyric; and in a subsequent edition by his beautiful and passionate tale of 'O'Connor's Child.' Gertrude of

Wyoming 'is written upon the whole in a much purer style than the Pleasures of Hope'-though still not without occasional forms of expression having more sound than sense, such for example as the transport and security entwine which耳 have explored the recesses of the British poets,' in seven volumes, 8vo. (reprinted in 1841, in one volume, 8vo., with additional notes by Mr. P. Cunningham). The 'Essay on English Poetry' by which this work is introduced is written in many passages with great beauty and classic correctness. The year after its publication the author delivered a course of lectures on English Poetry, at the Surrey Institution, where Hazlitt had lectured on the same subject two years before. In 1830 also Campbell undertook the editorship of the New Monthly Magazine, which he retained till 1833. In 1824 he published his 'Theodric, a domestic tale:' it wants the force and fire of some of his other poetry, but it is perhaps the sweetest of all his poems. He never wrote anything in a more poetical and touching manner than in the close of this poem. For some years after this he was much occupied by the interest he took in the emancipation of Greece and of Poland, and also in the project of the London University, now University College (which he contributed largely to), to which Campbell was a very devoted friend. Campbell had in originating the idea of a university in London, the execution of the work is due to others. [University College, P.C.] In 1827 he was elected Rector of the University of Glasgow, taking up his residence in the city in the two following years. He lost his wife, by whom he had one son, who survives him, in 1830; in 1831 he established the Metropolitan Magazine upon relinquishing or losing the editorship of the New Monthly, but retained its management as a member of the firm of Longman, Hurst, Rees, Orme, and Brown. In 1832 he paid a visit to Algiers, an account of which he published in the Metropolitan Magazine in a series of papers, afterwards, in 1837, collected and reprinted in two volumes, 8vo., under the title of 'Letters from the South.' The other publications of his last years, none of which brought him much reputation, were a 'Life of Mrs. Siddons,' 2 vols. 8vo. 1834; a 'Life of Petrarch,' 2 vols. 8vo. 1841; 'Life and Times of Frederick the Great' (of this he professed to be charmed), 1839; and one of his most interesting works, 'Pilgrim of Glencoe,' a poem, 8vo. 1842. In the summer of 1843 he retired to Boulougne; and he died there on the 16th of June, 1844. His body was brought over to England, and interred on the 2d of July in Westminster Abbey, near the centre of Poet's Corner, close to the tomb of Addison.

(Gentlemen's Magazine for August, 1844; Chambers' Cyclopaedia of English Literature, vol. ii. pp. 369, 370; and Campbell's various Works.)

CAMP, the name of a celebrated family of painters of Cremona. The eldest and master of the others was Giulio Campi; the others were Antonio, Vincenzo, and Bernarino Campi; the first three were the sons of Galleano Campi, who died in 1536, the last apparently their cousin. Antonio and Vincenzo were both living in 1591, in which year the latter died. Antonio was painter and architect.

Giulio, according to Lanzi, was the Ludovico, and Bernarino the Annihale, comparing them with the Carracci as a school. Giulio was born about 1500, and died in 1572. He was the scholar of Giulio Romano at Mantua, and contributed greatly to the dissemination of the principles of the Roman School throughout Lombardy. As to the rest of those as those of all the Campi, are very numerous. In many instances he has combined the vigour of design of Giulio Romano with the colour of Titian, but his works are in various styles.

Bernardino Campi was born in 1522, and died about 1590. Though instructed by Giulio, he adopted a different style from his cousin, and is generally allowed to have surpassed him. They were both very similar in colour, in design and composition, but they were more different than they appear.
Sugar the flows, he establishment thence feet the now-certain treaty Hall's 1757, the of Britain the Mountais. Since, the point of the point. August 1757, the United States. expected its, expected in 1816 and 1817 to its intersection with the river St. John and to the middle of the channel of the river; thence to the mount of the river St. Francis, along its channel and the lakes through which it flow, to the outlet of Lake Pobenagemook, thence south-westery in a straight line to a point on the north-west branch of the river St. John—which point is to be 10 miles distant from the main branch of the St. John, but if the said point is found to be less than 7 miles from its head, to be public purposes. All the rivers falling into the St. Lawrence and the St. John, then the said point to recede down the said north-west branch of the St. John to a point 7 miles from the crest—thence, in a straight line, to where the said lands intersect the section point of the St. John; thence southerly to its source at Metajermere Portage and along the highlands which divide the rivers falling into the St. Lawrence from those falling into the Atlantic to Hall's stream, and down the middle of it, thence northwesterly on the line of the boundary surveyed previously to the year 1774 at the 45th degree of N. lat., and thence west along this line to the St. Lawrence.

The southern boundary is altered at the entrance to Lake Superior so as to transfer to the United States the island of St. George, or Sugar Island. The line is then carried through Lake Superior north of Isle Royale, then south-west to Figeon river, along it, and Lake Saisiagenea, Cypress, Bois Blanc, La Croix, Little Vermillion, Namecan, and La Phie to Chaudière Falls, thence to the north-western point of the Lake of the Woods (49° 22' 55" N. lat. and 95° 14' 36" W. long.), thence due south to its intersection with the parallel of lat. and along that parallel to the Rocky Mountains.

These lines were defined to settle differences which had arisen on the construction of the treaty made between Great Britain and the United States in the year 1783. Previous to this treaty, the extent of the territory granted to the United States was considerably than at present—extending as far south as the source of the Mississippi (47° 10' N. lat.), and from the source of this river west to the Rocky Mountains. According to the French special map, St. Louis, by more than 200,000 acres. The Beausoleil line was drawn in a straight line along the boundary surveyed previously to the year 1776, it included all the country not then defined as part of the province of Louisiana.

Since the article in the P. C. was written some magnificent works connected with the navigation of the St. Lawrence have been undertaken. The first of these is the enlargement of the Welland Canal, uniting Lakes Erie and Ontario on the north of the Niagara river. The new locks are 265 feet wide, 84 feet in depth, and 145 feet long. The canal (set at 6 feet wide) was 20 feet wide, 40 feet deep. The estimated cost of the improvements is 405,000$, and they are expected to be completed in the present year (1845). The canals uniting Lake Ontario with the great ports of the province are the Cornwall, the Beausoleil, and Lachine. These works cost the State of New York $2,976,500, but the lines are not yet completed. It is situated on the south side of the river; the length is about 12 miles, and the cost of its expansion is 248,976$. It unites the Lakes St. Francis and St. Louis, the navigation between which is checked by the cataracts of Islandia, and the construction of a canal to enable boats to avoid the necessity which now exists of going along the Rideau canal—a work which will lose much of its usefulness for commercial purposes. The enlargement of the Lachine canal, at an estimated cost of 208,636$, is expected to be completed in 1846. It ought originally to have been carried down to Lake Lachine, the upper end of St. Louis, to the most eastern part of the city of Montreal, and crossed the St. Lawrence below the island of St. Helene. It would thus have afforded winter docks for vessels at Montreal, and have saved the trade the expenses of steamers to bring down the great vessels up the rapids at the north-east end of St. Helene's island.

The Champlain canal, which unites the lake of Champlain with the Richelieu river, and by this river with the St. Lawrence, is completed.

The tenure of land in the Seignorial districts of Lower Canada, that is, with two exceptions, of lands granted by the crown of France, is remarkable, and as a system of colonization deserves notice. A tract of land, varying in extent from 200 acres, sometimes has been the grant of the Beauchampois, which is six square leagues—was granted to a seignor, or lord of a manor, to re-grant to others at a certain fixed rent (cens). The seignor held of the crown upon the accustomed rents and dues, according to the custom of Paris: he had a local legal jurisdiction, which has now abolished; he performed homage on a mutation of possession; he was to reside by express condition of some grants (tenant feu et liens); certain timber was to be reserved for him; he was to make no trade without the privilege of trading with the Indians. On alienation by the seignor, the fifth part of the purchase-money (pont) was paid to the crown. He was bound to make grants of the lands to his subjects at an accustomed rent, and was not permitted to sell such lands to others. He also paid a right to the crown by the payment of a right to the crown by the payment of the service of the purchase-money (droit de bannalité), or the grinding of corn at his mill; and the right of pre-emption (droit de retrait) of lands offered for sale by persons within the seignory.

Any settler, not already possessed of land, was entitled to demand of right, from the seignor, a grant of waste land, usually of about 90 acres, at the accustomed rent, commonly a sol or more an acre; and the seignors were directed to make grants of the lands of holders of titles of the Crown, and common seignorroy; the grants were to be personally to occupy his land under the penalty of its re-union to the domain; he was to clear the land; to make and repair roads; to preserve timber for the crown; to give notice of minerals; and on alienation one-twelfth of the purchase-money (lods et ventes) was to be paid to the seignor.

The system had many advantages. The settler had no more land than his means enabled him to cultivate; what he required he was to purchase; he was free from any condition that no mill of any kind shall be erected by the tenant—a condition beyond the authority of the seignor to impose, and as a general condition perhaps void, as being opposed to public policy. The right of pre-emption, which was formerly perhaps beneficial in some extensive land speculation, has been used to gratify personal animosity. The accustomed rent has been increased, as though it was a farm rent, and this has also been done to evade the penalty of forfeiture imposed on the tenant. It is reported also that the price of the sum—a proceeding which induced the commissioners who lately reported on the subject, to observe that they could recognise no difference between demanding for a concession a sum of money in the nature of a price, and the stipulation of the settler for an equivalent amount in money, there would be a violation by the seignor of the original conditions of his grant.

The abuses of the system have occasioned many complaints in the province, and has also given rise to some feeling in favor of the commutation of the fines payable on alienation. But instead of submitting the subject to the Provincial Legislature, which was perfectly competent to deal with it, the government passed the imperial act of the 6th of April, 1812, called 'the Commissions' Act,' which placed matters in a worse state than before. Instead of enforcing on the seignors the duty to make grants, which many refused to do;
placing the rent in a uniform state, and checking the abuses of the seigniors; this act enables the seigniors to pay the fifth (guite) to the crown, and on so doing the tenure of the land is commuted into free and common socage; the waste lands, which they only held on trust for public purposes, became public property. The tenants of the tenures, who were alleged to justify this measure, are left more completely at the mercy of the seigniors than before, and no conditions are imposed on the seigniors to afford them any relief. It has been asserted, say the Commissioners, by persons from various districts of the province, that the feudal exactions and the neglect of the government to enforce the ancient laws of the Province in relation to the tenure, conducted in no small degree to the outbreaks in 1837 and 1838. A system of justice and enforcement, it would have been found to have been infinitely preferable to making large grants to land-companies—for even under its imperfect working, the French settlements of Lower Canada present a remarkable spectacle of successful colonization, though checked by circumstances which have seriously interfered with the activity and energy of the population.

There are 223 seigniories in Lower Canada. They are almost inclosed by the townships, or lands held in free and common socage. The system of land-holding is defective in not being connected with a general land-tax on all waste lands not in the possession of the crown. The surveyors' note books and surveys ought also to be as generally accessible as similar documents are in the United States, to every person desirous of obtaining information of any land proposed to be sold by the government. (Report of the Commissioners on the Seignorial Tenure of Lower Canada, 1844.)

The sketch of the political history of Canada was brought down to the P. C. to the year 1800, when Sir F. Head, who had been appointed lieutenant-governor of Upper Canada in December, 1835, was in the province; and Lord Gosford was governor of British North America. At that time there were associated with the latter, as commissioners, to inquire into the condition of the province, Sir G. Alvey, judge, and Sir G. Gipps, an officer of engineers. The events since this period have produced a great change in the government of the province. The amicable feelings which at first prevailed in the assembly of Lower Canada and Bermuda were interrupted by the unexpected disclosure made, during the sitting of parliament, by Sir F. Head, of the instructions given by the British government to Lord Gosford, which were considered to indicate a want of good faith in the mission with which he was charged. The supplies were consequently refused. But in the same session the House of Assembly sat 109 days—117 bills were introduced; 58 were passed; 34 were passed by the Assembly and rejected by the Legislative Council; 15 were passed and returned with amendments by the council; 10 were introduced into the assembly and not passed; 5 were received from the council and not passed, and one was reserved for the sanction of the home government; 81 reports were made by standing committees, and 104 reports were made by special committees. Of these measures not one has been specified as injurious to British interests. The refusal of supplies, the demand for a reform of the Legislative Council, the opposition to a war-chest, the disposal of public lands, and the influence of the legislature over the responsibility of the members of the administration to the house, were the acts for which the assembly has been accustomed. The house was composed of 88 members, of whom the government had only the support of about 9; and this was the normal state of the system. A responsible government did not exist, and the country was governed as a Crown colony, the members of the administration having rarely been taken from the house and never from the party composing the majority.

It is important to remark, that on August 20, 1836, the Hon. Mr. Baldwin, in a letter to Lord Stanley, proposed the establishment in Canada, of a provincial cabinet, composed of persons possessed of public confidence, and whose opinions and policy should be in harmony with that of the representatives of the people. He stated that in Upper Canada, from 1824 to 1828, and of the organization of the executive council, in the assembly and in parliament ten resolutions. The 1st stated that supplies amounting to 142,160l. had been refused in Lower Canada between the years 1832 and 1837; 2nd, that in October, 1836, the governor had applied to the assembly for the arrest of the French inhabitants of Lower Canada, the whole system of justice and enforcement being in a state of ruin; 3rd, that the House of Assembly, on the 3rd of October, 1836, had refused the supplies and required an elective legislative council; the repeal of the North American Land Company Act; and the free exercise of its control over all branches of the executive government; 4th, that the existing state of Lower Canada, it was unadvisable to make the council elective, but that measures should be adopted to secure it to a greater degree of public confidence; 5th, that the province of Lower Canada, with the consent of the executive council in Lower Canada, it was unavoidable to subject it to the responsibility demanded by the House of Assembly; 6th, that the title of land held by the Nee United States in Lower Canada should be confirmed; 7th, that it was expedient, when lands in Lower Canada shall be discharged from feudal dues and services, to repeal the Canada Tenures Act; 8th, that for discharging arrears, the receiver-general of the province should be empowered to sell the lands; 9th, that the government, by its direct influence over the hereditary, territorial, and casual revenues of the province, should be placed at the disposal of the legislature; 10th, the legislature of Lower Canada, 1st convoked on the 10th of August, 1837, when the resolutions passed in the British parliament were communicated; but the assembly adhered to its demands, the propriety of which it considered the resolution of the British parliament to be on the immediate question of the place. Matters were brought to an issue by the arrest of two provincial leaders, who were rescued. Warrants were issued for the arrest of others; the posse of the districts of Chaudiére and Chambly were used to support the military. The issue was not doubtful, but the horrors of a civil war were witnessed. At St. Eustache, Sir J. Colborne had no influence over the militia who accompanied him, and houses were burnt and people pillaged after they had been lettered, and in opposition to his orders. About the same time an insurrection occurred in Upper Canada, where considerable insurrection prevailed against the government. It was suppressed. The military force in both sections of the province being small, and the absence of provisions having weakened the authority of the administration, martial law was proclaimed.

Lord Gosford was recalled from Lower Canada, and Sir J. Colborne became Administrator. Sir F. Head was recalled from Upper Canada, and was succeeded by Sir G. Lowther. On January 16, 1839, the Earl of Durham was appointed governor of Canada and high commissioner for the adjustment of Canadian affairs. On the 10th of February the Act for the Union of Upper and Lower Canada, and empowering the appointment of a special council, Lord Durham arrived in Canada May 27, and on June 23, 1839, passed an ordinance, by which it was enacted that no person or persons, excepting by special pleasure of the said council, should be admitted into the province, they should suffer death if convicted of being found at large or coming into the province. Other persons were also transported to Bermuda, a place beyond the jurisdiction of the government of Canada. This ordinance was disallowed by the Crown, and, in consequence of being
taken by Lord Durham at this step, and the Act to indemnify
him, he threw up his office and returned to England without
leave. A report was however made by him on the affairs of
Canada, and it was agreed that the two provinces should be
united, and that the responsibility of members of the execu-
tive to the House of Assembly should be recognised by
connecting the administration with the majority of the house.
Another disturbance in Canada shortly afterwards occurred,
and the constitution of Lower Canada was further undermined
by another act of parliament. On the 23rd of July, 1840, the
Act of the 3 & 4 Viet. c. 35, for the re-union of the
province, was passed. It authorises the appointment of a legislative
council by the Crown of not fewer than thirty-four members; and
elects, that the two provinces shall return an equal number
of representatives to the House of Assembly (at present 42
each); that the city of Toronto shall return two members,
and the towns of Kingston, Brockville, Hamilton, Cornwall,
Niagara, London, and Bytown, in North America, one each;
that the cities of Quebec and Montreal shall return each two
members, and the towns of Three Rivers and Sherbrooke, one
each; that the members of the House of Assembly shall be
elected for four years; that all writs, proclamations, journals,
&c., of the council and assembly shall be in the English lan-
guage only; that the entire duties and revenues of the
province shall form one consolidated fund, and the sum of
75,000l. is specifically appropriated for the civil government
of the province; that the Act was brought before the
during the administration of Mr. Poultin Thomson, who was created
Lord Sydenham. Many of his measures have been severely
condemned, but his true merit was that he acted with the
majority of the assembly, though that majority for the time
was secured by questionable processes of elections;
and that, for the first time, the House of Assembly
was directly connected with the actual government of the
country, and with its administration. The House of Assembly
also passed, with his assent, the responsible government resolu-
tions, for the permanent establishment of this system. When
the land companies desired to interfere in the direction of the
public works, Lord Sydenham replied, that the local govern-
ment and the legislature were more intimately acquainted with
its works in questions than the great gentlemen in London,
and he acted as if convinced that the province must be governed through the aid of the representa-
tive body and local opinion.

On the death of Lord Sydenham, Sir C. Bagot was ap-
pointed to succeed him. He associated to his administration
some of the leading French Canadians, who had been un-
wisely excluded from office. This step had the happiest re-
sult, and party seemed banished from the province. He is said
to have been of that party to which much prejudice has been
cited to sustain the statement, and he governed in a
spirit of truth, honour, justice, and legality. Sir C. Bagot
was attacked by a fatal illness, and was superseded by Sir C. Met-
call, who presided in 1843. The government office have since resigned, and the first parliament of the
United Province was dissolved in consequence. They claimed
to be consulted on all public appointments, as responsible to the
Assembly for the conduct of public business. It does not
appear that any appointment which they proposed to make
was objectionable. An assertion of an uncontrolled prerogative on
this question of patronage has been made by the governor,
and it is identically the same with that which was contested in
this country during Lord John's administration. The new
ministry, which is chiefly composed of members of the old
official party, appears to have very nearly equal members, in the
new parliament, with the parliamentary or responsible government party; but their real position is at present unnder-
determined in consequence of many petitions on contested elections
remaining to be heard.

It is inexplicable that the Colonial Office should have hesi-
tated to act with cordiality and openness with the responsi-
ble members of the local administration, who are jointly
interested in the government of the province, and the dis-
pensation of public patronage by the local administration is
both a necessary sign of confidence and an element of political
strength. A weak executive can possess little power for any
beneficial purposes.

The last parliament restored the ancient boundaries of the
cities of Quebec and Montreal, which had been limited by
Lord Sydenham, and it petitioned the Crown against the
city of Toronto. It also petitioned the Crown against the clause of the Union Act re-
stricting the use of the French language.

The total expenses paid by this country on account of the
army, navy, ordnance, and commission in Canada in 1837,
was 189,048l. The total excess of expenditure, above this
amount, from the year 1837 to 1843, in consequence of the
invasion, has been 4,005,017l. The expenditure for these services in 1843 was 806,007l.

The population of the counties of Lower Canada in 1831
and 1843 was as follows:—

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<th>Counties</th>
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<th>1843</th>
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<tbody>
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<td>10,061</td>
<td>17,577</td>
</tr>
<tr>
<td>Gaspé</td>
<td>5,003</td>
<td>7,438</td>
</tr>
<tr>
<td>Bonaventure</td>
<td>6,100</td>
<td>8,230</td>
</tr>
</tbody>
</table>

Total, 1831, 511,012; 1843, 678,560, or increase 166,671.

The county of London includes those of L'Assomption
and Lachenne; that of Huntington, those of L'Acadie
and Lep itmari; that of Dorchester, those of Dorchester
and Beauce; and that of Montmorency, those of Montmorency
and Orleans, which counties were dissolved in 1831.
The population of the city of Montreal in 1840 was
40,137.

The population of Upper Canada in 1841 was as follows:—

<table>
<thead>
<tr>
<th>Province</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ottawa</td>
<td>9,324</td>
</tr>
<tr>
<td>Eastern</td>
<td>30,279</td>
</tr>
<tr>
<td>Johnstown</td>
<td>30,952</td>
</tr>
<tr>
<td>Bathurst</td>
<td>27,635</td>
</tr>
<tr>
<td>Prince Edward</td>
<td>14,661</td>
</tr>
<tr>
<td>Midland</td>
<td>32,208</td>
</tr>
<tr>
<td>Victoria</td>
<td>13,161</td>
</tr>
<tr>
<td>Newcastle</td>
<td>41,952</td>
</tr>
<tr>
<td>Home</td>
<td>64,401</td>
</tr>
</tbody>
</table>

Total in 1841, 455,301; in 1831, 321,903; increase, 133,398.

Total population of the whole province 1,133,851. The
population of the town of Kingston in 1841 was 6922;
Hamiton, 3418; and of Cornwall, 1407.

The total number of emigrants who arrived in the province,
at Quebec, from 1832 to 1842 both inclusive, was 227,608,
most of whom must have gone elsewhere.

The number of emigrants who arrived at Quebec in the
following years was:—

<table>
<thead>
<tr>
<th>Year</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1841</td>
<td>28,086</td>
</tr>
<tr>
<td>1842</td>
<td>44,374</td>
</tr>
<tr>
<td>1843</td>
<td>21,727</td>
</tr>
</tbody>
</table>

In 1844, 20,142; in 1845, 28,526; in 1846, 28,485; in 1847, 24,000; the total number of emigrants from the United Kingdom who arrived at ports of the
United States in part of the above period was:—
The arrival of shipping at Quebec in the following years was:

<table>
<thead>
<tr>
<th>Year</th>
<th>Ships</th>
<th>Tons</th>
</tr>
</thead>
<tbody>
<tr>
<td>1836</td>
<td>53,075</td>
<td>41,500</td>
</tr>
<tr>
<td>1837</td>
<td>34,000</td>
<td>1841, 45,017</td>
</tr>
<tr>
<td>1838</td>
<td>13,059</td>
<td>1842, 63,852</td>
</tr>
<tr>
<td>1839</td>
<td>24,376</td>
<td>1843, 28,825</td>
</tr>
<tr>
<td>Total</td>
<td>300,214</td>
<td></td>
</tr>
</tbody>
</table>

By a late alteration of duties, foreign wheat imported into Canada is taxed under a provincial act at 3s. per quarter, and wheat and flour exported from Canada may be imported into Great Britain at a duty of 1s. per quarter.

(Canadian Statute Books, from 1845.)

CANARIA, or Gran Canaria, is an island of the Canary group, to which it has given its name. It is situated between 27° 49' and 28° 15' N. lat., and between 15° 29' and 15° 45' W. long. It is nearly circular, and about twenty-four miles in circumference. At the circumference it is about sixty-five, like the other Canaries, is of volcanic origin, consisting of trachyte, basalt, and more recent volcanic productions. The surface is extremely uneven, and the rocks rise in general with a slope of 10°. The moors are, however, situated in the southern coast, and is called Pico del Foro de las Nieves.

The German naturalist Von Buch determined its elevation above the sea by the barometer, and found it to be 6226 English feet; but Lieutenant Arlett found it to be 6648 feet.

The island is situated in the centre of the island is the Roque de San Nicolás.

In the climate the Canaries resembles the island of Tenerife. Canaria has more anchorages than any other of the Canaries. The bank on which it is situated is a great deal to the south of the island. During the summer, when there is a north-east wind, the high land, by obstructing its course, occasions calms to prevail off the south-west end of the island to the distance of eight or nine miles from the land, where the current is continually changing. The same cause has the effect of creating a current close in shore, which the coasting vessels turn to account. The productions of this island do not differ from those of Tenerife [P. C., vol. xiv. p. 204], except that there are no camels on Canaria. The capital, Las Palmas, is built on a bay of moderate extent, which has tolerable anchorage. It is the largest town in the Canaries, having a population of 18,000 individuals. It is well built, and has a cathedral, hospital, and college, with convents of monks and nuns. The streets are well supplied with water, and are paved with cobblestones. The streets or principal squares. The market is well supplied with every kind of provision, especially of fruit. It carries on a considerable commerce with England and America, and sends a few small vessels to the fisheries on the western shores of the Saharan. Canaria was taken by the Spaniards in 1483, and has since remained in their possession.

(Glas, History and Conquest of the Canarias Islands; Von Buch, Physikalische Beschreibung der Canarischen Inseln; Die Canarischen Inseln. . . durch ihren gewissenhaften Eingeborenen; Mac Gregor; and Arlett's Survey of the Canary Islands, in London Geogr. Journal, vol. vi.)

CANCELLERI, FRANCESCO, born at Rome in 1519, was in the Roman college, and a professor of theology. He was afterward secretary to the senator Rezzonico, and afterwards librarian to the learned Cardinal Antonelli, Prefect of the Propaganda. In 1775 he edited a newly discovered fragment of the 81st book of Livy, with a preface on the occasion of the new accurate edition added by Pius VI. to the Basilica of the Vatican, Cancellieri undertook a work of historical and liturgical edification on the ancient office of Secretary of that Basilica, 'De Secretariis Basilarum Vaticanarum.' 4 vols. 4to., Rome, 1784, which contains a complete account of the office of the papal chancery in general. He afterwards published a 'Descrizione del Caccare Tulliano,' a notice on the statues of Pasquino and Marforio, as well as various treatises on the ecclesiastical polity and discipline of the Church; and in the pontifical chapel of the Vatican on great festival days; he explained the origin and meaning of the various ceremonies, of which appear to the learned and unlearned, and gives a description of the Pontifical and Cardinalia of all the Orders of the Church.

Most of these treatises have been translated into French.

When the French revolutionists drove away Pius VI. from Rome, in February, 1798, Cancellieri was separated from his patron, and should have been sent off to a western border early in the summer.

(London, Encyclopaedia of Plants.)

CA'NO, ALONSO, a very celebrated Spanish painter, sculptor, and architect, was born at Granada, in 1601. He was educated in Seville, with his father, an architect, had removed; and he studied sculpture there, under J. Montanes, and painting under Pacheco and Juan de Castillo, all men of celebrity; but Cano's true masters in design were some ancient statues in the Casa de Pilatos, belonging to the Duke of Alcañiz. Cano is called the Michelangelo of Spain; in some respects they were similar, but the similarity is more in the extent of their abilities than in the quality. Cano, as did also Michelangelo, obtained his reputation first by sculpture, and as early as 1630, he had earned such celebrity, that he was appointed painter to King Philip IV, of Spain, and had the superintendence of various architectural works in the royal palaces of Madrid and in the city. After various adventures in the principal cities of the south of Spain, Cano having a leaving nature, he had not a single scholar who approached him in ability. His works, which are conspicuous for vigour of design, richness of colour, and boldness of execution, are very numerous; there are many at Seville, Xeres, Cordova, Madrid, the Escorial, Arcos de la Frontera, Granada, Malaga, Algeciras, Malaga, Malaga, and Granada, where, in the church of San Diego, a Conception of the Virgin with angels is considered his masterpiece.

Cano was of a singular disposition and of a violent temper, which on more than one occasion pleased him in great danger of the Inquisition. He was accused of having assassinated his wife out of jealousy; but the charge rests solely upon the testimony of Falomino, who wrote many years after the event, that Cano said he would murder his wife, in vain for a record of any process against him. The story is, that at Madrid, in 1843, when he returned home one evening, he found his wife assassinated, his house robbed, and an Italian assistant who used to live with him had absconded; but notwithstanding the presumptive evidence against the Italian, Cano was himself accused of the murder, and was put to the rack; no confession however being elicited from him, he was released and absolved of the charge. Upon his plea of exceision and of ars, his application was granted by the Inquisition. Several years after, in 1856, when he was in Granada, a councillor of that city commissioned him to make a small figure of Saint Antony of Padua; for which, when finished, he was asked 100 ducats for his work. But at the proper time that Cano had been about the work, said, "Why, you have been 25 days only, over this figure, and you are charging me four pistoles per day for your work, an exorbitant rate; for I, who am a councillor, do not receive half so much." Upon which Cano, greatly insulted at his misplaced artifice, furiously answered, "I have been 50 years learning to make this figure in 25 days;" and immediately dashed the saint to pieces on the pavement, to the great consternation and horror of the simple councilor, who made all haste out of the house of a man who could so unceremoniously demolish a saint. The act was in fact a capital offence; but it appears to have been unknown to the Inquisition. A similar destruction of an image of the Virgin caused the death of Torrigiano, who was convicted of heresy, and was beheaded before his sentence was carried into effect. Cano is said also on his death-bed to have refused to take the crucifix presented to him by the priest, on account of its bad workmanship.

Palmolino, Montaner, Ciceronian Sketches of eminent Painters in Spain; Cosío, Bermudez, Diccionario Histórico, &c.

CAN'O'NICA, LUIGI, one of the most eminent of Cagnola's contemporaries (Cagnola, P. C. S.), executed many public and private buildings at Milan, among which were works, that which is the most noted and the most remarkable for its purpose and character, is the so-called Arena, or Amphitheatre, which, in regard to mere extent of plan, more than matches the Colosseum, and is about 150 feet square, by 400 feet; but it is comparatively a more spacious enclosure, surrounded by not more than eight rows of gradins, or seats,
rising no higher than twenty feet from the ground. The principal entrance is at one extremity; and on one side in the centre of the longer axis, is an elevated pavilion, or loggia, intended for the victory, and adorned with eight Corinthian columns of red granite. This singular edifice was begun in 1805, by order of Napoleon, who then sought to propitiate his Milanese subjects by embellishing their capital. Canoppi continued his labours on it till 1815, but the time of the beautiful Palazzo Bellotti cannot be claimed for him, although it has been attributed to him. His chief works there are the Palazzo Orsini (the interior), the Casa Canonici, and the two theatres, Ro and Careano. He also has three other important buildings in Milan, but, as the last was only executed from his designs, by Betieli, Canoppi died at Milan, in February, 1844, at the age of eighty-two, leaving a considerable fortune, and making several magnificent bequests, one of which was 174,000 francs (to the students of the Primary Schools of Lombardy; another, 87,000 francs to the Milan Academy of Fine Arts, the interest of which is to be devoted annually to the education and support of some young artist, architect, painter, or sculptor.

CANOPPI, ANTONIO, an Italian artist, who resided during the latter half of his life in Russia, and died at St. Petersburg, in 1832, at the age of fifty-nine. His father, who was civil engineer in the service of the state, was the author of the most splendid of the abodes of the illustre of his day in that profession, educated him. But though he profited by the instruction bestowed upon him, Antonio soon relinquished his pursuit for art—construction for design. He aspired to build after the manner of Piranesi, and, by the power and vigour of his imagination with visions of architectural pomp, which he had afterwards opportunities of displaying when he began to paint for the stage. His first practice however was as a fresco-painter, in which capacity he was employed by many Italian nobles to adorn their saloons. At this period, he obtained the notice of Canova, who did much to recommend him, and also gave him instruction in sculpture. At Venice he became scene-painter at the Fenice theatre, and was afterwards sent to Naples to execute some capacity of the scenery executed by him is said to be still preserved for the sake of its beauty. While he was thus winning public admiration, a cloud was suddenly thrown over his success by the political changes of the time, or rather, in consequence of the active part he took in them, which was such that he was marked out by the French government as a very dangerous opponent, one that was at all events to be got rid of. Finding his personal safety threatened by the emissaries of Napoleon, he is said to have returned to Genoa, where his services were enlisted to carry him to Vienna, so fortunate was there to meet with a protector and patron in the Russian ambassador Prince Rasumovsky, who proposed to him to establish himself in Russia. Accordingly, furnished with letters of recommendation by this nobleman, he went to Moscow in 1807, where he was fully employed for several years, chiefly in adorning with mural painting and arabesque decorations the saloons of the principal nobles. The hall of the Senate thus embellished by him excited general and lively admiration, but that and all his other labours of the kind in that capital, perished in the memorable conflagration of 1812. Just before that event Canoppi had sought an asylum at St. Petersburg, where he was already known by reputation, and was readily engaged as scene-painter at the Imperial Theatre, in which service he continued till his death, with the exception of the interval of a twelvemonth, when being ordered (1819) to travel for the benefit of his health, he visited the regions of the Caucasus. At length, by the order of splendid scenery, which he produced for the theatre at St. Petersburg, in the course of nearly twenty years, those for the opera of the Zauberflöte and Semiramide were considered truly wonderful performances of their kind; and the name of Canoppi was enrolled with those of Sanquirico, Quaglio, Schinkel, and others, as one of the greatest scene-painters of his time. His engagements with the theatre did not however so completely occupy Canoppi as to prevent his exercising his pen upon smaller subjects and easel-pieces. Thus, to every other and the most artistic scenery, such as those of the Winter Palace (the one destroyed by fire in 1838), and the St. Peterburg at St. Petersburg; both which are or were in the Gallery of the Hermitage. But he sometimes took historical, or rather, poetic subjects, and several of these, as the Tempest in the Zenas to the inferior regions, one representing Tartass, the other the Elysian Fields; also a Bacchanalesque Scene, remarkable for the masterly combination of two lights, that of the moon in the landscape and that of torches within the temple. The Interior of a Convert is another greatly admired work by him.

Besides having a considerable taste for literature, Canoppi wrote on various subjects appertaining to his art, perspective and architecture included; and there is one publication by him, which is remarkable, entitled Canoppi sur l'Architecture en général, et en spéciale sur la Construction des Théâtres Modernes.‘ (Knihuozasuyno Gzeto, No. 23, Nov. 1887.)

CANTARINI, SIMONE, known as II Fearsome, was born near Rome in 1723. He is said to have been a pupil of Persicolli, but he afterwards chose Guido Reni for his master, and lived some time with him in Bologna. He very shortly showed himself to be a formidable rival, even to Guido himself; but was somewhat overthrown before the age of thirty. He had made enemies of all the painters of Bologna, and of other people too, so that he became at length totally neglected and avoided by the Bolognese, and he accordingly felt himself compelled to leave Bologna. He removed to Rome, obtained a high reputation there, and in its respects, especially in grace of conception, was pronounced to be superior to his master Guido: even Count Malvasia, himself a Bolognese, styles Cantarini the best colourist and the purest draughtsman of his time. After his service in the court of the Pope in Rome, he returned to Bologna, and opened a school there, which however he gave up shortly afterwards, upon receiving an invitation from the Duke of Modena to visit that city. The bane of his life however, his own conceit, followed him to Modena, and he did not long remain there. His contemporaries he very soon disgusted the artists of that place, and he finally quarrelled with the duke himself, about a portrait with which the duke was not satisfied. From Modena he went to Verona, where he died, in 1749, aged only thirty-six, under the shadow of having failed to get paid. Cantarini’s fault was not so much an exhibition of his own works beyond their merits, as a denial of merit to others. He was certainly a great painter, as far as execution could bo considered; but he so much despised his contemporaries, and had few rivals; he showed also great mastery in the general management of the nude; in drapery he was not so successful. He painted a few altar-pieces, several holy families, and many portraits, in which he was admirable. There is a head of Guido, when old, by Cantarini, in the gallery of Bologna, which cannot be surpassed, and has perhaps seldom been equalled. His masterpieces are, Sant’ Antonio at the Franciscans at Caggì; San Jacopo, in the church of that name at Bologna; a beautiful painting of a young learner, at the Domenico at the Predicators, and several others, especially the portrait of a young nun, at Pescato. He etched also several plates in a masterly manner, some of which are sold as the works of Guido. (Malipiero, Vol. III; Pitrices; Lanzi, Storia Pittorica, etc.; Bartsch, Printre-Gravure.)

CANTHARUS, a genus of Ascanthopterygious crossopterygious fishes, established by Cuvier for the reception of certain species belonging to the family of Speroidei, and presenting a common character of—a deep compressed body; a single elongated dorsal fin; a short muscle; and teeth which are small, numerous, crowded, conical, and ranged in several rows; those of the external row being strongest and most curved. The fishes of this genus inhabit the Mediterranean and Atlantic. One of them, the Black Bream of Montagu, (Cantharus griseus, Cuv. and Val.), is not uncommon on the southern shores of England, where it enters harbours and feeds on marine vegetables, though it also feeds on other fish. It attains the length of 20 inches, and is a bluish grey colour, marked with alternate light and dark narrow longitudinal bands, the centres of the scales being darker than the edges. The dorsal fin is pale brown, and lodged in a groove throughout its length; the other fins are grey; the ventral, anal, and caudal fins are darker than the pectoral.

Besides Cantharus griseus, three other European species are enumerated by Cuvier: Cantharus vulgaris, C. brevis, and C. baylos. The first three are eight exotic species from the coast of Africa and the Indian Ocean.

(Cuvier and Valenciennes, Hist. Nat. des Pois. vol. v.; and Yarrell’s History of British Fishes, vol. 1.)

CANTONI, SIMONE, a recent Milanese architect of considerable pretensions, was born in the city of Milan, in the north of Italy, and received his first instruction in architecture from his father Pietro, who was of that profession.
and power of yielding without fracture. If the India-rubber thread were stretched while in the natural state, it could not afterwards be stretched without breaking the sheathing; and it is for this reason that the sheathing is applied to a stretched thread of the inner material.

Sometimes the threads sheathed in this way are used as alternate warps only, sometimes both for warp and weft; and various other modifications occur, according to the purpose to which the woven material is to be applied. Gloves are made at Leicester and Nottingham, with India-rubber thread, the threads being laid one inch apart on the top, to serve in lieu of garters. In India this material has been in some cases used as a substitute for leather in soldiers’ belts and other parts of their accoutrements. About 1821, a tent was introduced in India, which was made of India-rubber, combined with other materials, as a substitute for cords for bottles. In the first place, fibres of wool are felted or worked into a cylindrical mass; this cylinder is cut up into pieces the proper length for cords; and the cords so made are coated with a thin sheathing or cover of India-rubber. The cords so made are said to close the bottle air-tight, and yet to be removed easily.

Another mode of applying this substance in respect to its cords &c. is to put it upon the ends of ropes, threads, and halies. The idea of substituting this kind of covering for that made of stone, seems to have arisen from the desirability of providing a flexible and yielding footing for horses in the stable. Some of the stables at Woolwich Armory are paved with such ropes, so that in case of being thrown against a rocky shore. The elasticity of this substance has also caused it to be proposed as a material for the lining of vessels to prevent accidents from gun-shot and shrapnels, and for hammock-nettings and bulwarks, to protect the crew from shot.

The imperviousness to Water, the other principal quality possessed by India-rubber, is rendered available by using a solution of the gum as a varnish or coating the substance to be protected. When cloth is saturated with the solution of caoutchouc, it becomes not only water-proof but air-proof, and is then applied for such purposes as are noticed under AIRS AND CUSHIONS. P. C. S. Its water-repelling power is that which makes it available for clothing, and for safety-belts and other like contrivances. [DRY'S AND LIFE-PRESERVERS, P. C. S.] For such purposes as these the gum requires to be brought to a mellow state before using; and many recent inventions have had for their object the best mode of effecting this.

CANTONMENTS. The dwelling-places occupied by an army during any suspension of active operations in the field are called CANTONMENTS. These temporary shelters are either made of wood, or manufactured articles, in such a way as to be easily moved or erected, and to afford shelter against the weather. They are generally made of wood and canvas, and may be as large as a regiment may require. They are used in such a manner as to be ready for occupation at any time, and to be left without injury.

CAOUTCHOUC. The use of caoutchouc, P. C., was written, 'water-proof' cloth for capes and other garments formed perhaps the best known among the applications of this material to the arts. But the use of caoutchouc has increased very largely since that time, and seems likely to do so yet more in future, when its peculiar qualities are considered.

TCAMPOSSO. The qualities on which the manufacture depends are mainly two, elasticity and imperviousness to water; and nearly the whole of the recent applications of the gum in the arts depend on one or other of them. We may begin by the former, viz., elasticity, and notice a few of the recent inventions bearing upon it. C. Dalmont. The elasticity of a substance consists in its power of yielding and returning to its native state. The component materials for brasses, springs, straps, bandages, and other like articles, depends on its power when in a filamentous state of being stretched out to a considerable length, and of regaining its former length without rupture. For such purposes a compound thread is formed, having a centre or core of caoutchouc, with an envelope of cotton or worsted twisted round it. The method is said to have been first practised at Vienna, from whence it extended to Paris, and thence to this country. The bottle-shaped masses of India-rubber are, in the first instance, cut up into strips. This used in the first instance to be done by cutting up the bottle with scissors, and then separating the layers of which it is formed; another plan was to soften the bottle, inflate it by a forcing-pump to the requisite pressure, and then cut it with a sharp steel in a plane parallel to the surface of the bottle; the pieces so obtained are sold, and are called India-rubber sheets. India-rubber became a substitute for goatskin for the manufacture of shoes, and for hammock-nettings and bulwarks, to protect the crew from shot.

CAPPEL, EDWARD, was born in 1713, at Truro in Suffo. He was educated at Bury St. Edmunds, and spent the greater part of his life at Hastings and London, occupying himself almost exclusively on the studies relating to the name of Shakespeare. He was enabled to command leisure for such pursuits by the patronage of the Duke of Grafton, who obtained for him the appointment of deputy-inspector of plays. He died on the 24th of February, 1781, at his chambers in the Temple. As a commentator on Shakespeare, Capell is ranked much more highly now than he was in his own times, but he is really useful only as furnishing hints for others to work upon. There is not more excellence in the valuable parts of his edition than in that of his countryman of the same name, Mr. William Shakespeare, his Comedies, His
and Tragedies," &c., 1767, 10 vols. 8vo. 3. "Notes and Various Readings to Shakespeare," 1775, 4to. 4. "A Letter from Mr. Locke to Dr. Tillotson," in a Preface, 1777, 4to. 5. "Notes and Various Readings to Shakespeare;" to which is added, "The School of Shakespeare, or Extracts from divers English Books that were in print in the Author's time." &c., 1783, 3 vols. 4to.

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mankind and he savage manufacture held demonstrable; is obvious that the effect of ind

To consider capital in all its relations to the material interests of man, to the increase of population, the employment and wages of labourers, to profits and rent, it would be necessary to examine the entire subject in which this article will be confined to the following points:—I. The origin and growth of capital. II. Its application and uses.

I. Capital is first called into existence by the natural foresight of man, who even in a savage state discerns the advantage of spending a part of his produce on commodities for consumption in future, and stores up a part for his future subsistence. The greater proportion of mankind possess this quality, and those who do not possess it are admonished of it by the privation of nature. In civilized life there are many concurrent inducements to accumulate savings; of which the most general are,—the anxiety of men to provide for their families and for themselves in old age; social emulation, or their desire to substitute the manual labour of others for their own. The accumulation of wealth, therefore, is gradually carried on in society; and a love of ease and luxury, which can only be purchased by present sacrifices.

A desire to accumulate some portion of the produce of industry being thus natural to mankind and nearly universal, the growth of capital may be expected wherever the means of accumulation exist; or, in other words, wherever men are not obliged to consume the whole products of their labour in their own subsistence. From the moment at which a man produces a surplus of wealth, by the consumption of one part and the accumulated surplus of production over the consumption of the whole community is the capital of a country.

Thus far the origin and growth of capital are perfectly intelligible; but it is not yet apparent how far they are to control the introduction or manner of its consumption, which interfere with its apparent simplicity. As yet no distinction has been noticed, either in the original definition of capital or in the succeeding explanation of its causes, between those parts of the products of labour which are reserved for the re-production of other commodities, and those parts which are intended solely for use or consumption. These two classes of products have been divided by Adam Smith and others into capital and revenue; by which division all products are excluded from the definition of capital unless they be designed for aiding in further production. The inpropriety of this distinction however has been pointed out by Mr. M'Culloch ('Principles of Political Economy,' p. 97), and it does not appear to need the addition of any new division of a capital nature. The question is whether it is generally wise to increase or diminish the capital stock, and that the result will be as desirable as the means by which it is produced. The cause of increase of the capital stock in the latter part of the 18th century is best described under the division of this article, where the application and uses of capital are considered; but here it must be observed that the accumulation of capital proceeds slowly or rapidly in proportion as one or other of these modes of expenditure is more or less predominant. It must be observed that the general result of industry, it is obvious that the effect of individual conduct would be precisely the same to themselves, in preventing accumulation, as if they were unable to earn anything more than was absolutely necessary for their support. It is true that he who would enjoy more comforts must be willing to give up something in the way of a lower standard of living, as will presently be seen, their expenditure would conform, indirectly, to the accumulation of capital by others; but all their labour would only suffice for their own support for one year or less. If no part of the produce for capital would be available, in the present year, either for their support or for any other purposes. But when a man, instead of spending the results of a whole year's labour within the year, subsists upon one-half of them, the other half remains to be consumed in the course of the succeeding year, and such economy will have placed him a whole year in advance.

As it is evident, from these illustrations, that capital may increase in the ratio in which the products of labour exceed the expense of subsistence, it would seem to follow as a necessary consequence that, when a certain amount of capital has been produced, the higher the rate of profit which may be obtained from such capital, the greater will be the means of further accumulation. [Faoro, 2. C.] It is not necessary to suppose that this rate of profit depends wholly on the capitalization of the wages of labourers, but that it may depend upon the conduct of those who enjoy the profits. The larger their profits may be, the greater may be their personal expenditure; and a taste for luxury and display may be encouraged, the gratification of which may be more easily obtained than in less prosperous circumstances. When the rate of this expenditure is such as to satisfy his desires, we cannot wonder if he thinks less of the moral.

Yet, whether savings proportionate to the means of saving be made or not, it is undeniable that a high rate of profit offers the best opportunity for augmenting capital. If three per cent. profit upon a man's stock will enable him to subsist as he has been accustomed, and to lay aside one per cent. annually as capital, the rise of profit to six per cent. would enable him to add one-third to his stock, and to raise it by one per cent. to his capital, so long as he made no change in his style of living: and thus the doubling of the rate of profit would add to the means of accumulation in the proportion of four to one.

Most of all due allowances, therefore, for greater profit of expenditure, the proposition that large profits are favorable to accumulation may be held as demonstrable; for, reverse the circumstances, and suppose that profits were as small as to disable those who were willing to save from enjoying any surplus whatever, the result must be precisely the same to themselves as if they had voluntarily consumed the whole excess of their production; while their poverty would not conduce indirectly to accumulation by others, as their expenditure of a surplus might have done.

But, apart from abstract reasoning, does the experience of different countries bear out the same conclusion? In England, for example, was capital accumulated more rapidly under a lower or a higher rate of profit, or a combination of both? These questions do not always receive the same answer.

Mr. M'Culloch compares the progress of the United States of America, in wealth and population, with that of England and Holland, and ascribes the comparative rapidity of their advancement to the fact, that the rate of profit is generally twice as high in America as in either of the other countries ('Principles of Pol. Ec.,' p. 107). He adds (p. 110), that if the rate of profit have become comparatively low, the common man will be a more industrious enterpriser in some cases, 'he is lazy and unsound at bottom.' Professor Jones, on the other hand, denies this inference, and takes a more encouraging view of the state and prospects of our own country. He says, that fall of the rate of profits, which is so common a phenomenon in the present generation, is an effect of overpopulation and wealth, is, it will be seen, so far from indicating greater feebleness in any branch of industry, that it is usually accoun-
panied by an increasing productive power in all, and by an
ability to accumulate fresh resources more abundantly and
more rapidly. So far therefore is this circumstance from
being, as it has hastily been feared and described to be, an
universal symptom of national decay, that it will be shown to
be one of the elements which their saving habits, the
accumulation of "economical prosperity and vigour." (Distribution
of Wealth, Preface, p. xxxi.)

These opinions, apparently conflicting, upon matters of
fact, may prove, upon examination, not to be wholly irrecon-
cilable. It is not doubtful whether the United States of America
be a good example for the purpose of this inquiry, as there
have been many concurrent circumstances in operation, in that
country, all tending to the same result; and of which high
profits, rapid accumulation, and high and populous
populations, will be safer therefore to confine the examination of the
effects of high profits upon accumulation to our own country at
different times.

First, then, it will be admitted on all hands that individual
fortunes have been more rapidly accumulated in England
at those times in which the profits in particular departmens
of industry were the highest. This admission is no more, in
other words, than the truism, that when a trade is prosperous
more and more capital is therefore invested, and the rate
of profit in all departments of industry has the same
effect in augmenting the sum total of national capital. Poli-
tical reasoners are too apt to assume a universal analogy
between individuals and nations, which is often deceptive,
and lead them astray. But it is certain that if this analogy were allowed, it would be decisive of the
whole question, and would exclude all observation of facts.

The fact, as stated by Professor Jevons, is undeniable, that a fall
in the rate of profit is a universal error. It is true that
increase of population and wealth. There is more capital in
England and in Holland, in proportion to the population, than
in any country in the world, and in those countries the rate
of profit is the lowest. The resources of England have been
increasing in an extraordinary manner during the last few
years, as evinced by the productiveness of the property-tax
and other impostus, compared with former periods, and as
proved by all statistics (Porter's Progress of the Nation, sec.;)
and, at the same time, the more evident the wealth of
the country has become, the lower has fallen the general
rate of profits.

The general principles of profit have been briefly stated in
the article Factor, P. C.; but here it may be mentioned, that
a fall in the rate of profit is a common result of enormous
accumulations of capital. Capitalists are forced into
competition with each other, and are ultimately obliged to content
themselves with lower profits. But, in the meantime, does
the aggregate accumulation of national wealth diminish?
This question is most important to all who wish to
illustrate the progress and present condition of Great
Britain. [Census of 1841, P. C. S.] All evidence shows that
British capital is positively overflowing, and seeking employ-
ment, and much more so, for a time, than the resources
such as begin to be felt. It is thus that, by no statistics can decide, with arithmetical precision, the
comparative rate of increase in the accumulation of capital at
different times; but so far as outward indications of wealth may
be read on, there are very few who are prepared to deny
that accumulation is now advancing, in the aggregate, at least
as rapidly as ever, in proportion to the population of the
country.

This fact, when submitted, is nevertheless consistent with the
universal proposition, that high profits are favourable to
accumulation. In calculating the aggregate savings of a people
already rich and populous, it must be borne in mind, first,
that the existing generation has inherited the accumulations of
the preceding generations; and, secondly, that a large
number of persons continually saving a small portion of their
individual gains, may produce a greater aggregate accumu-
lation than the larger proportionate savings of a less number
of persons.

With reference to the first point, it need only be observed,
that if the inherited capital be not squandered or wasted, its
annual interest alone affords the means of enormous accumu-
lation; while the rest of land, the profits of trade, and the
wages of labour, are continually supplying new funds for
further accumulation. It may be worth while to be made clear by an illustration. Let us suppose one
hundred men, each saving 100l. annually out of their
profits. Their aggregate accumulations would amount to
10,000l.

But suppose one thousand men, each equal capitals, but unable,
on account of a lower rate of profit, to save more than 10l.
a year; their aggregate accumulations would amount to
50,000l. In both cases, they would have maintained them-
sewils and their families out of their profits, and have paid
the wages of all the labour required in their business; after
which had been so much available for increased production,
and for the employment of a larger quantity of labour. This
example falls far short of the circumstances of Great Britain,
for the number of small capitalists is even more extraordinary
than the enormous capitals possessed by a comparatively small
number of individuals. But all additions to the national capital are of incalculable amount.

The conclusions to which we are led by these inquiries,
are,—that a high rate of profit is favourable to accumulation;
that the amount of the national wealth is greatly increased by
and that, under ordinarly favourable circumstances, the masses of inheritedcapital and the aggregate savings of vast numbers of capitalists
still facilitate accumulation in a greater ratio than the increase
of population, which a high state of civilization has a tendency to
check. [Population, P. C.]

II. The consideration of the application and use of capital
will be discriminated into two classes: the one, which concerns
the outlay of the present, and which the nation expends on
at the outset, the distinction raised by political economists
between what is called productive and unproductive labour
and expenditure. The end of all production is use or con-
sumption: some products are immediately destroyed by the
labour of those who make them; others are, at the same time,
slowly, but are ultimately destroyed by use, as clothes or fur-
niture: but whatever the durability of the thing produced, its
sole use is the enjoyment of men. A man is rich or poor ac-
(Continued.)
ments which it facilitates. While they are engaged upon household services their employer is free to follow his own more immediate object of consuming and the investment of his capital, or the labours of his profession. It is not, therefore, in the employment of servants that expenditure is unproductively incurred, but in the employment of excessive numbers from an increased capital labours and the application used directly and exclusively for the purpose of an enjoyment which begins and perishes in the enjoyment.

We will now briefly examine the nature of productive and unproductive consumption of peripheral articles, and the effects of consumption of the same, generally. A man who produces anything has one object only in devoting their labour to it—that of ultimately consuming the thing itself, or its equivalent, in the form of some other product of labour. If the consumption of this labour is in goods, or in services, he is in all respects also a producer, and adds to the common stock of enjoyment as much as he withdraws from it. But money is the representative of the products of labour, and if given in exchange for them, the character of the transaction would appear to be the same. But the direct interchange of the products themselves. In the case of productive labourers, it would be admitted to be precisely the same; but a distinction is taken when the labour of the consumer is itself unproductive. It is true that he in his past labours has created a commodity, consuming enjoyment. He parts with his money, which is an equivalent to the seller, but he produces no new source of enjoyment for society. But the consumption of a productive labourer may also be unproductive. Such part of his consumption as is necessary to keep up his body perfectly fit, in mind and body, for his employment, and to rear his children, suitably, is all clearly productive. If any residue remains, and he spend it upon immediate enjoyment—sellers and traders, for example, which vanishes with the enjoyment—that portion of his consumption is unproductive.

It must not be imagined, however, that the only result of money spent upon unproductive labour or of unproductive consumption, is necessarily waste. The results of a man’s labour may have as its end the enjoyment of his body, but as the capital of another secure that for him, his labour may be productively expended; and again, the maker and seller of commodities unproductively consumed are productive, and their profits may be productively employed. The distiller and the brewer are productive labourers, but the consumption of spirits is itself unproductive.

We are now enabled to confine our attention to the uses of capital as applied to its most important end, the employment and aid of productive industry. Its first and most important use is the division of employments, which, though necessary for any advance in arts, is impracticable without some previous accumulation of capital. Until there is a fund for employing labour, every man’s business is that of seeking his own subsistence. But when the capital of another is so large as to form the capital of another however small that for him, his labour may be productively expended; and again, the maker and seller of commodities unproductively consumed are productive, and their profits may be productively employed. The distiller and the brewer are productive labourers, but the consumption of spirits is itself unproductive.

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CAPITEN, TENANTS IN. [BArON, BArONY, P. C. ;
FEUDAL SYSTEM, P. C. ;
CAPITO, ATEIUS C. [BARO S, P. C. S. ;
CAPITOL, LOWICK, P. C. S. ;
CAPS, PERCUSSION. There have been three modes adopted, in different times, for firing off muskets, fowling-pieces, and other kinds of hand-guns, viz. the match, the flint and steel, and the percussion cap; the last of which depends for its effect upon the union between the flint and the steel, at the right hand side of the touch-hole, to produce the priming-powder, to prevent its from being blown away. The match was employed by hand; but in the arquebus, a later invention, it was brought over the touch-hole by means of a trigger, such as the trigger on a lever and chain which made the wheel revolve, and also brought the piece of pyrites down in contact with it, so that the grinding of the two together might produce a spark sufficient to kindle the priming of the gun. The next improvement consisted in the flintlock, made by placing a flint at the right hand side of the touch-hole, and still does form, an important branch of Wolverhampton trade; while the manufacture of the flints, especially during times of war, has been largely carried on in various parts of England and the Continent where the best flint is found. The employment of percussion caps, instead of the above contrivances, arose out of the discovery of certain chemical substances which will explode by percussion or a blow without the aid of heat. Such substances are called detonating or fulminating materials; and the shells and firing-muskets are said to have originated in the following manner:—About the year 1793, on account of a scarcity of saltpetre in France, the French government caused experiments to be made to determine how far a certain preparation of chlorate of potash would answer as a substitute for gunpowder. The attempt was, from various causes, unsuccessful; but it suggested to the mind of Mr. Fordyce, a gentleman of Scotland, the thought of employing some such agent for igniting gunpowder. He accordingly wrote several experiments, he took to London, in 1806, a fowling-piece having a lock, in which a small piece of apparatus struck smartly against a morsel of fulminating mercury, exploded it, and caused the ignition of the gunpowder. The principle was enough established, though not yet perfected; and Mr. Fordyce was encouraged by the then Master-General of the Ordnance to make further experiments, which he did. Fordyce proposed, as his reward, to be paid the price of the gunpowder which would be saved by the government in two years; but changes of administration, and difficulties of various kinds, interfered with the hoped-for progress of the method; and it was not till many years afterwards that its use became at all extensive in England, or indeed anywhere. We have it therefore known that a slight blow would explode certain powders, and that this explosion would ignite gunpowder; numerous improvements became introduced by degrees. Various salts and chemical compounds, such as some of the chlorates, nitrates, and fulminating mercury mixed in this way; the most familiar example of which is afforded by the 'cokeers' or 'congresses' now sold so cheaply in the streets, and which ignite so readily by friction (in effect a series of minute percussions). About twelve or fourteen years since, the Board of Ordnance made experiments for the Board of Ordnance on certain points connected with these detonating compounds; such as the best proportion in the ingredients for fulminating mercury and other varieties; the best mode of using the charges; the best mode of protecting them from injury; and the probable effect of the gases resulting from the explosion. Mr. Koch describes the experiments in his 'Dictionary,' in which he states that the French prepared forty thousand percussion charges from two pounds and a half of fulminating mercury. When the method was first introduced into England, it was found that a very considerable difficulty in causing the explosion of the mixture to ignite the gunpowder. But this is now effected by putting the detonating mixture into a little copper box or cell called a cap, which is adjusted over the touch-hole, and so arranged as to make the detonating compound slightly touch it, and explodes its contents: the little cell itself is destroyed, so that a new one is required for each firing. The size of the cell, or 'percussion-cap,' the nature of the mixture, the quantity of powder, and the mechanism for firing it, have been the subject of many improvements within the last few years, some of which are patented. The caps are now made in large numbers at Birmingham, in the same manner as metalla blanks being cut out of sheet copper or mixed metals. The top is applied to the touch-hole, surrounded with an iron cap, and exploded with a slight blow from a mallet. The detonating compound, with or without the small containing copper cap, has been applied to several varieties of guns, and is said to be fire- resistant, in that the shell strikes against the object against which it is directed. In ordinary circumstances a bomb-shell, or similar missile, has a fuse so attached to it as to ignite the gunpowder within a certain space of time; but the object of the detonating shell is to dispense with such a fuse. Colonel Maceroni, in 1826, proposed the use of shells in which a short tube was screwed into one side of the shell, and a percussion cap placed in the tube, just before the shell was to be fired from the muzzle of the gun; when the shell was fired, the compound, ignited the gunpowder, and burst the shell. Many other such shells have been from time to time proposed, of which those by Captain Norton were a good case. An article appeared in the public prints two or three years ago, the experiments at Woolwich, in 1842, with these shells, were made with the view of determining whether the shell would be certain to explode in striking the object. Another combination of invention by Captain Norton, to which reference was made when it reached the bed of the sea, but not before; there is an iron tube screwed into the shell, and an iron rod suspended within the tube by a piece of quill; a kind of wing or sail keeps the shell afloat, and in the water; and on striking the bottom, the iron rod falls through the tube, and a percussion cap attached to its lower end explodes the shell. Another contrivance is to aid submarine explosions, for blasting or other purposes: a box filled with gunpowder is lowered to the bottom of the river or sea, and a sounding-lead provided with a percussion cap is guided down by a string so to strike the box, to explode the cap by the blow, and to ignite the gunpowder by the explosion. Percussion caps are now used in a very extensively by sportsmen, and are also being gradually introduced into many of the armies of Europe.

CAPSELLA, a genus of plants belonging to the natural order Cruciferae, the suborder Angustifoliateae, the tribe Lept. 
where. It has a triangular-obovate pouch, compressed valves, keeled but not winged; numerous seeds, simple fimbriae. The species of the Linnaean genus Thlaspi, without wings to their valves, form this genus. The best known is the common Shepherd's Purse (C. pallida, P. costaria). It is an annual herb, with a variable leaf, a cotyledonary leaf, and a flower, with Knoch describes several varieties of this plant. He also describes two other species as inhabitants of Germany. C. procumbens (Leptidium procumbens of Linnaeus), and C. pauciflora, apparently a variety of the last

CAPSTAN. [WINDLASS, P. C. ;
Babington Manual Brit Bot. ;
Roch. Fert., and so on:]

Koch describes several varieties of this plant. He also describes two other species as inhabitants of Germany. C. procumbens (Leptidium procumbens of Linnaeus), and C. pauciflora, apparently a variety of the last
CARADOC FORMATION, the uppermost of the two great divisions of the lower Silurian strata of Masham. It is not well and clearly seen except in Salop, the Abberley and Malvern Hills, Woolhope, May Hill, and other points on the eastern borders of Wales.

CARAGLIO, GANDELLINI, a celebrated old copper-plate, medal, and gem engraver, born at Verona or at Parma, about the commencement of the sixteenth century. He was the pupil of Marcantonio at Rome, and is one of the best of the early Italian engravers. His prints are rather numerous, though he is not generally considered as having been very successful. Bartch describes sixty-four; and Brulliot knew only of fifty-six.

In the latter part of his life Caraglio gave up engraving on copper, and confined himself to medal, cameo, and gem engraving. He is said to have been a great collector. He owned, says Vasari, that Sigismund I, King of Poland, invited him to Warsaw to execute some works for him. He returned to Italy well rewarded, and died about 1670, at his own estate in the neighbourhood of Parma. The fact of his settling in the Parman territory is in favour of the supposition that Parme was his native place: he signs himself Parmensia on several of his works, yet more are signed Jo. Jacobus Veronensis; some Jac. Carolii. He engraved after Il Rosso, Raphael, Titian, Michelangelo, P. del Vaga, Julio Romano, Parmegiano, and other famous masters. His heads are well executed, as is the nude generally, but the draperies are hard and unnatural: his lines are distinct and show great mastery for the period, but he did not retain his skill in the last years of his master Marcantonio.

(Vasari, Vite de' Pittori, &c.; Bartch, Peintre-Graveur; Brulliot, Dictionnaire des Monographes, &c.)

CARAVAGGIO, POLIDORO DA, a celebrated Italian painter. Some humanists believe his family name was CALARDA. When he was eighteen years of age he was a labourer, and was with many others employed as such about 1612 in the Vatican, when Raphael was painting the loggia and stanaue there, in the pontificate of Leo X. He appears to have taken great interest in the progress of the works, and he made some attempts at design himself, which had sufficient merit to induce Maturino of Florence, one of the assistants employed, to undertake to teach him to draw, for he soon displayed extraordinary ability. A strong attachment grew up between the two young painters. Maturino employed Polidoro to assist him in his work. Their joint labour soon attracted the notice and admiration of Raphael, and Polidoro was considered, before those works were completed, says Vasari, the 'più bello o più nobile Ingegno' of all the young painters employed.

Vasari evidently gives the greater merit to Polidoro, but as the latter works which he painted alone, were very different in style from these and others which were done in Raphael's company, it is not surprising that some writers have ventured to give Maturino the greater credit. These works were in fresco and in light and shade, or what the Italians call chiariscuro, and consist mostly in figures and other ornamental work. These are a monument of the skill and taste with which he adorned buildings, interiors or exteriors. Their figures, of which they were not sparing, were drawn in a pure antique style, and not inferior in that respect to the works of any modern master. They imitated antique statues and bas-reliefs, and ancient sculptured ornaments of any kind. Vasari says that there was not a fragment of antique ornamental art in Rome which they did not copy; they painted also original works from sacred and modern story. Of all those works since the greatest remains, but some are in a more or less preserved by the prints of Chorubino Alberti, P. S. Bartoli, and Gascotuzzi. The last engraved, in five sheets, the story of Niobe, which Maturino and Caravaggio painted as a fresco in the façade a house opposite the Palazzo Lancelotti: it was one of their masterpieces. The sack of Rome, by the soldiers of Bourbon in 1527, put an end to the joint labours of Polidoro and Maturino; they both fled, but Maturino is supposed to have returned, and to have died of consumption in Florence. Polidoro went to Naples, where he was received into the house of Andrea da Salerno; he practised there some time, but finding that his works were not duly appreciated, he removed to Messina. Here, in 1536, upon the visit of Charles V., on his return from his victorious expedition to Tunis, Polidoro, after the triumphant decorations on the occasion. He dwelt several years in Messina in high esteem, and executed many good works, not in his early style of chiariscuro, but in colours; and some of them were for altar-pieces: Vasari mentions a Christ led to Calvary amidst a crowd of people, as a masterpiece. In 1548 he made up his mind to return to Rome, having, to his misfortune, as it proved, amassed a considerable sum of money. Polidoro had provided himself with a large sum of money, and all things were prepared for his departure, when one morning, before he had been many years to accompany him. This wretch however loved his master's money much better than his person, and he hired some assassins to strangle him during the night, when he was asleep, and shared his blood with the assassins, who, having stolen the body of Polidoro in two or three parts, carried it to the door of the house where a lady lived whom he had been in the habit of visiting; and the servant went weeping and lamenting, and related the discovery of the body; to a certain great personage. This personage, who had ever suspected the truth of the man's story, and caused him to be put to the rack, upon which he made a circumstance of confession of the whole infamous affair. The miserable wretch was tortured with heatedforcps, hanged, and quartered, but as Vasari has observed, this did not bring Polidoro to life again: he was buried in the cathedral of Messina. Some of the pictures which he painted at Messina are in the Gallery of Naples. He excelled in landscape. He also etched several plates in a good style; they are however extremely scarce: the prints after him are likewise scarce.

(Vasari, Vite de' Pittori, &c.; Gandellini, Notizie Istoric., &c.; Lanzi, Storia Pictorica, &c.)

CARBONIFEROUS SYSTEM, the great group of ages which includes nearly all the valuable coal yet discovered. It consists of

D. The coal formation.

a. The limestone-shale group.

The prominent marks a, c, are the least constant in range and character; the limestone-shale graduates in South Wales to Devonian strata, and in Ireland constitutes the yellow sandstone series of the (so-called) Crag. Most of the coal of Ireland belongs to the millstone grit group. CARDAMINE, a genus of plants belonging to the natural order Cruciferae, the suborder Siliquose, and the tribe Anthemideae. The most abundant species in the flat or compressed valves of a capsule stigma, the seeds in a single row, with the funicle simple and siliform. The species, which are numerous, are usually smooth herbs, with stalked, entire, lobed, or pinnately cut leaves, and racemes of white or red flowers.

C. prostrata, Cuckoo-flower, or common Ladies'-Smock, has pinnate leaves, the leaflets of the lower leave roundish, slightly angled, those of the upper leaf linear-aculate, entire; the petals three times longer than the calyx, spreading, the stamens half the length of the petals, anther borne in a leaf condensed, of sandstone, marble, of marble, and soluble in acids. The circumstances explain its other common English names. It still retains a place in the London and Dublin Pharmacopoeias, but why it is difficult to say. At one time it had the reputation of being a diuretic and antispasmodic, and a diuretic. The flowers was administered as a dose in hysteria, chorea, epilepsy, and other nervous affections. It is a native of Europe, Asia, and America, and is abundant throughout Great Britain.

Bartch describes four other species of Cardamine as natives of Great Britain, C. impatients, C. sylvatica, C. hiera, C. amara: with the exception of the last they are common plants. C. bellidiformis has been figured in the 'English Botany' as a British plant, but no station for it is known. There is C. hircina, when ripe, and laid upon the ground, put forth buds which produce a new plant. It is extensively propagated in this way in moist soils. It is said that other species have the same property. C. impatiens is so named from its expanding and sometimes explosive leaves. The annual species may be increased by seed, the perennial by dividing the roots.

(Don, Gard. Dict.; Loudon, Encyc. of Plants; Biebichon, Manual of British Botany.)
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CARDBLAME PRATENSIS—Medical Properties of.
This indigenous herbaceous plant decorates our meadows and pastures in April and May with its light purple reddishly yellowed blossoms. It is called, in the Pharmacopoeia, a faint, mellifluous oil, which is nearly lost by drying.

The taste is acrid and pungent, similar to but less agreeable than that of the common watercress, which is disapproved by age. The effects of the plant are said to be stimulant, diuretic, and anti-pyretic, and it is employed in the treatment of kidney and bladder diseases. It is one of the best remedies for kidney trouble, and is highly recommended by the medical profession.

But staple-shape, Dialogos, they heckle and once. To the card,’ each Madrid their All the completed, but trifling have are They faint There dealing Bartolomeo and form recent improvements, being in the same mechanism.

This is the card-making engines of the cotton districts, that it has been estimated four thousand hinds and forty-eight thousand feet of wire are cut up weekly to make them. The wires are inserted in leather, because the flexibility of this material allows it to be bent round the surface of these leaves. If a hard and tangle tuft of cotton occurs in the process of carding, the rigidity of the surface of the leather prevents the wire from yielding and giving the objection; and it has been proposed to remedy this by applying to the face of the leather, before the wires are inserted in it, a coating of woolen cloth, saturated with camtouche to render it very pliant. Another suggestion is for the use of cotton fibers, which will be more adapted to the weft of woolen, saturated in like manner with a solution of caoutchouc. But both are alike in their object, and have relation only to the minor working of the method, the card-making machine being independent of the kings Philip III., II., and IV.

CARDUCCIO, the name of two very able Florentine painters, brothers, who settled and chiefly resided in Spain, where, agreeably to Spanish orthography, they wrote their name 'Carducci.'

Bartolomeo, the elder, was born in 1590. Vincenzo, the younger, was born in 1586. Bartolomeo was painter, sculptor, and architect, and was the scholar of Federigo Zuccaro, whom born brothers accompanied into Spain, in 1585, where they attained great distinction in the service of the kings Philip III., II., and IV. Bartolomeo was equally excellent in fresco and in oil, and there are still some of his works extant in Spain. He drew in the style of the antique, and with great exactness; he excelled also in composition, in expression, and in colour. There is a large hundred feet of copper, by him in a chapel of San Felice Rea at Madrid, which Cumberland says may well be taken for one of Raphael's. His principal works were the frescoes he painted in the Escorial; he painted also at Malaga, Logroño, Valence, and other places. Bermudez few Italian artists did so much for the arts in Spain as Bartolomeo Carduccio. He died at Madrid in 1608, having served the kings Philip II. and III. for twenty-three years. The latter, who had appointed him his painter, granted a pension to his widow, and to his two daughters, both of whom were born in Madrid. Vincenzo was the scholar of his brother, and succeeded him as painter to Philip III. in 1609, and his services in the advancement of the arts in Spain were even greater than those of his brother, though in the technicalities of art he was a less able painter. He however educated a numerous school, and in 1633 published a book of dialogues on painting in Spanish, 'Dialogos sobre la Pintura,' &c., which, says Bermudez (1800), is the best work in the Castilian language on the subject. There are many great works at Madrid, and some at Valencia, Toledo, Salamanca, and Valladolid, but his greatest work is the series of paintings from the life of Saint Bruno and other saints, in the Cartuxian Convent of Pajal, completed in 1628 to 1632.

(Clean Bermudez, Diccionario Historico, &c.; Cumberland, Anecdotes of Eminent Painters in Spain.)

CARDUVUS. [THISTLE, P. C.]

CAREW, THOMAS, born 1560, of a good family in Gloucestershire, and settled at Oxford, and attached himself to the court of Charles I., at which he held several easy offices. He died in 1639, leaving a volume of small poems (1640, 8vo.), besides scattered pieces never yet wholly collected. Many of Carew's poems are light and airy effusions, chiefly lyrical, and all dealing with topics of a trifling kind. But their merit in their own kind is great. Thomas Campbell pro-

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On 1794, taste the Account 'A its An Syo. 1808, Having in superior in several his hospital, or try. 1734, the species Cyperaceae, 1794, wrote several for the stage; among which were 'Chromonothongophotis', 1734, and 'The Dragon of Wansley', 1787. His pecuniary affairs were repeatedly much embarrassed; and, in a fit of despondency, owing perhaps to this cause, he put an end to his life on 1742.

CAREX, a genus of plants belonging to the natural order Cyperaceae, and to the tribe Cariceae. The flowers are diellous, arranged in imbricated spikes, each covered by a glume; the female flowers have a single uretheca persistent perigone, in which the nut is completely inclosed; one style with two or three stigmas; the male flowers have three stamens without a perianth. The species for the most part are inconspicuous and unattractive plants. They are however exceedingly numerous, and there are from one hundred and five species, and this is probably not more than half that are now known. Babbage describes sixty-six species as natives of Great Britain, being the largest number of phanerogams in this country. Koch, in the 'Flora Germanica', describes one hundred and three species as natives of Germany and Switzerland. Although so numerous, they serve directly few of the purposes of man or the higher animals. Their leaves are tough and hard, so that it is rare for them to be eaten by even the bravest in cases of great necessity. They are for the most part inhabitants of wet and swampy grounds, in bogs, fens, and marshes, in the temperate and northern parts of the world. In the bog-gounds of Great Britain the leaves of some of the species are used for tying the bines of the hops to the poles. In Italy they are used for placing between the staves of wine-casks, are woven over Florence flasks, and occasionally employed for making chair-bottons. The leaves of the Carex silvatica, according to Linnæus, are combed and dressed, and used as a warm lining for gloves and shoes; and thus protected, the Laplanders seldom suffer from being frost-bitten.

C. arenaria has a place in some of the continental Pharmacopoeias, its root-stick being a reputed diaphoretic and diuretic. It is used under the name of Géranium, and is employed in cases of skin-disease, as well as in secondary syphilis. The C. hirta and C. diatricha are often substituted fraudulently or by mistake for it, but do not, according to Bischoff, possess the properties. It is not known to the practitioners in medicine of this country.

C. arenaria grows on the sands of the sea-shore, and is one of the plants which, in conjunction with the Elymus and Arundo, binds the loose sands, and forms them into solid embankments. Although most of the species are devoid of striking beauty, some of them when in flower are much admired on account of the elegant drooping of their panicles of golden-coloured flowers. This is the case with C. remotis and C. Fretensis. Unattractive as the mass of these plants are to the general observer, they have been carefully studied by botanists, and Wildenow, Goodenough, Wahlenberg, Schkuhr, Scopoli, Boott, Biddington, and S. Gibson have done much to throw light upon this obscure genus. Their importance in medicine, though not extensive, is not to be denied to their utility to man. They frequently form the only vegetation of the swamp, and by their existence and decay they gradually form a soil, on which plants more immediately useful to man may be grown.

CARLI, or CARLEE. [POOHAN, P. C.]

CARLINA. [THISTLE, P. C.]

CARLILSE, SIR ANTHONY, surgeon, was born near Durlam, in the year 1768. He commenced his professional career at the college at York, and was transferred to Durham, where he remained for some time under the instruction of Mr. Green, the founder of the hospital in that city. Having finished his preparatory studies he proceeded to London, and attended to the business of Dr. Bellisle, and Mr. Cruikshank. He was at the same time pupil to Mr. Watson, then surgeon to the Westminster Hospital. On the death of Mr. Watson, in 1798, Mr. Carlile was appointed his successor. He became a member of the College of Surgeons, and was early appointed one of the rounds of that body. He was appointed an examiner, and one of the curators of the Hunterian Museum. He also held the appointment of Professor of Surgery and Anatomy, and in 1829 he filled the office of President. He was assistant surgeon to the Chirurgical Operative School in 1830, and was as well President of the Ducaulm, and Surgeon to the Duke of Gloucester, whom he was introduced by the learned Dr. Samuel Parr. In 1808, on the death of Mr. Sir Anthony Carlile was appointed to the chair of anatomy to the Royal Academy, an office he held for sixteen years.

Sir Anthony Carlile owed his position to the activity and industry with which he pursued the various departments of science, and in particular with his professorship of his early acquaintance with John Hunter gave him a taste for the study of anatomy, which he pursued with much ardour, and many of his earlier literary productions were on this subject. One of his first papers was 'A Case of an unusual Formation in the Brain,' which was printed in the Transactions of a Society for the Improvement of Medical and Surgical Knowledge in 1793. To the second volume of the Transactions of the Linnean Society, published in 1794, he contributed a paper entitled 'Observations upon the Structure and Economy of Biological Plants, by C. Carlale, 1794.' 'The Use of the En.NotNil fed on chyle, and that their organization was adapted to their food. In 1800 he was admitted a Fellow of the Royal Society, and contributed a paper to the Philosophical Transactions of England, relating to 'The Influence of the Hunger in the Arteries distributed on the Muscles of slow-moving Animals.' This paper was the result of dissections of the Lemur Tardigradum and Bragunydidactylus, in which the author pointed out the peculiar distribution of the arteries in these animals. He conceived that the expansion and constricting of the arteries tended to retard the velocity of the blood, and thus to secure a greater supply to the muscles of these animals, which living upon trees and only moving slowly, require that their muscular system should be constantly in action. There are several other anatomical and physiological papers by him in the Philosophical Transactions: 'An Account of a monstrous Lemb,' 1801; 'The Physiology of the Stapes,' 1803; 'Account of a Family having hands and feet with supernumerary fingers and toes,' 1814. After the paper on the distribution of the blood-vessels in the slow-moving animals, his attention was directed to the connection between the circulation of the blood and the action of the muscles. In 1804 he gave the Croonian lecture on 'Muscular Motion,' this paper pointed out the difficulties which the invested the subject, and which may have been the means of drawing the attention of others to the subject, who followed up the inquiry with more success.

To his medical literature may especially Sir Anthony are many contributions. One of the first was 'On the Nature of Corns and the mode of removing them,' published in Simson's 'Medical Facts and Observations,' 1779; 'A New Method of applying the Tourniquet,' Lond. Med. and Physic Journal, 1777; 'On the general and individual action of Bougies,' Bibd. 1800; 'Letter to Sir Gilbert Blane on Blister, Rubefacient and Eserchotic, giving an account of the employment of an instrument adapted to transmit a definite degree of heat to effect certain purposes,' London, 1858. In 1817 he published a larger work entitled 'Essay on the Disorders of Old Age and the means of prolonging Human Life,' 4to. London. A second edition was published in 1818. This work is principally devoted to the examination of the investigations of other writers on the subject of performing certain surgical operations on aged persons. It is probable amongst old people, if the question were examined statistically, the knife kills many more of the diseases to which it is attended. Sir Anthony published 'an alleged discovery of the use of the spleen and Thyroid gland,' being a paper read at one of the evening meetings of the College of Physicians. The author's object was to demonstrate the connexion between the spleen and the diseases of the tongue, and therefrom thence to show the connection between certain parts, and thus to offer an explanation of their respective offices. That he failed to perform this, the still unexplained functions of those organs prove.
extra-vascular parts. There are some preparations illustrative of the union of these parts in the Hunterian Museum prepared and presented by Sir Anthony Carlisle. One of his rarest and most valuable subjects, that of 'London Medical Gazette' in 1826, on 'Galen's Practise,' in which he regards disease as a humoral and constitutional inflammation, occasioned by alimentary crudities, because certain vegetable acids and acidifiable viands are often the notorious associates of the disease. It was manifest from this and other papers that he was not keeping up with the knowledge of his day.

He published numerous other papers: two on plants, in the 'Horticultural Transactions,' two on antiques, in the 'Philosophical Transactions;' and on the 'decomposition of Eggs, in 'Nicholson's Journal,' and on Cathartic the battle of vipers, the venereal disease, etc., in 'Saturday's Journal.' The most remarkable of his papers on general subjects was one on 'Galvanic Electricity,' in 'Nicholson's Journal,' in which he first pointed out the fact that water might be decomposed by the galvanic battery. He was also a frequent contributor to the newspapers, and letters of his appeared in the 'Times' on the Salt-Duties, the importance of Salt to the Health of the Human Beings, Military Flogging, Hygeian Quackery, &c. Amongst other subjects on which he wrote with great vehemence was the miss-mind-wifery, and in the 'Times' of February 26, 1829, is a letter addressed to Mr. Robert Pool on that subject, earnestly entitling him, for the sake of propriety, not to degrade the College of Surgeons by making mid-wifery a part of the requirements of a surgeon.

Mr. Carpenter's degree of Doctor of Medical science at the beginning of this century, and Sir Anthony early in life was always anxious to improve, and surgery is indebted to him for many minor improvements in instruments, &c. He first made the practice of cutting small vessels with straight-edged amputating knives, approaching in its kind to the ordinary cutting-knife, for the clumsy crooked knife of former days; and also was the first to employ the carpenter's saw, simple in its construction compared with that formerly employed, a saving of a quarter of an hour to an hour in this country, and he has by the aid of Mr. Stodart introduced various improvements in surgical apparatus.

The talents of Sir Anthony Carlisle consisted in his observing power. His contributions to science are frequently deficient in sound generalization. His rapidity of observation and his power of application made up for this deficiency, and gave him a position while he lived which his works will hardly claim for him now that he is dead. He died in London, on the 16th March, 1844, in the 80th year of his age. (Petigrew, Medical Portrait Gallery; Lancet; London Medical Gazette.)

CARPENTER, DR. LANT, was born September 2, 1785, at Kidderminster, and was descended born both on the father's and mother's side from families of the ancient nobility of that town. In consequence of his father's failure in business, he was at an early age adopted by a Mr. Pearell, a relation of his mother, a man of plente and benevolence. To his care and instruction young Carpenter was much indebted, and while a boy in Mr. Pearell's family he began to display that self-denying benevolence and that interest in education which characterised him through life. Mr. Pearell had established a Sunday-school at Kidderminster, about the time that Mr. Rakey was in his 12th year. However, without knowing of Rakey's efforts. Young Carpenter, then eleven years of age, who taught in his school, was anxious to give to the boys of his class some additional instruction in writing and arithmetic, and other branches of useful knowledge, during the week. As they went to their work at five in the morning, he was called by them at four o'clock to give them their lesson before the commencement of their daily labour. This he continued through the year, the lesson in summer being held in a cherry-tree, and in winter in a small summer-house without fire.

His school-education was received partly under the Rev. Robert Gentleman, minister of the congregation to which Mr. Pearell belonged; partly under the Rev. Mr. Blake, with whom he resided for some time; and with Mr. Pearell he had founded and endowed for the better instruction of the sons of dissenters of the middle class; and partly under his uncle, the Rev. B. Carpenter of Stourbridge. Being designed for the ministry, he was sent (A.D. 1797) at the age of seventeen to the academy at Northampton, which had been established by Dr. Doddridge, and which still exists in London on the designation of Coward College. But about a year after Lant Carpenter entered it, the establishment was closed, and a time broken up, the trustees being dissatisfied with its condition and its want of a sufficient number of the students. Lant Carpenter's friends were probably for the most part Arians: his own views appear to have been still more remote from the standard of reputed orthodoxy. He was not driven from his own institution before their expiry and he moved them for the full term, and Lant Carpenter finished his academical career at the university of Glasgow, though he was obliged to leave (A.D. 1801) too soon to take a degree, but furnished with the most gratifying testimonials from the professors under whom he had studied.

On leaving college he was engaged for a time as assistant in the school of the late Rev. J. Corrie at Birmingham, and was afterwards one of the librarians of the Athenæum at Liver- pear, where he was conducting a public library, and he conducted a Sunday-school. In 1806 he applied for the degree of M.A. to the university of Glasgow, and the senate sent him instead the transcript of the degree of B.A. which he had already obtained.

While at Exeter Dr. Carpenter was engaged in controversy with some of the clergy of the town and with other persons, but however unpopular his opinions might be, he was held personally in the highest estimation. In 1806 he proposed the establishment of a public library at Exeter, the lead in proposing the carry-off, and managed the library for the first year. This library still exists. He also aided in the establishment of a Lancasterian school in the town, and contributed towards the funds to establish a Sunday-school. He occasionally took part in public affairs when questions of religious liberty were concerned; and in 1815 moved the adjournment of a meeting held to oppose the Roman Catholic claim; and failing in this, got up a counter petition in support of those claims.

In 1817 he removed to Bristol, as one of the ministers of the Unitarian congregation there. Here his labours in the discharge of his ministerial duties were continued; and he was very industrious in his private occupations. He is remarkable for his ability to act for himself in objects of general utility, and took an active part in organizing the Bristol Literary and Philosophical Institution. Among his coadjutors in this work were the Rev. W. D. Conybeare, Mr. (now Sir) H. T. Delabagh, and Dr. J. C. Harwood. He was also appointed part of the board of governors of the Bristol College, as he was given to understand that his religious sentiments would render his co-operation injurious rather than otherwise. In his own congregation he succeeded, amid some discouragements, in the establishment of a Sunday-school, and continued his exertions for the instruction of the young people of his congregation.

These various exertions, combined with the preparation of his numerous publications, were too much for his strength. He had ill health during the last year of his life, and would have resigned his ministry at Exeter, but for the affection of his congregation. In the summer of 1826 he was again laid aside: both body and mind had been overworked, and a long and painful course of sickness and despair ensued. He resigned his pastorate at Bristol and spent some time in travelling in England and on the Continent; by which his health and spirits were gradually restored. At the beginning of 1829 he resumed, by invitation, his ministry at Exeter, the congregation there being in want of a successor, in hope of his recovery; but his school, which had been for a time carried on for him, was given up. In 1839 his health, which had been for some time declining, was more grave, and the two succeeding months were a period of health and spirits carded. He was again recommended to travel, and while going in a steam-boat from Naples to Leg- born, fell overboard unperceived and was drowned, in the night of the 8th April, 1840. His body was afterwards found on the coast of the English territory Mr. Porto d'Ano, the antient Antium, and was interred on the sea-shore.
Dr. Carpenter was an industrious and useful writer. His publications, including those which were posthumous, amount to forty-four. Most of these were polemics or the other sermons or pamphlets which do not require notice here. The following are his more important works:—1. An Introduction to the Geography of the New Testament, 12mo., 1805; this work has gone through six editions. 2. Unitarianism, edited by the author, 12mo., 1809; this has gone through three editions. 3. An Examination of the Charges made against Unitarianism, &c. by Dr. Magee, in his Discourses on Atonement, &c. 8vo., 1820. 4. Principles of Carpenter in Braces, &c. 8vo., 1838. This work is a reprint of articles which he had contributed to Rees's Cyclopaedia. 5. A Harmony or Synoptical Arrangement of the Gospels, with dissertations, notes, and tables, and illustrated by a map and plan, 8vo., 1835; a second edition, somewhat augmented, was published in 1840. 6. The Apostles, 2 vols. 8vo., 1836; this was contributed to the periodicals of his own religious denomination. He edited two selections of hymns and some other works.

Few men have been more deservedly esteemed than Dr. Carpenter. Even the strongest opponents of the theological system with which he was identified softened their tone when speaking of this good man. As an instance of this it may be mentioned that his 'Harmony' and 'Practical Sermons' and the Memoir of his Life were favourably and largely reviewed in the 'Ecclesiastical Review.' Not of all opinions, but his, his cordial respect for him. In his own denomination his extensive influence was derived perhaps more from the reverence felt for his piety and goodness, than from his varied attainments in controversy; he was a valued friend, and even among those who had, like the writer of the present notice, but few opportunities of personal intercourse, his memory will ever be cherished as something peculiarly dear and sacred.

CARPENTRY is defined by Robison as 'the art of framing timber for the purposes of architecture, machinery, and in general for all considerable structures.' Considered as a branch of the art of building, it embraces the construction of the framing of partitions, beams, and roofs; the nester woods, work of doors, window-frames, the plastering of floors, staircases, and the work of the joiner. [JOINERY, P.C.S.]

As in the article Building, P.C.S., our object here is rather to point out and connect various articles in other parts of the work than to present even a complete outline of the theory and practice of carpentry, which involves a knowledge of the nature and properties of various descriptions of timber, of the strength of materials exposed to various kinds of strain, of the mechanical principles involved in the construction of trusses, roofs, and the various framings which tend to bind the several parts of a building together, or to sustain and distribute pressure, and of the practical details relating to the choice of wood and the union of several pieces by various kinds of joints and connections.

The properties of timber an account is given under Wood, P.C., p. 518, and also, in connection with other matters relating to carpentry, in the articles on Sawn timbers, framings, frames, or, P.C., p. 8. Of the woods used in carpentry in this country oak is one of the most durable, though its comparatively high price, and the difficulty of working it, restrict its use. It should be borne in mind however, that the irregular direction of the fibres of oak greatly impairs its strength when sawn into beams for the construction of floors. The strength of oak is less than one of equal size of fir, because in the latter the fibres extend in almost perfectly straight lines from end to end, while in the former their course is so tortuous that those which near the surface are frequently cut through by the saw. Hence a square piece of oak only one inch thick will be as strong as half an inch thick sawn timber, to which allusion is made under Saw, P.C., p. 476. Fir, which is very easy to work, and is peculiarly advantageous for house carpentry, on account of its stiffness, is not of the same species, but probably closely allied to the fir, and which also enters into the composition of the sawn material, to which allusion is made under Saw, P.C., p. 508. The supplying of oak is chiefly from foreign countries, and the principal forms in which it is brought are those of balks, or large blocks of various sizes, each of which consists of a whole trunk roughly sawed; deals and deal-ends (DRAWS, P.C., p. 538) which are simply those portions of a trunk or large log, which have been cut down to 4 inches wide and battens and batten-ends (BATTENS, P.C., p. 41), which are similar to deals, but only 7 inches wide. Various technical terms are applied to the smaller pieces of timber cut out of balks, deals, and battens. The transverse dimensions of which are frequently called their scantling. [SCANTLINGS, P.C., p. 10.] Stuff is a general name given by carpenters to the wood upon which they operate. By the drying-up and evaporation of its vegetable juices, timber will become shriveled, and lose part of its weight; it frequently warps or bends, and splits, or becomes cheesy, or full of longitudinal cracks, which, as noticed under Saw-MILL, P.C., p. 481, are useful in a radiating direction a requisite to their strength. OAK, being more elastic than the other timbers to which allusion is made, is almost entirely in a lateral direction, the length of a piece of timber, in the direction of its fibres, being affected only in the most trifling degree. To prevent as far as possible the injurious effects of shrinking, warping, and cracking of timber, it is well seasoned by long exposure to a current of air before it is used, an object which is effected by various modes of stacking and piling with internal openings for the admission of air: but as no ordinary amount of seasoning will perfectly accomplish the desired object, precautions should be adopted to lessen the evil of subsequent shrinkage. Where it is required to bend timbers they are softened by boiling or steaming, then brought to the required shape, and secured at the proper curvature until they become cold and dry, when they will retain their new form with very little variation. For the various modes of cutting timber see the articles Saw and Saw-Mill, already referred to, and Wood-CUTTING MACHINERY, P.C., p. 521; and for a notice of the principal boring tools used by the carpenter, see BORING MACHINES, P.C., p. 226.

Of the employment of timber in immediate connection with brickwork, as in bond-timbers, wall-plates, carper-beams, or doorways and windows, &c., a notice will be found under Oak, P.C., p. 136: referring his bar to the articles on SAW, P.C., p. 142, and FLOORS, P.C., we will find most of the information required in a work of this character on carpentry is connected with building. In Roor especially, and in the account of centering under SCAFFOLDING, P.C., plans are explained which are of elementary importance in framing or combining several pieces of timber into a rigid framework in which the strength of each is used to the greatest advantage which must be applied, with such modifications as circumstances may dictate, to almost every construction in carpentry; while under TRUSCING, P.C., p. 518, the application of the same principles to the support of large beams or girders is explained. The construction of timber partition-woods, or rather of the timber framing of such partition-woods, is generally considered by carpenters as one of the principal objects to be attended to in the design of buildings, or in various circumstances, in the general principles as are involved in the trusses of a roof, may be noticed here, because, though a distinct branch of carpentry, it does not, like the construction of floors, demand a separate article.

Partitions formed of brick-nogging, or of brickwork included within the intermediate spaces of a timber framing, are noticed under Building, and as, from their weight, they are inapplicable excepting in cases where there is a sufficient ground for the use of such partitions, as in basement partitions, or in such partitions of upper rooms as are immediately over partition-woods rising from the basement, they call for but little skill in the arrangement of the timbers, and in the manner of their support, or, as they are called (from the use of small timbers denominated quartering in their construction), quarter partitions; wherever they rest upon a solid basis, it is sufficient to fill the rectangular framing.
which bounds the partition at the sides, top, and bottom with a series of upright rectangular bars, the greatest width or thickness of which is disposed in a direction at right angles with the face of the partition. These upright timbers, or quarterings, are placed at uniform distances from each other, the interval between these being in a brick nogging partition either 18 or 27 inches, so as to receive either two or three bricks in length, while in other cases they are usually less; and the depth of the quarterings, which regulates the thickness of the brick-ogging, is usually 3 inches. Those for brick-ogging, where the surface is to be covered with plaster, should somewhat exceed the thickness of the brickwork, so as to allow for irregularities in the form of the laths. When however the floor upon which the partition rests is furnished with a floor-board, in the thickness of which the stress should be borne by the extremities of the lower edge of the partition, which should be constructed as nearly as possible like the trusses of a roof, and should be capable of affording support to the floor above it, and also, if needful, to that below it, on which it appears to rest. The simplest mode of accomplishing this is to insert in the frame two inclined bars, resembling rafters, abutting upon the lower corners of the partition, which of course must be firmly supported by the main beams which rest against the ends, or by columns, or wall-plates or are otherwise immovably connected with the brickwork, and either meeting in the centre of the top of the partition, like the rafters in Roof, Fig. 9, or being joggleed into the edges of a central upright timber resembling the king-post in Roof, Fig. 9. In the latter case, the bottoms of these bars, or the middle portion of the bottom of the partition, and, if needful, the floor beneath it also. In either case the point of meeting becomes a fixed point for supporting the ceiling or floor above it. That would be generally understood by a brace. The arrangement, or if a doorway be required where the central post would come, two posts may be used instead of one, with a horizontal bar of wood between their upper ends, the two uprights then resembling the queen-posts i, and the horizontal bar the collar-beam in a case of this description. These diagonal bars are called braces, and the horizontal piece between the posts is sometimes called an intertie, but the names are objectionable because their action is the reverse of that of a tie, or of what is called an entie. When therefore the braces often derange the bracing of partitions, and sometimes render it impossible to retain the advantage of the tie afforded by the bottom piece of the rectangular frame which bounds the partition. In some cases the intertie, or rather collar-beam, forms the head of the doorway; but as the doorway is mostly much lower than the partition, it is not unusual to extend the horizontal piece which forms the head of the doorway the whole length of the partition, and to form the long rectangular space above it with a proper number of these interties. It is often necessary to fix with the upright quarterings to which the laths are to be attached, a mode of bracing with parabolic arches of iron or wood, as illustrated in Roof, Fig. 18, is adopted. The usual mode of bracing is occasionally used for brick-ogging partitions, or, in rural cottages, for the brick-ogging of external walls; but of course its adoption occasions much trouble in cutting the bricks to fit the oblique lines and angles produced by the brace. In countries, such as England, where the joint required in carpenter's work some remarks are made near the end of the article Roof; while Scarfing [P. C., 13], or the mode of joining timbers longitudinally, is the subject of a separate article. Robison maintains that the joint of mortise-and-tenon, or the mortise-and-tenon joint which is worthy of notice, under the name of fos-tail wedging. It consists in the insertion in the end of the tenon of a thin wedge, which, when the mortise is not cut through, but simply into the piece of wood in which it is formed, is rather a tenon upon a tenon, and often makes it somewhat of the dovetail form, by the mere act of driving the tenon into its place. Robison suggests that, to guard against the liability of the tenon to split beyond the shoulder, the required thickness of the wedge, which will be sufficient,
written by one Yvo of Narbona or Narbonnete to the Archbishop of Bordeaux, containing the confession of an Englishman (who had lived among them), touching the barbarous demeanour of those Tartars. The Englishman, according to his confession, or according to this letter, had been perpetually besought by the chief of the Tartars, and to do to his country certain navigations, and had betaken himself to the Holy Land. Not long after his banishment, being at Acon (Acire, or St. Jean d'Arc), and thirty years old, he there lost all his money at dice. Then, having nothing but a shirt of sackcloth, a pair of shoes, a hat, and a small knapsack, he went out on his travels through Syria and Asia Minor; and, to prosper the better, he felied idioty and drunkenness, for idiots have been at all times objects of superstitious reverence with the Tartars, as a) evidence of belonging to the elder days in indicating the fact that he was a Ghiour or Christian. After long wandering, he fell among the Mongol Tartars, learned their language, and went with them when they began to march upon Europe. The hordes which he followed was defeated and driven back by a mighty army collected by the duke of Austria, the duke of Bohemia, the patriarch of Aquileia, and others, including the prince of Dalmatia, who took eight prisoners, and among them this strange Englishman. The letter states that he was employed by himself and his compatriots, and as having been employed as interpreter and ambassador by the Tartars in their communications with the Christian princes. The account the fellow gave to his captors was flimsy and very short, and full of horror and exagerrated. Mahomet had once records this famous letter under the date of the year 1245.

But the intrepid monks of the two new orders were not deterred by any prospect of danger. "And although," says the introductory epistle to the travels of Carpinus and his companions, "we perforce, of free will, came to the Tartars and other nations that we might be slain or reduced to perpetual slavery, or should suffer hunger and thirst, the extremes of heat and cold, reproach, and excessive fatigue beyond our strength (all events of which, owing to the length and rarity of which we have endured, even beyond our first fears); yet did we not spare ourselves, in order that we might obey the will of God, according to the orders of our lord the pope, and that we might be useful in some things to the Christians, or at least, that the will and intention of these people might be assuredly known and made manifest to Christendom, lest suddenly invading us, they should find us unprepared, and so make incredible slaughter of the Christian people." In Poland and Russia, and wherever the widely spread Slavonian language was spoken, Friar Benedict the Pole served the Italian as interpreter. The two monks ran great danger of being murdered by the people of Lithuania, who appear to have been at this time many degrees less civilized than the Mongol Tartars, and were employed by the emperor to conduct and kindly entertain. As the Russians adhered to the Greek or Eastern church, Carpinus in a public meeting exalted the grand duke and his bishops to abandon their heathen heresies, and to accept the letters of Pope Innocent, wherein they were admonished to return into the unity of the Roman Catholic church. Although our Franciscan effected no conversion, he raised no animosity by this boldness. He and his companion Benedict received good advice as to the best means of dealing with the Tartars, and were sent forward to Kijow, then the chief city of Russia, and not very far from the uncertain moveable frontier of the Mongols. At Kijow they hired an interpreter; but they afterwards found reason to lament that this man was useless to the three, and nothing could be understood. The Mongols at this time occupied all the country between China, Siberia, and the Caspian Sea, the van of this nomadic pastoral army being on the river Doniper, and its rear under the great wall of China. The subordinate khan or chiefs passed the two monks onward from post to post until they came to the head-quarters of the great Banu. These posts were far apart. The country where Banu had his camp (called by the travellers Comania) was far beyond the Caspian Sea. But their toils were not over; for their first duty was to procure to their sovereign, the Khan of khanes and Emperor of all men. They then entered a country called by them the country of the pagan Nayan, where they travelled for many days, till they arrived at the court of the Great Khan, in the latter country. They journeyed for about three weeks, contrarily riding with great expedition. "In the whole of this journey," say the monks, "we used extraordinary exertion, as our Tartar guides were commanded to bring us on with all expedition: on which account we always travelled from early morning till night, without stopping to take food; and we often came to our quarters so late, as not to get any food the night, but were forced to eat in the morning what we ought to have had for supper. We changed horses frequently every five miles, and walked the remainder of the road on foot. It is not easy to name the places or even to trace the road which they followed; but they appear to have passed by the head of the Balik lake, and to have traversed great part of the country vaguely denominated China. The Tartary, being a vast region, was not one great state, but many; and they entered Tartary, as there is no mention made of their travelling on camel, or of their entering upon that desert. Here they do not attempt to name the place, merely calling it the Court of the Emperor. This great potentate, whom they call Koj or Coka, had many subjects, and it is said that he could contain 3000 men. Princes and great lords from China, a duke from Russia, two sons of the king of Georgia, and an envoy of the caliph of Bagdad, were waiting and anxiously to receive them. Their reception was not precipitated into a defiance against the Church of Rome, the Roman empire, and all the Christian kingdoms and nations of the West; and they were otherwise informed that it was the intention of these Mongol princes to subdue all the kingdoms of the earth as Genghis (Gengha) Khan had commanded them to do. The Lord of the World however admitted them to an audience, received from them the letters of the pope, and gave them in return letters for his Holiness written in the Mongol language and also in Arabic. The monks complained that during their stay there, which continued a whole month, they were in such extreme distress for victuals and drink that they could hardly keep themselves alive; adding that they must verily have perished at last if God had not sent them a faithful Tartar, a valiant companion, who supplied them with victuals and who procured them some food. At last, on the feast of St. Brice (the 18th of November, 1247), they received permission to depart from this inhospitable court. They returned to the court of the Great Khan, and passed through the desert, and often sleeping at night on the snow. On the 9th of June, 1248, they reached Kijow, where their Russian friends joyfully received them. In all they had passed sixteen months entirely among the Mongols and the people that had been conquered by them. Pope Innocent had re-advised them to be diligent and accurate in their observations, and faithful in reporting what they saw and heard of these strange people who had made all Europe tremble. The next year they travelled through China, Tibet, the borders of India, and other and later travellers through the vast regions which intervene between European Russia and China. Carpinus was the first to uproot a set of monstrous fables, and to give some true and striking picture of the Tartars. By the same time he revealed their number, warlike strength, and close political union; and warned the disturbed and distracted kingdoms of Christendom that if these hordes moved westward they would be found irresistible, and that Christendom might be destroyed for the single purpose of opposing them. The chapter entitled "How the Tartars are to be resisted," is full of good sense. It appears that Friar John returned to Italy, and that there, with some assistants, he published his plain unvarnished
There is a good portrait of Carr in the second volume of Dance's 'Collection of Portraits,' which work also contains those of several other architects of the same age.
Many years after, the last remaining son of Francesco, named Marsilio, having formed a conspiracy to recover possession of Padua, was seized and put to death in 1456.

(Linus Familiaris Jesu Christi: Saggio, Storia Civilé di Venezia; Vergerio, Vita Carrariensis Principum ad ann. 1355; Verzi, Gian Battista, Notizie Storico-genalogiche de' Signori di Carraia; Tizotti, Viaggi di Master Francesco Notizie di Padova. Scritti di Taddeo di Benci, Ser. Sei, Consolare, Milan, 1833. This last is a kind of historical novel of the wanderings of Francesco II., after his father's imprisonment.

CARHAYE. [CARDING, P. C. S.]

CARSTARES, WILLIAM, a Scottish ecclesiastic, more distinguished for his political exertions in furtherance of the Revolution settlement than in connection with his profession, was born at Cathcart, near Glasgow, on the 11th of February, 1664, and was the 5th of the 10th of the family. Afterward he gave lessons in the High Church, Glasgow, where, by his son, but in a less degree and with less diplomatic capacity, took a lively share in the ecclesiastical-political movements of his time; offered a violent opposition to Cromwell's schemes of general toleration, and suffered by the prevalence of his own principles of clerical coercion during the persecutions of the Covenanters under Charles II. (See 'Notices of the Life of the Rev. John Carstares, by the Rev. William Ferrier.') William Carstares acquired the rudiments of his education in a neighboring school, and afterward studied in the University of Edinburgh. Early in life he seems to have resolved to plant the seeds of subsequent distinction by arduous study, and he appears to have become in early life not only an accomplished scholar, but an observer of things. During a part of the portion of the latter end of the reign of Charles II. he lived in Holland, and studied theology at Utrecht, where he is supposed to have taken orders. Accident introduced him to the notice of the pensionary Fagel, who, finding in the young clergyman great sagacity and self-reliance, and a knowledge of the political institutions of his own country seldom equalled at his early years, recommended him to his master, the Prince of Orange, afterwards William III. It was natural that the prince, with the absence of the Duke of York, was after him next heir to the crown, should have about his person individuals acquainted with the politics of the country of which he might eventually become ruler. In this view he chose young Carstares as one of his confidential advisers, and events justified the selection. The time of his return to Britain is not precisely known. He was in London in 1689, and more or less connected with the projects on which the prosecution in connection with the Rye-house and Williamite plots were founded. There is much reason to presume that he was the medium of communication between the court of Holland and some of the parties prepared for insulation. He was, at all events, in the secrets of the Argyll party in Scotland, and the key to a cipher through which much important correspondence was passed; he was found to be the handwriting of a warrant to apprehend him was issued, and he was found attempting to conceal himself in Kent. Sufficient evidence could not be found to bring him to trial in England, and he was sent out with a writ of habeas corpus, which was defeated by sending him to Scotland, where the practice of torture still remained a stain on the administration of justice, which Carstares was subsequently a main instrument of removing. In the presence of the Privy Council of Scotland he was subjected to the torture of the 'thimblerig,' or thumb-screw, which he bore with great fortitude, refusing to divulge the secrets he possessed. He was subsequently presented by the Privy Council with one of these cruel instruments, which he bequeathed as a memorial to his family, and in a later stage of the trial it is said that William III., having desired to experience the original symptoms of this species of torture, the divine turned the screw at his request, but rather too vigorously for his Majesty's nerves.

Whether the general supposition be true that Carstares was then acquainted with some of the secrets, the divulgence of which might have baffled the projects of the Prince of Orange in connection with the British crown, is likely to remain as much a mystery as he left it. That he knew much more has been conjectured by the industry nor cruelty to overcome his firmness; but no clue was obtained to the character of his knowledge is pretty clear from the circumstance of his afterwards being released on a sort of compromise, by which he confessed a knowledge of many of the projects of the opposite family, and other cases of Jerviswood. He returned to Holland with all his secrets undivulged, and was warmly received by the prince, who, in devising the expedition which created the Revolution of 1688, is said to have mainly relied on the full knowledge of British parties, and the advice, both bold and sagacious, of Carstares. It has sometimes been urged as a proof of the Zabulon-like illusion between the Scottish Presbyterian and William III., who could not precisely understand the pertinacity with which his northern subjects adhered to the principle of spiritual independence, that Carstares was recommended to the crown by his Majesty's sister, to expedite the trial of a messenger dispatched to the English, at which it was understood that there would be a violent opposition to the oath of allegiance, the king, taking advice from less sagacious counsellors, had prepared to deliver to a messenger dispatches directing the peremptory enforcement of the act. It is, however, more probably that authority to stop the messenger in his Majesty's name; as presenting himself to the king (who had gone to bed) in the middle of the night, in the guise of a petitioner for his life, and threatened with a civil war unless the money seized prevailed on him to dispense with the oath. Whether the anecdote be true or not in all its circumstances, there is little doubt that his influence obtained the dispensation. He became now virtually prime minister for Scotland. He received the popular designation of 'Carstares; and as Long observes, 'It is curious to remark how the honesty sagacity condescended to stoop and truckle to a Presbyterian clergyman, whom their predecessors in office had tortured and executed. Even after the death of William, his knowledge of Scottish affairs, and the respect paid to his talents, left his with considerable influence. In 1704 he was chosen Principal of the University of Edinburgh. He died in the 28th of December, 1716.

(Signed, and Letters addressed to William Carstares; to which is prefixed the Life of Mr. Carstares, 4to, 1714.)

CARThAMUS TINCTORIUS. [Saratow, P. C.]

CARTRIDGE, a cylindrical case containing a charge of gunpowder or shot, or of powder and ball, for firearms, used for military purposes, to facilitate the loading of match, carbines, and pistols, are formed of a strong hard paper manufactured for the purpose, called cartridge-paper, and are styled ball or blank cartridges according as they contain, at both ends, either ball or blank. The cartridges for cannon and mortars, which always consist of powder only, are usually cased with flannel, though sometimes pasted, tin, or even wood is employed. The North Americans, during their last war with England, are said to have employed very thin sheets of lead, resembling them used for lining tea-caskets, for this purpose. The advantage of such a substance is, that it obviates the danger of burning particles of the cartridge-case which remain in the piece after discharge, and the smoke is much less offensive. Wire cartridges consist of an inner case of wire network inclosed in a thin paper case, to the outer end of which a wadding is attached. The shot, with which it is usual to mix bone-dust or some other substance to fill up the space, is fastened to the wadding by means of a cord, or by a bit of wire upon the charge of powder. When the gun is fired the paper case is torn to pieces as soon as the cartridge leaves the gun, and the shot immediately begins to quit the cartridge by passing through the meshes of the wire net-work, which is carried forward with the charge until it is quite empty, when it falls to the ground. By this contrivance the leading of the gun is avoided, and the recoil produced by the discharge is lessen'd, the charge leaving the barrel like a bullet. The wire is also intended to prevent a great deal of smoke, that lighter charges, and consequently a lighter gun, may be used; much time is saved in loading, especially as no separate wadding is required; and, as the cartridge has no inclination to move before it is impelled by the explosion of the powder, the grain of the gun is more regular, and the trial of a piece of loosing charges is avoided. Greener, in his work entitled The Gun; or a Treatise on the various descriptions of small Fire-
arms, which was published before wire cartridges had been brought to their present state of comparative perfection, suggests the use of a case of felt, made much thicker at the bottom than at the sides, as a substitute for wire.

In the 'Transactions of the Linnean Society', vol. xlv. pp. 106, 107, is a description, illustrated by figures, of a machine invented by Mr. Caffin for filling cartridges, in which two cylindrical cases, each of which will contain the proper charge for one cartridge, open at both ends, and turn upon a central axis at the rate of 600 per minute. This machine, if properly arranged, should enable one man to make 30,000 cartridges in a 10-hour day.

The produce of caraway, on very rich old lieys in the hundreds or low lands of Essex, has often been twenty hundred weight to the acre. (Don.) There is always a demand for the seed, or more properly speaking the fruit, in the London market.

C. verticillatum has the general and partial involucres of many leaves, the leaves pinnate, and the leaflets linear. The segments of the leaflets spread in such a way as to appear whorled, hence the trivial name. It is a native of the western parts of Europe. In Great Britain and Ireland it occurs as a rare plant in damp, bilious pastures.

C. bulbocastanum of Koch, is the Bunium bulbocastanum of Linnaeus. [Bunium, P. C. S.] It is the Scandia and Stium bulbocastanum of Sprengel and Moench. Babington, in his Manual, has restored the Linnaean species. (Babington, Manual of British Botany, G. Don, Gardner's Dictionary.)

C. carum, Common Caraway — Medical Properties of. The umbelliferous plant is indigenous in most parts of the south of Europe, where its roots are used in the same way as those of the parsnip and carrot, and its fruits, incorrectly termed seeds, are collected as aromatic stimulants. For a variety of uses, it is extremely useful. The seeds are chiefly in Essex, for the fruit alone; but much of what is used in this country is imported from Germany, where it is in extensive use to form a liqueur. The fruit is too familiarly known to require description; but to secure it in perfection it must be ripe, brown, not green, and when opened it should emit a strong characteristic odour. This depends on the presence of a volatile oil, which exists in the proportion of 4 to 5 per cent. It is obtained and purified by repeating the official process of distilling the oil for caraway, aqua, and spiritus. The directions in the Pharmacopoeia for preparing the two latter are never complied with; as a portion of the oil dissolved, or diffused through the menstruum, is a more speedy mode of obtaining the object. The oil is sometimes given drop by drop on the tongue. The portion of caraway are similar to those of dill [Anethum graveolens, P. C. S.], and the observations there made on the use and abuse of this carminative are applicable here.

C. CARUM, Common Caraway, was born at Birningham in 1772, and was entered a commoner of Christ Church, Oxford, in 1702; having however already commenced author by the publication of 'An Irregular Ode to General Elliott' in 1707, and of a 40o pamphlet of 'Sunsets and Odes' in 1788. While a commoner, he descended into the study of Italian, French, and English literature, as well as of Greek and Latin. Having taken his degree of M. A. in 1706, he was in 1797 presented by the Marquis of Anglesey to the vicarage of Bromley Abbas, in Staffordshire, worth 187l. a year, with a residence. The same year he published 'An Ode to General Kosciusko.' In 1805 appeared his translation of the 'Inferno' of Dante in English blank verse, accompanied with the original; and in 1814 his entire version of the 'Divina Commedia.' It was some years however before this work, to which Carly principally owes his literary reputation, attracted much attention. It was first brought into general notice by Coleridge, who is said to have become acquainted with it when Carly himself was a schoolboy. Ultimately its merits were generally acknowledged, and the author had the satisfaction of bringing out a fourth edition of it before his death. It is not only unusually careful and exact, but distinguishes itself by its force and expressiveness. It must, however, be considered as a defect detracting materially from its claim to be regarded as a faithful representation of the 'Divina Commedia' that it is in blank verse; rhyme is an essential element of the Gothic spirit and classic beauty of Dante himself. Besides, it has produced verse translations of the 'Birds' of Aristophanes, and of the 'Odes' of Pindar; a series of Lives of English Poets, in continuation of Johnson's, and another of Lives of Early French Poets, in the 'London Magazine'; testing editions of the works of Pope, Cowper, Milton, Thomson, and Young. In 1826 he was appointed assistant librarian in
the British Museum, out he resigned that situation in 1832, on the claim that he and his friends conceived he had to the office of a stockbroker, though the printed bond, being passed over in favour of another person. He afterwards received a pension of 200l. a year from the crown, which he enjoyed till his death, which took place at his house in Charlotte-street, Bloomsbury, on the 18th of June, 1844. He had interred on the 21st in Poets' Corner, Westminster Abbey.

(\textit{Gentleman's Magazine}, for October 1844.)

\textbf{CARYCRINITES}, a genus of Crinoidea, from the Palaeozoic limestones of North America.

\textbf{GENE H.CREDIT. [BAIN, BAKER, BANKING, P. C., p. 387.]

\textit{CASHMERE}, or \textit{CACHMERE}, a peculiar textile fabric formed of the fine downy wool found about the roots of the spires of the Tibet goat (\textit{Goat, P. C., p. 258}), and so called from the original seat of the manufacture, in the valley of Cashmere, in the north-west of India. \textit{(\textit{CASHMERE, P. C., p. 342.})}

Shawls of exceedingly delicate quality are the principal articles manufactured of this material, but a cloth woven in imitation of them is also made, and called by the same name, or by corruption, \textit{Cassmere*}.

An interesting description of the manufacture of Cashmere or Kashmir shawls is given in Vigne's 'Travels in Kashmir,' from which an extract, entering more fully into the subject than any I have found, is given in the \textit{Illustrated London News}, August 13, 1842. From this it appears that the thread is dipped in rice-water before weaving, by which process it is made stronger, the stiffness thus imparted being subsequently removed. Of the amount of woolliness, however, we find no satisfactory account. The author of the article 'Shawls' in the new edition of the 'Encyclopaedia Britannica' intimates, in common with some other writers, that the process more nearly resembles the weaving of tapestry \textit{(TAPERTY, P. C. p. 60)} than the ordinary operation of weaving. The needle is occasionally used in the production of the patterns, but Vigne observes, that 'if the pattern be worked with the needle the shawl is far inferior,' in every respect, to those in which the pattern is woven in, and that 'an excellent pair (the shawls being always made in pairs) of the former description may be purchased in Kashmir for 150 rupees (about 10l.), whereas an equally good pair of the mule (the real), or the latter kind, could not be procured for less than 700 or 800 rupees.' The process is exceedingly slow, the weaving of a pair of shawls, or, as some writers have it, of a single shawl, often employing three men with a clumsy old-fashioned loom for a period of six months; and owing to the numerous heavy duties charged upon the shawls between leaving the looms and reaching a purchaser in this country, the value of real Cashmere shawls of the best quality is very high. They have frequently been sold in London at from 100 to 400 guineas each, and in one instance, when the import duty, which has since been reduced, was amounted to one cent, on the value, as much as 600 guineas was demanded for a single shawl.

The peculiar softness of Cashmere shawls appears to be in some degree attributable to the processes of washing to which they are submitted after weaving. The rice-water for this use, observes Vigne, 'is found in the canal between the lake and the floodgates at the Droggun.' Some ruins, in large limestone blocks, are lying on the washing-place, and in one of these is a round hole, about a foot and a half in diameter, and a foot in depth; in this the shawl is placed, and, water being poured over it, it is stamped on by the naked feet for about five minutes, and then taken into the canal, by a man standing in the water: one end is gathered up in his hand, and the shawl spread and beaten with great force upon a flat stone, being dipped into the water, and well worked with four strokes. The shawls, if coloured, are then dried in the shade, as the hot sun would injure the colours, and about ten days afterwards the same process is repeated, though for a less time. White shawls however, after being treated in the same manner, are spread in the sun, and bleached by sprinkling water upon them; and the alternate washing and beating, and drying and bleaching in the sun, is repeated three times, repeating it, for the most usual in the second washing and stamping. There is something peculiar in the appearance of Vigne, *which certainly communicates to the shawl a softness which cannot be given to those manufactured at any place in

\textit{the plains of Hindustan.} At the same time, he adds, 'those made in Paris or at Norwich would be, I think, as soft, as much as of the same kind, if not more so, with their being made by a machine instead of the hand.' For the same reason, he proceeds, 'it is well known that the calico made in India is much softer, and is much more durable, than any other made elsewhere.'

When the wool is washed out and the surface of the ground, is bad tasted, and Vigne believes the cause to be brackish. Old shawls that require cleaning, and sometimes also new ones, are washed by means of the freshly-pulled root of a parasitical plant called kritz. A pound of this root is broken up and mixed with about 400 weight of washed sand, into which a piece of pigeon's dung, equal in size to a tailor's egg, beaten up in about an equal quantity of water. The shawl is saturated with this liquor, stamped upon, washed with the hand, and then steeped in the canal. Vigne gives further directions on the procuring and washing of Cashmere shawls, and a shawl of this kind is frequently called a shag-rolled shawl, as it is manufactured from the shawl wool in Yarkund China, which resembles a coarse English kerseymer in texture. Respecting the statistics of the manufacture some additional information will be found in the articles \textit{CASHMERE, P. C. p. 290.} and \textit{KASHMIR, P. C. p. 158.} and in the \textit{Encyclopedia Britannica.}'

Shawls. Various attempts have been made to naturalize the Cashmere shawl goat in this and other European countries, but as the peculiarities of its wool appear to be beyond imitation, the object of these attempts is of course impossible.

Of the shape, size, and manner of weaving these shawls, \textit{Vigne} gives us particular accounts. It would take too long a space to quote his observations, and it is sufficient to state that Mr. Holdsworth, who has devoted himself to the study of this manufacture, has, after some difficulty, in obtaining a knowledge of the secret, patented the plan, and subsequently sold his patent to the Messrs. Holdworth, of Glasgow, who established the manufactory in that city, but before the manufacture was completed, the obtained the offered reward in 1829.

\textit{CA'SSIUS}, a genus of Passerine birds, of the family \textit{Coricroides}, allied to the bee-eaters and starlings. They are distinguished, among other characters, by their large, coarse and sharply pointed beaks. The species of \textit{Ca'ssius} are almost all inhabitants of America. They are gregarious, and feed upon grain and insects.

\textit{CA'SSIUS, AVIDUS}, was, according to \textit{Dion Cassius}, a native of Cyrrhus in Syria, of the same tribe as \textit{Heliolodorus}, who was prefect of Egypt in the joint reign of \textit{Antoninus Pius} and \textit{Marcus Aurelius}. Cassius served in the Parthian wars (\textit{A.D. 165 or 166}) under \textit{Lucius Verus}, in which he defeated \textit{Vologases}, and took Samosata and \textit{Ctesiphon} without a battle, and was given tribute in the form of 12,000 horses, the sons of whom were freed by the emperors (\textit{A.D. 166}). He was subsequently appointed governor of Syria, and in \textit{A.D. 170} he went to Egypt to suppress an insurrection in the lower country which was excited by some fanatic.

He succeeded in putting it down, and lived for about a year after (\textit{A.D. 176}) he himself rebelled against the emperor \textit{Marcus Aurelius}, and proclaimed himself emperor of the East. Cassius was assassinated in a few months, and his head was carried to Aurelius. The emperor immediately put to death all the men and women of the family of Cassius, on the pretest of a fresh conspiracies. Dion Cassius, who loved a tale of scandal, says that \textit{Fatina}, the wife of Aurelius, being apprehensive that her ins.
band would not live long, and considering the youth of her son Commodus, attempted to secure the interests of herself and her family by corresponding with Avidius Cassius, and urging him to proclaim himself emperor whenever he heard of the death of Nerva. It is certain that there was a report of the death of Aurelius, and that this was the immediate occasion of Cassius proclaiming himself emperor. It is also said that he was himself the author of the report of the death of Aurelius. The letters between Aurelius and his wife, and those between Avidius Cassius and his wife, show that the letters of Avidius Cassius are probably not genuine. Vulpocius attempts to show from these letters that Faustina was not privy to the design of Cassius.

The picture is a portrait of Avidius Cassius; Dio Cassius, lib. lxxv. ; Tillemon, Histoire des Empereurs, vol. ii.]

CASTAGNO, ANDREA DEL, a distinguished Florentine painter, sometimes called the Infamous, was born at Castagno in Mugello, near Florence, about the year 1476, and died aged about seventy-four. He was contemporary with Cosimo Rosselli and Massaccio, and painted in a style which in some respects resembled the styles of both masters, but he always remained far behind Massaccio, though he survived him many years. He was the first Florentine painter to adopt the new method of oil painting, which he learnt from Domenico Veneziano, and whom, after he had mastered the secret, he basely murdered. [VENZIANO, DOMENICO, P. C.] Very few of Castagno's works still remain: there are three in the gallery of the acquisitor Donati, two in St. Peter's, Rome, a work of great merit for its period; there are also two or three of those noticed by Vasari, in religious buildings of Florence. In 1476, the Pazzi and other conspirators concerned in the murder of St. Stephen were all executed. Castagno is said to have been hanging by the feet on the façade of the palace of the Podestà, they were done with such ability, and in such a variety of attitudes, that Castagno was henceforth called Andrea degli Impiccati (of the hanged). It was his best work, but, it has since perished.

[Vasari, Vite de' Pittori, &c.; Baldinucci, Notizie dei Professore del Disegno, &c.]

CASTIGLIONE, GIOVANNI BENEDETTO, called by his pupils LE BENEDETTO, was at Mantua IL GRETCHETO, was born at Genoa in 1616, and was one of the most distinguished of the Genoese painters, and an admirable etcher. He was placed by his father with G. B. Paggi, and upon his death very soon afterwards with Andrea de' Ferrari, and finally, it is said by Sopranì, Lanzi, and others, with Vandycck, who certainly lived some time in Genoa, but, except for a short visit, scarcely later than 1625, when Castiglione was only nine years old, if Sopranì's date is correct. This improbability, and the fact that Paggi did not die until 1643, and that he lived in Paris, makes his connection with Vandycck highly improbable. Vandycck was established in England in 1632, and Castiglione was then only fifteen years of age, and Vandycck did not settle in England until some years after he had entered into the service of the Infamous.

Castiglione painted in various styles, as history, portrait, landscape, and animals. He excelled in all, but most in animal painting and in pastoral landscape; in animals he has not had a superior in Italy. His masterpiece is the Nativity of the Saviour in the Pathé Library, and it is one of the finest pictures in Genoa: there is an etching of it by himself. He died at Mantua in 1670, in the service of the Duke Carlo I.; he had lived also for short periods in Venice, Florence, Rome, Nantes, and Bologna; in Florence he was licentiate to print his own portrait to be placed in the painters' portrait-gallery there.

Castiglione executed a considerable number of etchings, which are very highly valued, many of them are much in the style of those of Rembrandt: Bartholomé describes sixty-seven. One, of the entrance of the beasts into the ark, is characteristic of the particular taste of Castiglione; he generally chose subjects in which he could introduce animals, as fairs, markets, &c., and he seems to have had also a partiality for travels in the mountains, and for the life of the village. Of his best etchings are—the Discovery of the bodies of St. Peter and St. Paul, a night-piece; Diogenes in search of an honest man; and Melancholy. The majority of his paintings and engravings have been introduced into them with seldom very excellent; he is also sometimes inharmonious in his colouring, and heavy in his shadows. The name of Grecchetto was given to Castiglione, according to Sopranì and Lanzi, on account of the beauty of his colouring; but how the term is applicable is not very evident. Salvatore and Francesco Castiglione, the brother and son of Giovanni Benedetto, were both pupils, and were able painters.


CAT. FISH. [Anarrhias, P. C. S.]

CATABROSA, a genus of plants belonging to the natural order of Grasses, and to the tribe Festucaceae of that order. It has unequal grass-like leaves in two parallel rows, from the outer lateral ribs, much shorter than the spikelet; the flowers usually two, rounded on the back, distant; the outer palea membranous, with three ribs ending in teeth, which do not quite extend to the base; the seeds are set on a flattened, oblong, truncate pappus; the styles terminal; the upper glume has two very short, flat, lateral nerves, the awn absent. This is a genus formed by Pallot de Beauvais, and adopted by Babington in his 'Manual of British Botany.' The only British species is the C. aquatica; it has an equal pannicle, with half-twill of patent branches, and obtuse broadly linear leaves. It is found in ponds and ditches, and wet sands.


CATALPA, a genus of plants belonging to the natural order Bignoniaceæ. It has a two-parted calyx; campanulate corollas, with a ventricose tube, and an unequal four-lobed limb; fire-stems, two of which are fertile, and the other three sterile; the stigmas bilimellate; the capsule siliquiform, long, narrow, many-seeded, the valves constricted at the seeds membranous at the margin, with pappus at the base and apex. The species are trees with simple leaves, opposite or disposed three in a whorl; the flowers terminal, panicled.

C. syringaefolia has flat corolze leaves, three in a whorl. This plant is a native of North America, and is grown in the banks of the Ohio in Illinois, where it occurs in such great abundance that the wood is cut up for palings. It is a low-growing, singular-time tree, with smooth, white bark, easily injured by the frost. The leaves are large and come out late; the petals are white, spotted with purple and yellow. It is a plant well adapted for large shrubberies. There is one in the gardens of Gray's Inn, which is said to have been planted by Lord Bacon. The branches are used for drying wool of a cinnamon colour. The name of the genus appears to have been derived from the plant growing on the banks of the Catawba river. It does not bear fruit in this country.

C. longifolia has oblong leaves, acuminated, three in a whorl, undulated. It is a tree thirty or forty feet in height. It contains much tannin in its bark, and might be used for tanning. It is said to be serviceable in humoral asthma. It is known in the West Indies by the name of ' enche oak.'

There are several other species of Catalpa, all elegant plants. The C. syringaefolia thrives well in common garden soil, and may be propagated by seeds or divisions of the root. The other species must be cultivated in a light, loam, peat, and sand, or any light rich soil. Cuttings, half-ripened, root readily, if planted in sand with a hand-glass over them.

(Don, Gardener's Dictionary; Burnett, Outlines of Bot.)

CATAMARAN is a name given both in the East and West Indies to some kinds of rafts which are used in short navigation along the sea-shore. The rafts which are used by the fishermen and others at Madras consist of three logs of timber; the ends or ten feet long, which are lashed together with those rafts the trees rows pass through the surf to fish, or to convey refreshments to ships when no boat could venture off. On the coast of South America the rafts are of considerqble size, being made of trunks of trees from 70 to 80 foot long, lashed together, and being from 20 to 25 feet wide; the middle trunk is longer than the rest, and projects beyond them at the after extremity. They carry sails on masts resembling shears; and they are steered by raising or lowering, as the occasion may require, a board which is run vertically between the timbers round the fore or after part of the raft.

CATCHFLY. [Silene, P. C.]

CATECHINUM, Medical Properties of. This peculiar principle is one of the most characteristic of Catechu, strictly so called, but also from gambir and some kinds of chinchea bark. Certain slight differences are found in it, according to the source whence it has been obtained, such as that from catechu having no acid reaction on litmus, while the others have. The best mode of procuring its digest
CATECHUS in sulphuric ether, then evaporate the ether, wash the residue in cold water, repeatedly dissolve it in boiling water, and by renewed evaporation procure it pure. The appearance is that of a white semicrystallized powder (seems to be the granules due to the cooling of the solution) which is followed by an unpleasant and somewhat sweetish one. It is persistent at the ordinary temperature of the air, but by long exposure to damp it resolves itself into a mould-like mass. Hence it melts into a transparent fluid; by a strong heat it becomes brown.

Of hot water it requires only from three to four parts for its solution, but of cold 1600: of boiling alcohol from two to three, of cold from five or six parts for its solution; of boiling ether it requires seven to eight, while of cold it needs a hundred and twenty for its solution. It is one of the most delicate tests of some of the salts of iron (when these are devoid of any free acid), as it strikes a most beautiful dark green colour, without precipitation; which colour results if there be but a small part of iron in solution. It does not precipitate either a solution of gelatine or of starch, a peculiarity which distinguishes it from tannin; and which constitutes its claim to attention as a therapeutic agent, as a means of arresting hemorrhage in distinct organs. Pure tannin is almost certainly precipitated by the starchy or gelatinous principles it meets with in the food in the primae viae, and there has therefore little influence on hemorrhage from remote organs. All who know the importance of checking the flow of blood in those of a hemorrhagic diathesis, especially from leech-bites, scarification of the gums, &c., will be glad to have a new resource in catechu.

CATENIPORA, a genus of corals found only in the Philippine strata, and in Britain only in Silurian rocks. [M. DREPHILLOGA, P. C.]

CATGUT, AND VIOLIN-STRINGS. Several useful articles, manufactured from the intestines of the sheep, are, for some unexplained reason, denominated catgut. The catgut is generally in the form of cord, string, or twine. The chief purposes to which such cord is applied, are musical strings, for harps, violins, and guitars; hatters' bowstrings, for the bowing of fur and wool; clockmakers' cord, and strings or ropes for the winding of the various kinds of watches. These are wrought by a careful preparation before being brought into the state of cord.

The intestines, when taken from the animal, are, by repeated washing and scraping, freed from the loose adherent matters; and are further steeped for some time, as a means of loosening the surface membranes. When this steeping has brought them to a particular state or stage, they are laid on a sloping board, and scraped with the back of a knife, in such a manner that the inner and outer strata or external layers of the membrane, each equal in width to half the circumference of the intestine. The membrane so removed is called by the French filandre, and is employed by them, when further prepared, for the purpose of filling the tubes of rattets and batutires, and also for threading for sewing pieces of intestine together for other purposes. When the membrane is removed, the intestine is again steeped in water, and the inner mucous membrane scraped from it; and it is also exposed to the action of an alkaline ley, until at length it is brought to a clean state as before.

Large ends are cut off and applied to other purposes; the smaller ends are laid by for making cord.

In the making of violin-strings, after the cleaning, the intestines have a certain degree of twist imparted to them. Two or more are affixed, at the ends, to a rotating machine, and twisted round each other somewhat in the same way as twine or silk. The size of the membranes and the number of them twisted together, depend on the thickness of the string to be made. The twisted strings are exposed to the action of sulphur in a closed chamber, and are then rubbed with a horsehair cloth; these processes are repeated two or three times. If a string be sulphured too much, it becomes too brittle to be of much use; it is therefore kept in a warm, dry place, until the surface is somewhat rough, and the determination of the proper degree of sulphuring is a nice point in the manufacture.

The Italians have often had the reputation of making better violin-strings than any other people. The violinists of England, France, and Germany acknowledge the excellence of the Scotch, but Dr. Ure being able to assign a sufficient reason for it. Dr. Ure suggests the following considerations: It is well known to physiologists that the membranes of lean animals are far more tough than those of fatter ones; which are found in the London, where no lean animals are slaughtered, the membranes of the sheep are supposed to be less tough and tenacious than those of Italy, which are not so highly fed. Hence it is inferred that the membrane employed by the Italians is better fitted for the manufacture than that used by the English manufacturers.

Whether this be so or not, the fact is the sets of strings so often used in the lute and guitar (translated from the German by Mr. Fardely), says in relation to violin strings: 'The best strings which have come under my observation are those from Milan, which are sold at a high price; whereas those from England are almost every music shop. I shall point out the signs by which the best strings may be distinguished, as there are some imitations of them manufactured at Neukirch, in Vogtland, in Bohemia, and in the Tyrol, which are sold for Italian. The Milanese strings are also distinguished by not being the third string should be equally clear as the first. They are by no means smooth to the touch, for they are not ground or polished off by any process, as all other manufactured strings are. If a good string be held by one end in the finger, and opened out, it will recoil to its former position like a watch spring. Every string, when stretched on the instrument, should look like a thin strip of glass on the finger-board: those which are of a dull and opaque appearance are useless. The Milanese strings are also distinguished by each separate one being tied twice with red silk; which however the Neukirch string-makers have imitated. Their clarity is after all the best criterion; as no other strings which I have tried are so soft, and more elasticity for which the Milanese are so much esteemed.'

The thickest string of the violin, and many other musical strings, are coated with an envelope of fine wire. This is done by stretching the string very tightly, applying the wire at one end of it, and causing it to fall perpendicularly, making the string by giving it a rotary motion.

For the strong thick cord used for hatters' bowstrings, the largest of the membranes are used, after being cleansed and prepared; from four to twelve of them being twisted together, according to the size of the cord to be produced. The pieces are twisted to a length of fifteen, twenty, or twenty-five feet; and to effect this, pieces of the membrane are sewed end to end, till they produce the required length. While under the process of twist, the tail is held between the fingers, to equalise the thickness. The cord is exposed twice to the fumes of sulphur, and is rubbed repeatedly afterwards.

The catgut employed by clockmakers is prepared from the smaller intestines, well prepared with potash. The hollow membraneous tube is sometimes cut into two strips in a curious way. The tube is drawn over a ball, behind which is a kind of knife having two cutting edges or blades, whereby the membrane is divided into two parallel strips. The method somewhat resembles that by which straws are split for the straw-plait manufacture. For larger and stronger purposes, clockmakers sometimes use cord composed of two hemp, or hemp and wool, or hemp and flax, and sometimes for whips and similar purposes is prepared and wrought much in the same way; short pieces being sewed together to produce a piece of the requisite length, and this being twisted to give it a sufficient degree of strength.

For the mode of preparing, from a membrane covering the intestine of the ox, the fine pellieke known by the name of 'gold-beaters' skin,' see Gold-Beating, Gold-Beater's Skin, P. C. S.

CATHARTOCARPOS (from σαρπώμα, to purge, and "ερευς, fruit), a genus of plants belonging to the natural order Loguminosae. It has very blunt sepals, hardly joined at the base, more or less unequal; five unequal petals; ten unequal free stamens, the three lower ones longest, the four upper ones short and straight, the three upper ones bearing atheriformed anthers; the anthers ovate, opening by two chinks at the apex; the ovary stipitate; the legumes tereite or a little compressed, indehiscent, woody with elevated sutures, many-seeded; the seeds without chaff, the pulp; the seeds elliptic, rather compressed, horizontal. The species are trees with abruptly pinnae leaves and racemes of large yellow flowers. In appearance they are not unlike the common laburnum when in flower. The genus C. Cathart. (CATHARTOCARPUS, P. C.), was formerly known under the same name, but since separated by Persoon, who has been followed by Lindley, Nees von Esenbeck, and others. The habit of these trees, and the character of their fruit, differ from the species of Cassia. It is also undoubtedly desirable to separate the genus Cassia, with nearly two hundred species, should be sub-divided.
CAV

C. Fistula, the Purging Cassia, or Pudding Pipe-tree, has leaves with 4-5 pairs of ovate, rather acuminate glabrous leaflets; the petioles glabrous; the racemes loose, bracteolate; the legume cylindrical, rather oblong; it is possible this species has hitherto been supposed to have been originally a native of tropical Africa, but it is now extensively diffused over the globe, and is found abundantly in Hindustan, China, the East Indian Islands, the West Indies, and South America. It is a tree from thirty to forty feet high, with erect glabrous branches. It is a very common street tree in the East Indies, and is found from nine inches to two feet in length. The valves of this pod are thin, hard, and brittle; and its cavity is divided by numerous thin brittle transverse diseiements; the partition is very thin, and easily broken, we notice the borders of the pod, and they are surrounded by a soft pulp. The pulp has a sweetish flavor, not unpleasant taste, and is separated by boiling the pod in water, straining the fluid, and then evaporating it to the consistence of a thick extract. This extract acts as a mild purgative on the system; species was long in great repute in Europe on that account. It is now however seldom used; and although admitted into the lists of materia medica of the British Pharmacopoeias, is only placed there as entering into the composition of the Electuarium Cassia and the Confection Senna.

The pulp, according to Henry, consists of 61 per cent. of sugar, 67-75 of gum, and 13-25 of tannin. It probably also contains Cathartine or an analogous principle.

C. Acanthocarpa, Horse Cassia, has leaves with 12-18 pairs of ovate, rather acuminate, glabrous leaflets; axillary racemes; nearly cylindrical, very long, and transversely toroso legumes. It is a native of Java and the Moluccas. Its legumes are above two feet in length, and contain a black cathartic pulp, which is used as a medicine in the East Indies.

G. Don has described a species of Cathartocarpus (C. conspi-
cerus), a native of Sierra Leone, where the pods are called Monkey Drum-sticks. In the Gardener's Dictionary there are fifteen species of Cathartocarpus described.

CITILLUS, a fossil genus of bivalve shells, allied to Ceratula and Perna, so named by Cuvier and Brongniart. In the chalk occurs species of large size, remarkable for their large fibrous texture and manner of preservation. There are also been called from the circumstance Inoceramus by Sowerby, who includes in the genus one species from the fissas and others from the gotter.

CATO, DIONYSIUS. [Dionysius Cato.]

CAUCAICALIS, a genus of plants belonging to the natural order Umbelliferae, the suborder Camphoraceae, and the tribe Caucaulineae. It has a calyx of five teeth, the petals ob-
cordate, with an infixed point, outer ones radiant and bifid, the point slightly laterally compressed, the carpels with fili-
fully. The style is usually solitary, and stands surrounded by secondary ridges, all bearing 1-3 rows of prickles. The species have herbes with multiplied leaves, and white flowers. They are called by the common name of Bur-parsley. Two of the species are found in England, C. daucoides and C. laetifolia. Thity is found on chalk; the latter is a rare plant, and has been probably introduced.


CAULERPITES, a group of fossil forocaid plants, of which numerous species are known. They are found through nearly all the marine formations. In the oolites seven species have been found. The recent genus Caulerpa is found in warm southern climates.

CAUVLOPERIS. [Coel-Planta, P. C.]

CAVALLINI, PIETRO, a celebrated old Roman painter of the fourteenth century, and one of the earliest masters of the modern Roman school, was born at Rome in the latter half of the thirteenth century, and lived at Rome during the first part of the fourteenth century. He was the son of Avignon. Vasari's account of Cavallini is somewhat inconsistent with the period of his death as adopted by Manni and Lanzi, 1364; for if, as Vasari says, he was eighty-five when he died, he must have been a much older painter than Giotto, and can scarcely, as he asserts, have been his pupil. Vasari however says that Cavallini was living in 1364, but so many of his dates have been found to be incorrect, that he cannot be strictly depended upon. Cavallini was painter, architect, and worker in metal, and his works are still in the church of the Glori-cell of the porch of St. Peter's; and there are still some of his own mosaics in the Basilica of San Paolo and at Santa Maria in Trastevere at Rome. He executed also many paintings in the churches, but there are no remains of them; 'the history of the building'; and nothing remains but the imperfectly consumed the above-mentioned Basilica of San Paolo, outside the walls of the city: the mosaics however, and a miracle-working wooden crucifix made by Cavallini, remained unimjured.

Cavallini painted also several frescoes at Florence, Orvieto, and at Assisi, and his works are still in a tolerable state of preservation. A crucifixion in the church of Assisi is the most remarkable and the best preserved. It contains a crowd of figures, some on horseback, and dressed in a variety of costumes; in the sky, which is a bright blue, are several effigies of angels. It is a work of so high a standard, and is so very angular, the figures sometimes distorted, and the perspectivel incorrect, the figures have expression and character, and if we consider the examples which can have been his only pupils, and even his assistants, it is not surprising work. The fact that Cavallini's works, especially his heads, are very inferior to those of Giotto, is, considering his industry and powers of observation, one reason for concluding that he was an older than Giotto. Under this sup-
position there is nothing inconsistent in the fact that Cavallini designed the crosses which were erected to Queen Eleanor, and that he was the Petrus Romanus Civia of the Inscription on the shrine of Edward the Confessor in Westminster Abbey, and accordingly the architect of the shrine, which was finished in 1270. Walpole adopts the sup-
position, and concludes that Cavallini returned to England with the abbot Ware, who was elected in 1260, and went shortly afterwards to Rome to receive consecration from Urban I.

The celebrated miracle-performing picture of the Annunciation, or la Nunziata, in the church de Servi at Florence, formerly attributed to Cavallini, is now with more certainty attributed to a Maestro Bartolomeo who lived at Florence in 1296.

(Vasari, Vitza dela Pittura, &c.; Lanzi, Storia Pitturica, &c.; Walpoe, Anecdotes of Painting, &c.)

CAVOLLO, TIBERIUS, a distinguished electrician, was born at Naples in 1749, and from the university of that city he completed his education. In 1771 he was sent to London, in order that he might attain a correct knowledge of the mode in which mercurial transactions are conducted in England, but he soon discovered that he had attained the knowledge of a natural philosopher, and in these he continued to be engaged till his death, which took place December 6, 1809. He was buried in old St. Pancras churchyard, London.

Cavallo was less distinguished for originality of thought than for his vast industry in the research of the laws of nature by the way of observation and experiment, and for his highly retentive memory; he possessed this faculty to such a degree that, at an age when he was unable to comprehend the reasoning employed, he could repeat, or at least recollect, the contradictions in the books of Eoctol. He had considerable skill in music, for which he retained the taste even after his sense of hearing was considerably impaired. He was appointed a member of the Academy of Sciences of Naples in 1789, and in the following year he was elected a fellow of the Royal Society of London.

The labours of Cavallo consisted chiefly in the performance of experiments relating to electricity and magnetism, by which he contributed much to the progress of that branch of Venerable philosophy: he also made researches concerning the composition of the atmosphere and the characters of minerals. In order to determine the nature of the electricity in the atmo-
sphere he employed what he called an 'atmospherical collec-
tor:' this was a long rod pointing at one extremity a small

glass tube terminating with a cork from which were suspended two pith balls. The rod being held out as far as possible from an upper window of the house, when the balls diverged by the electricity of the atmosphere, they were drawn in, and the nature of the electric fluid was ascertained by examination.

In 1775, while residing near Islington, he made a remarkable experiment with a kite, raised in the air to the height allowed by 120 yards of string, from which he ascertained that a great quantity of electricity may exist in the atmosphere without producing thunder or lightning. A small cloud passing over the house, he charged some jars with the electricity obtained from it, which he found to be positive; by degrees the quant-
ity diminished, and finally was annihilated by the air. A great dark cloud rising towards the zenith, the fluid, which began again to manifest, was found to be negative: the electricity continuing to increase and the rain falling copiously, he pulled in the kite lest some serious accident should happen, he nevertheless was severely injured in his arms, breast, and legs. He frequently made experi-
ments of this kind, with kites which were about four feet long
and two feet wide; the string was of common twine twisted with threads of fine copper-wire.

He invented an instrument called a 'condenser of electricity,' which consisted of a tin plate between two parts of a wooden frame covered internally with gilt paper: the plate was taken up, and two pieces of mother-of-pearl, or silver, being connected with the body containing the electricity, the effect of the condensation was shown, at the opposite edge, by the electrometer. He invented also a 'multiplexer' of electricity, composed of two brass plates insulated by being supported on glass pillars, and of a third plate which could be insulated or un insulated at pleasure: this last being fixed to a lever which turned on a pivot, after receiving electricity from one of the former plates, conveyed it to the other, with which an insulated diaphragm was connected; and the second plate to the first it received a fresh supply of electricity, which it conveyed in like manner to the other; and so on, till a sufficient quantity was accumulated on the latter.

Among his experiments was one in which were exhibited some remarkable phenomena of the electricity in glass tubes containing mercury. The mercury was boiled in the tube, and the latter being afterwards sealed, on elevating and depressing alternately the corks, electricity was excited by the friction of the mercury; this changed from positive to negative, and the contrary, as the tube was placed in direct and inverted positions.

Cavallo invented also a simple microspher of a thickness of mother-of-pearl, divided into angles, each equal to $\frac{1}{12}$ of an inch; this being fixed in the diaphragm of a telescope, at the focus of the eye-glass, served for measuring small angles.

Besides four Bakarian lectures on thermodynamical and magnetic subjects, he published several papers on electricity and cognate subjects, in the 'Philosophical Transactions,' Cavallo published, in London, 1, 'A Completo Treatise on Electricity,' 5vo. 1777, 2, 'An Essay on the Theory and Practice of Medical Electricity,' 5vo. 1780; 3, 'A Treatise on the Nature and Properties of Air, &c. 4to. 1781; 4, 'The History and Practice of Aerostation,' 8vo. 1785; 5, Mineralogical Tables,' 1785; 6, 'A Treatise on Magnetism in Theory and Practice,' 8vo. 1787; 7, Description and Use of the Magnetic Compass, 8vo. 1783; 8, 'Essay on the Medical Properties of Factitious Airs,' 8vo. 1798; and 9, Elements of Natural and Experimental Philosophy,' 4 vols. 8vo. 1808.

(Aikin's General Biography; Chalmers's Biographical Dictionary.)

CAVENDISH, MARGARET, DUCHESS OF NEWCASTLE. This eccentric lady, the youngest daughter of Sir Charles Lucas, was born in Essex towards the close of the reign of Charles II. In 1680 he was created Earl of Suffolk in the life of honour to Henrietta Maria; and, accompanying the queen to Paris, she became in 1645 the second wife of William Cavendish, who had formerly been Earl and was then Marquis of Newcastle. In 1662 he had been created Earl of Devon, which title he inherited through his mother, and which was annexed to the dukedom of Newcastle. On the death of his first wife, Cavendish married her cousin, and had six children by her. They were: James, who succeeded his father; Elizabeth, who married the Marquis; John, who married a daughter of the Duke of Cumberland; and two others.

The period which succeeded the acquisition of the dukedom was chiefly devoted to the nobly pair to that course of literary study and composition, which, however creditable in the mind and manners of the period, was humbler in the character of the parties. Horace Walpole, in his 'Royal Antiquities,' said of Margaret Cavendish, 'She was a writer of many kinds, and a most industrious one, though her works were not of a high class. She was a very great reader, and was so fond of reading that she would not be otherwise employed as to read for a sitting of half an hour, and at least half a day for a sittings, and at least half a day for a sitting. She was a very great reader, and was so fond of reading that she would not be otherwise employed as to read for a sitting of half an hour, and at least half a day for a sitting. She was a very great reader, and was so fond of reading that she would not be otherwise employed as to read for a sitting of half an hour, and at least half a day for a sitting. She was a very great reader, and was so fond of reading that she would not be otherwise employed as to read for a sitting of half an hour, and at least half a day for a sitting. She was a very great reader, and was so fond of reading that she would not be otherwise employed as to read for a sitting of half an hour, and at least half a day for a sitting.

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architecture as an industriously compiled register of facts, names, dates.

Besides the preceding there is one other publication of his to be mentioned, the 'Memorias para la Vida de Jove

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Lances,' Madrid, 1814, in which he has left an affectionate por

traiture of that excellent friend. Cean-Bermudes died in

1834, and left several manuscript works, one of which, on the

Roman antiquities of Spain, was afterwards edited at the

expense of the Royal Academy of History.

D. Fr. 23-celled, stamens 3, 5-cleft, leaves pubescent, and
distinguished by its large size, its graceful form, and the harmony of its parts. It is known as a species of

C. CEANOTHUS, a genus of plants belonging to the natural

order Rhamnaceae. The calyx is 5-cleft, campanulate, cut
ound after watering, with the base permanent and adhering to the ovary as a piece. Its petals are yellowish, often

dry, 3-celled, loculicid with papyre valves; seeds 1-seeded.
The species are smooth or pubescent shrubs, with erect

branches; alternate serrated, 3-serrated; and very slender, white blue or yellow flowers disposed in terminal

panicles or in axillary racemes. They are natives of North America.

C. Americana, Red Root, New Jersey Tea, has ovate,

acuminate, serrated leaves, pubescent beneath; flowers ar-
ranged in axillary elongated thyrses, with a pubescent rachis.

As infusion of the twigs of this plant is used in Canada

for venereal diseases. During one of the wars with America,

the leaves of this plant were used in New Jersey as a substitute

to tea. It dyes wool of a fine strong tannin-cinnamon color.

It is called Clammy-root.

There are several other species of this genus, natives of

North and South America. They are small neat shrubs, with

large red roots, which give them the name of Red Root. They

grow in dense thickets along the road-sides of the

common garden soil, and form proper plants for the front of

a shrubbery. They may be propagated by layers or seeds.

These from Mexico and the greenhouse species must be

protected from frost during the winter. Cutting will root in

and under a hand-glass, and will form vigorous plants.

(Lindley, Flora Medicina; Don, Gardener's Dictionary.)

CECILIANOS. [Siphomops, P. C.]

CECROPLA. [URTICACEA, P. C.]

Cedrela, a genus of trees, belonging to the

syncarpous group of polytelated exogens. The species

are timber-trees. The timber is usually compact, scented,

and beautifully veined; the leaves are alternate, pinnated,

without stipules; the flowers in terminal panicles.

The essential characters of the order are: calyx 4-5-cleft, petals

4-5 longer than the sepals; stamens 8-10, the filaments either

curl into a tube, or distinct, and inserted into a hypogynous

disk; the style and stigma simple; the cells of the ovary

equal and free; the petals or flower and the ovules 4; the leaflets

often more imbricated than twistered on the stem; the first capitular with the valves separable from the dissepiments, with which they alternate; the seeds flat winged, albumen thin or none. This
disorder is nearly related to Mollaces, from which it is chiefly distinguishable by its winged aecidiate seeds.
The following is a synopsis of the genera:—

1. Cedrela. Calyx 4-5-cleft; petals adnate to the corus; stamens 5 distinct; capsule 5-celled, 5-valved; seeds numerous,
each side of the dissepiment ending in a wing. 2. Sideretes. Calyx 5-cleft; stamens 8-10, joined into a tube; capsule 5-celled, 5-valved; seeds numerous, each

drawn out into a wing. 3. Chloronycynon. Calyx 5-cleft; stamens 10, connected at the base; capsule 5-valved, 5-valved; seeds 4 in each side of the dissepiment, drawn out into a wing. 4. Pterodecta. Calyx 5-cleft; stamens 10, alternate ones sterile; capsule 5-valved, 5-valved; seeds 2 in each side of the dissepiment, drawn out into a wing. 5. Oszaga. Capsule 5-celled, 5-valved; seeds 3 in each side of the dissepiment, drawn out into a wing. 6. Cedro Tosa. Bastard Cedar, has lanceolate leaflets, acuminate entire, pale glaucous beneath. It is a native of the East Indies, where it is called Tosa. It has an erect trunk of great height and size, with smooth grey bark. The flowers are very numerous, small, white, fragrant, like honey. The seeds are numerous, imbricated, winged. The bark is a peculiar and strong scented, and is said to be a good substitute for Peruvian bark in the cure of pulmonary diseases. Dr. Bo. Be.
ned it in Java with much success in the various forms of fever, dysentery, diarrhosa, &c. Horsfield also used it in dyspepsia.

C. esculenta, leaflets ovate-lanceolate entire on short stalks. It is a native of Barbadoes and the Caribbean Islands. It is

a large tree with a rough bark. The fruit is about the size of

a partridge-egg. When fresh, the bark and berries smell like

assafoetida. The trunk is hollowed out into canoes and

pattuicapes. The wood is of a brown colour, and has a fragrant

davour, from which it is called Tosa. It is also much used in the

West India Islands, Cedar. It is frequently cut into shingles

for covering houses, but is not adapted for ship-building, on

account of its being subject to the attacks of worms. It is

not adapted for casks, as it gives its odour to whatever is

placed in contact with it. It is a native of Java. Its bark is

said to have a better effect on some of the foavers of India

than cinchona. It is a very powerful astringent. The wood

is good for many purposes.

An essential oil called wood oil is found in Chloronycynon

Sudeticus, which is a native of the East Indies. The wood

is of a deep yellow colour, and called Suint-wood, remarkably

close-grained, heavy, and durable, and comes nearer to box

wood than the produce of any other tree. Pterodecta pos-

esses a volatile oil. F. Australis is a native of New Hol-

land, and its wood is said to be not inferior to mahogany.

F. Albomucronata is a native of the islands of Huilu and Ceram.

The spiny part of the fruit is formed into rasa. It was on

this account called by Rumphius Arbor radulifera. Oseya

xanthelytra, is a native of New Holland. It attains a height

of 100 feet. The wood is yellow, and employed for building

houses, and especially for the making of posts. The proper-

ties of other species of the order see Spermatophyta, P. C.

(Lindley, Flora Medicina; Don, Gardener's Dictionary; Lindley, Natural System.)

CELESTI, or CELESI, (Caravalle), a very distinguished

painter of the Venetian School, was born at Venice in 1637,

and died there in 1706. He was the scholar of the Cav.

Matteo Ponzone, but not his imitator. Celest's works are

very attractive, especially in colouring, in which he resembles

Paul Veronese; they display also great power of the composi-

tion and design, and are remarkable for their costly dra-

peries and general facility of execution. He painted landscape,

history, sacred and profane, and genre; cabinet pictures, gal-

lery views, and designs for tapestry and carpet-making. He

is seen to much advantage in the gallery of Dresden, where

there are five pictures by him, three of unusually large dimensions, and the figures are the size of life in all.

The following three are strikingly rich in colour, Bacchus and Ceres, Samson delivered into the power of the Phyllines, and the Murder of the Innocents. The remaining two are the Israelites bringing offerings for the making of the Golden Calf, and the sack of a city by night: the last is the largest picture in the collection, being very nearly 23 feet by 12 high. Notwithstanding the attractive effect of Celest's work, his middle tints are often insignificant compared with his lights and shadows, a defect which is attributable probably to his painting upon very hard grounds, a practice which prevailed very much in Venice in his time.

(Boschi, Pitture di Venezia.)

CELLULARES. [VASICULACEA, P. C.]

CELIA (named by Linnaeus in honour of Olaf Celsiu,

D.D., professor of Greek, and afterwards of Theology, in

the University of Upsal), a genus of plants belonging to the

natural order Solanaceae. It has 5-parted calyx, a rotate

5-jointed corolla, 4 perfect stamens, diandrous, bearded. All

the species are herbs with simple or pinnate leaves, the

flowers disposed in loose terminal racemes, each rising from

the axil of a bract or small leaf. C. orientalis has the lower leaves jagged, those of the stem

hippistom. It is a native of Cappadocia and Armenia.

C. subulatus, shrubby dished with the common tormentum, the leaves oval-oblong obtuse, cruminate, wrinkled, soft. It is

now cultivated in this country, but its native district is

unknown. It has sweet-scented flowers. There are several

other species of Celia, all of them closely resembling the

species of Verbascum, under which genus many of them

have been described.

In the cultivation of the species of Celia, the seeds should

be sown on a gentle hot-bed, and when the plants are large

eough, they should be set in separate pots, which require

protection of a hood or frame for the first winter. In the

second year they may be planted out, about the month of

May, in any warm sheltered situation. They will flower

and ripen their seed in the open air. C. subulata and C. persi-

naires, being shrubby dished, should be treated as Pelargoniums or other greenhouse shrubs.

(Don, Gardener's Dictionary.)
CELSUS, P. JUVENIUS, was the son of Juvenius Celus, also a jurist. This Celus the father is spoken of by Celsus the son, and also by Naevius and Ulpius, in which passages the father is spoken of as a jurist. The extracts from Celsus in the 'Digest' are supposed to be from the works of Celus the son. The son was twice consul according to Pomponius (Dig. 1, tit. 2). It is uncertain in what year he was first consul, but his second consulship according to the calendar of the 1st year of the pontificate of Sixtus I (A.D. 129), as appears from an extant inscription and a senatoconsultum of that time which is preserved (Dig. 5, tit. 3, s. 20). Celsus is also mentioned as a member of Hadrian's consilium, by Spanheim (C. Cels.); but he is calledJulius Celsus.

The younger Celsus was the author of a work entitled 'Digesta,' in thirty-nine books, as appears from the Florentine Index. He wrote also Epitome, of which the eleventh book is cited by Ulpius (Dig. 4, tit. 4, s. 3); Commentarii, of which the seventh book is cited; and it is supposed that the editors of the Commentaries of the first, second, and third books, with the addition of the fourth book, are the work of Celsus.

All these however were penal enactments independent of any censorship. The councils of the Church condemned books which they judged to be heretical, and weeded the fields against reading them. Afterwars the popes began to condemn certain works and prohibit the reading of them. The time of Hues and Wycelf, Pope Martin V. communicated those who read prohibited books. The introduction of printing, with the consequent increase of censors, and the multiplied system of censors, led to the growing influence of the church over the secular power, with a consequent increase of the censorship. In the 15th century, after censorship was abolished, the sacred writings from the Latin into the vulgar German, a language, he says, too rude and too poor to express the exact meaning of the inspired text, he adverts to the translations of the books of the Bible and other religious works, and the archbishop says, so difficult as to require the whole life of man to be understood, a difficulty which is now increased by the incompetence of the translator, which renders obscurity still worse obscure. His grace therefore, setting a full stop to the import of the illustrious city of Mainz, and wishing to preserve its honour by preventing its being abused, forbids all persons subject to his authority clerical and lay, of whatever rank, order, and profession, to print the translation of any work, from the Greek, Latin, or any other language, into German, concerning any art, science, or information whatever, publicly or privately, unless such translation be read and approved of before being printed, as when printed, before being published, and furnished. The archbishop writes to the emperor, one of the rulers of the University of Mainz, namely, the archbishop, one for theology, one for law, one for medicine, and one for the arts. All who violated this order were to lose the book, pay a fine of one hundred florins to the Electoral Chamber, and be excommunicated.

Then follows the archbishop's commission to the censorship—That no one in his province translate, print, or publish, any book in German, unless the censors previously read and approved its contents. And he directs them to refuse their approbation to such works as offend religion or morals, or whose meaning cannot clearly be made out, and may give rise to error and scandal. To those works which they approve they shall affix their approbation, two of them jointly, in their own handwriting.

There were works printed at Cologne in 1479 bearing the approbation of the rector of that university, and there is also an Heidelberg edition of 1480 of the book entitled 'Censorius' Latin Grammar,' which bears four approbations, one by Philip Retz, Doctor utroque juris, and another by Mathias Gisnus, Patriarch of Venice and Primate of Dalmatia. There was however no general system of censorship in the fifteenth century, which was an era of freedom for printing, and it is a curious fact that the learned scholak Merula, in a letter to his friend Poliziano, dated 1480, expresses a wish that a previous censorship should be established over all books, such as Pius recommends for his republic, 'for,' says Merula, 'we are quite destitute of censors, and there are no books.'

In 1501, Pope Alexander VI. (Borgia) issued a bull, in which, after sundry complaints about the devil who sows tares among the wheat, he goes on to say that having been informed that by means of the art of printing many heresies, impious, persecutory, and pernicious doctrines, have been and are being published in the provinces of Cologne, Mainz,
There is no text in the image.
There was a protest against the licensing of printing, expired in 1679, but was revived by statute 1 Jac. II. c. 17, and continued till 1692. It was then continued for two years longer by statute 4 & 5 Will. III., according to the practice, and the licensing system was finally abolished in England; but the question of its revival was repeatedly agitated in parliament, and was finally settled by the Licensing Act of 1853, by which the licensing system was again abolished.

The French censorship was originally in the hands of the bishops, for all matters concerning religion and ecclesiastics; but it was soon extended to include the printing of pamphlets, and was transferred to the faculty of theology, and the Parliament of Paris sanctioned the practice. The manuscripts were laid before the faculty, which appointed two doctors of divinity to examine them. The doctors made their report to the general assembly of the faculty, which, under the personal influence of the French censorship, was.exempt from the control of the royal council, and, if approved, were signed with their permission.

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the mercy of the executive. By a decree of the 27th Nivose, 1800, the number of newspapers at Paris was fixed, and the editors were forbidden to insert any article 'derogatory of the respect due to the institutions of the country, the sovereignty of the people, and the glory of the French armies,' or offending against the eminence or authority of the French and allies of France, even if such articles should be extracted from foreign journals, under pain of immediate suppression. The Moniteur was announced to be the only official journal. The 3rd Prairial, 1801, by order of the Consul on the report of Lucien Bonaparte, Minister of the Interior, for having thrown ridicule on the members of the Institute. Under such discipline the number of subscribers to the newspapers of Paris dwindled rapidly from 100,000 in 1795, to but one-third or one-quarter of the statement as a subject of congratulation. The Minister of the Interior had the censorship of dramatic compositions before they could be brought on the stage.

Napoleon was not friendly to liberty of any kind, and still less to that of the press. He felt very sore at the gibes and sarcasms of the English journals, which he had translated to him; and he insisted that no word, however offensive, should be omitted. When the organic law was discussed in the Senate, which was to be the legislative body of the empire, the number of guarantees to be given to the nation, and mentioned the liberty of the press among the rest. Napoleon contended himself with appointing a committee in the Senate with the nomination of the censorship of the liberty of the press, which was both a mincemeat and a sinecure.

In 1806 there appeared an instance of renewed book-licensing. A drama of Collin d'Harville, making part of the framework of his works, bore the following licence: 'Seem and allowed to be printed, of the permission of his Excellency the senator Minister of the General Police, dated 9 Prairial, year xiii. By order of his Excellency the chief of the department of the liberty of the press, F. Lagarde, the Journal of the Empire inserted this novel document in its columns; upon which the official Moniteur observed, in a tone of ill humour, that the emperor had been surprised to learn that an estimable writer like M. d'Harville should need permission to publish a work bearing his name; that this permission to print could be granted to any citizen could publish any book that he thought proper, being responsible for its contents before the tribunals, and pursuant to a decree of his Majesty, if charged with any thing derogatory from the power of the emperor and the interests of the country.

In Napoleon's kingdom of Italy the censorship was likewise declared to be abolished, but on the day of the publication of a work two copies were to be deposited at the office of the police, who were to examine them; like-likewise of 'the liberty of the press,' examined the book and made its report to the Minister, who, if he saw reason, stopped the sale of the work, and ordered the author or publisher to be seized after a week if he did not deliver the copy. To avoid such risks, were allowed to lay their MS. before the commission, which returned it with such corrections or suppressions as it thought advisable. This was called the facultative or optional censorship.

At last, in 1809-10, the project of a definitive law concerning the press in France became the subject of frequent discussions in the Council of State, in which Napoleon took a part. I conceive, said he, 'the liberty of the press in a country where the government is guided upon by the influence of the public opinion, but our institutions do not call upon the people to meddle with political affairs; it is the business of the Senate, the Council of State, and the legislative body, to think, speak, and act for the people, and the liberty of the press should not be in harmony with our system, for the manifestation of the power of public opinion would only be productive of disturbance and confusion.' On the question of the censorship the more liberal councillors of state argued in favour of the law that declares him Emperor, and the ministers under their own accord laid their works before the censors, should be relieved from further responsibility after publication. Those councillors who were for a previous and obligatory censorship, such as Cambacérès, Molé, Paquier, Portails, and Regnier, maintained that writers should be permitted to write on any subject upon their own responsibility, and that in a country like France, where public instruction was so organised and regulated as not to be permitted to spread any dangerous doctrine, it would be inconsistent to allow writers to assume uncontrolled the mission of teaching whatsoever they pleased. No mode of teaching or influencing the public mind ought to escape the vigilance of the authority of the state. Under every government, those who addressed publicly a certain number of persons were watched; & fortei, those who by their writings addressed themselves to all men, ought to be watched also. It had been the express right of power to prohibit, if in the course of the faculty; the art of printing is a social invention, and as such is subject, like all other inventions, to administrative regulations in order to prevent its being abused. Without the previous censorship, all the abuse and injury that might come too late.' (Sittings of the Council of State of the 11th and 25th of October, 1809, in Thibaudau, Histoire de la France et de Napoleon, ch. 67.) Napoleon was not for the obligatory and previous censorship, because it might find itself in opposition to the measures of government, and certain books appeared to have a sceptical or heterodox tendency. He preferred the optional censorship, leaving however to the proper authorities the power of stopping the printing or seizing the printed copies of any work which they thought dangerous. He was inexorable towards offences against the state. The decree of February, 1810, which was the result of these discussions, appointed a director-general of the press, with auditors, inspectors, and censors, under the Minister of the Interior. Through the number of printers was to be fixed in every department; sixty was the number fixed for Paris: printers as well as booksellers were to take licences and swear fidelity to their country and the emperor. Printers were to be seized on the first showing of the duties of subjects towards their sovereign, or of the interests of the state. Parties offending were to be brought before the courts, and punished according to the Penal Code; besides which the Minister of the Interior had the right of seizing any book, and confining the author to prison. Be-cause of the work, the printer was to transmit the title of it, with the name of the author, if known, to the director-general, and likewise to the prefect of the department, declining his intention to publish the work. The director-general, if he chose, might ask for the MS., and send it to one of the censors for examination. After the censor had made his report, the director would point out such alterations or suppressions in the text as he thought proper, and which became obligatory upon the printer. The final printer had to be sent to the prefect of the Minister of the Interior, who forwarded the MS. to another censor, who made his report to the director-general, and the director-general, assisted by other censors, decided finally upon the matter.

Authors or printers had the option of submitting their MSS. to the examination of the censors previous to printing. But even after being examined, approved, and printed, a work could be seized and its sale stopped, because it was not published, in its manner of composition, or its subject matter. If in twenty-four hours, to the Council of State, which judged finally upon it. A well-known instance of this occurred with regard to Madame de Stael's book on Germany, which was examined before it was published. The whole edition was destroyed. 'Your book is not French, and we are not reduced to seek for models among the nations which you admire,' was the minister of police's (Savary's) reply to Madame de Stael's remonstrances on the work.

Books printed abroad could not be imported into France without permission from the director-general.

The police had the censorship of dramatic works intended for the stage. Only one newspaper was allowed in each department, with the exception of Paris, subject to the approbation of the respective prefect. Such was the condition of the press in France during the latter years of Napoleon's empire.

At the first restoration of the Bourbons, in 1814, an article of the Charter of Louis XVIII. acknowledged that 'Frenchmen had the right of publishing their opinions by means of the press, conformably however to the laws enacted for the repression of any abuse of the liberty of the press.' Soon came the case of the minister, in the month of November, before the chambers the project of a law concerning the press, the effect of which would have been nearly to destroy its freedom. He proposed that all works of less than thirty sheets were to be subject to the previous censorship (censure préalable), excepting works in the dead or foreign languages, bishops' charges, pastoral letters, and catechisms and prayer-books, and memoirs of literary and scientific societies. This project was examined by a commission of the chamber, which rejected in its report the previous censorship. The article eight of the charter said that the law should repress the abuse.
of the liberty of the press, but the ministerial project by its previous censorship seemed to prevent it by suppressing the liberty altogether. The discussion was warm. Montesquieu maintained that to prevent and to repress were synonymous. He at last agreed to exempt from the previous censorship all works of twenty sheets and above, instead of thirty. With this concession the bill passed the chamber and was approved by majorities. A council of twenty censors was appointed. The office of director-general of the press was retained. Every printer was obliged to give notice of each work that he intended to publish. A limit of two copies of each book was then printed, at the director's office, before he published the work.

When Napoleon returned from Elba, in 1815, he did not enforce the previous censorship, because, said he, they had published whatever they pleased against him under the Bourbons, and therefore he had no reason to suspect them. The regulations concerning printing and publishing were maintained, and the press and the emperors were often at variance during the hundred days. The previous censorship was temporarily re-established and abolished again under the second restoration of Louis XVIII. After Charles X. came to the throne, he abolished the previous censorship altogether, and by so doing he gained a momentary popularity with the Parisians. But the press, and especially the newspaper press, did not show any great extent of gratitude for the boon, for it proved throughout his reign a sharp thorn in his side, as may be seen by the famous report of his ministers, upon which report the ordinances of July, 1830, were based. That report showed that M. Chantelou was the best keeper of the press, but it was signed by all the ministers. It contains an able, an eloquent, and, in the main, a true exposition of the crafty and persevering course of conspiracy by which the press was constipated, adding a determined hostility toward those seeking and his government, casting suspicion upon and misrepresented all their acts, even those which were evidently beneficial and liberal, because they proceeded from persons whom the press itself had rendered unpopular, appealing to the passions and prejudices of a susceptible and uninstructed multitude, and thus rendering, in fact, government impossible. This report is a very interesting historical document, and ought to be read by those who wish to form a dispassionate judgment of the press, and to form an estimate of the power for good and evil. 'At all times,' said the minister, 'the periodical press had been, as it was in its nature to be, an instrument of disorder and sedition.' Accordingly the first of the ordinances of Charles X., signed the 25th of July, suspended the liberty of the periodical press; no journal was to be henceforth published without a special authorization of the government, which was to be renewed every three months. All pamphlets or works under twenty sheets of letter-press were made subject to the same conditions. The ordinance was renewed, and the revolution of July was the result. The revised charter which was afterwards promulgated, 'Charter de 1830,' in its seventh article, says: 'Frenchmen have the right of publishing and printing their opinions, conformably to the law of November 6, 1817, and the constitution of November 17, 1830, constitution, and the revolution of July was the result. The revised charter which was afterwards promulgated, 'Charter de 1830,' in its seventh article, says: 'Frenchmen have the right of publishing and printing their opinions, conformably to the law of November 6, 1817, and the constitution of November 17, 1830, but they shall never use any language for good or evil.' The periodical press had been, as it was in its nature to be, an instrument of disorder and sedition. Accordingly the first of the ordinances of Charles X., signed the 25th of July, suspended the liberty of the periodical press; no journal was to be henceforth published without a special authorization of the government, which was to be renewed every three months. All pamphlets or works under twenty sheets of letter-press were made subject to the same conditions. The ordinance was renewed, and the revolution of July was the result. The revised charter which was afterwards promulgated, 'Charter de 1830,' in its seventh article, says: 'Frenchmen have the right of publishing and printing their opinions, conformably to the law of November 6, 1817, and the constitution of November 17, 1830, but they shall never use any language for good or evil.'

The constitution of Portugal establishes no previous censorship, but refers to the laws for repressing the abuses of the press. 

By the constitution of the kingdom of Greece of 1827, "the Hellenes have the right of publishing freely their thoughts by means of the press, abstaining however, from attacking the principles of the Christian religion; 2, offending decency and morality; 3, indulging in personal insult and calumny.

The Swedish constitution of 1809, promulgated under King Charles XIII., enacts that the states of the kingdom in every new Diet shall appoint a committee of six members, well informed persons, among whom must be two jurists, for the purpose of maintaining the liberty of the press. The committee will examine all MSS. which shall be laid before it by any author or bookseller, and if the committee declares that the work is fit to be printed, the author and publisher are then entitled to the protection of the law. President of the Committee of thar interest. This has occurred repeatedly, but then the paper appears again the same day or the next day under a slightly altered title; for instance, in Argentina the paper is supposedly prohibited, but is continued under the title of Argus II. or Argus III.

The constitution of Norway proclaimed in the Storting of Eidsvold, November, 1814, enacts that no one shall be persecuted for his printed writings, unless he wilfully and repeatedly manifests or encourages others to manifest disapprobation to the laws, contempt for religion, morality, or the constitutional powers, or resistance to the constitutional authorities, or is guilty of sedition and libel against any one, in which case he will be fined by the tribunal.

The constitution of the Netherlands of 1815, which is still in force in the kingdom of Holland, says, art. 227, "the press being the fittest means to spread knowledge, every one of the citizens has the right to use the press to communicate his thoughts, without needing previous permission. But all authors, printers, editors, or publishers, are answerable for those writings which attack the rights either of society or of individuals." By this provision of the constitution the press is declared to be free; no censorship can ever be established. Authors, editors, and printers are not required to give security. Offences committed through the press are tried by the ordinary courts.

In Denmark, an ordinance of Christian VII., dated September, 1799, on the subject of the press, abolishes the previous censorship, but imposes severe penalties on those who offend through the press; death is the penalty for any person who shall excite rebellion or provoke a fundamental change in the constitution of the monarchy. Whoever censors or de-
fames or excite hatred or contempt against the constitution of the kingdom and the government of the king, either on general grounds or on the occasion of any particular act, shall be punished. As in the diet of 1816, the government shall be sent to hard work for life. Whoever shall cause or vilify the monarchical form of government in general shall be exiled from to three ten years. Any libel against the person and property of the prince friendly to Prussia, or ascribing to his government any unjust or disgraceful act, without quoting any authority, shall be sent to hard work in a house of correction for a limited period.

The liberty of the German press, or the thing so called, varied in former times according to the spirit of the different governments. As long as the emperors of the house of Austria were under the influence of the Jesuits, they tried to extirpate and root out what was characteristic of the spirit of the age, of the press. The emperors themselves took part in the struggle. The imperial censors were appointed, which sat at Frankfort on the Main, to watch over the productions of a host of authors. The states of the empire held many vice-chambers or courts of censorship; many of them allowed the press nearly complete freedom, but Saxony and the states of the early period, being foremost among them, the booksellers ceased to assemble at Frankfort, and chose Leipzig for the centre of their extensive trade, which it has remained ever since. King Frederick II, of Prussia granted liberty to the press because it amused him; but he cautioned the editors of newspapers to act cum grano salis, and especially not to give offence to foreign states.

The censorship was abolished in Bavaria in 1833; in Hesse and Mecklenburg it existed only occasionally; and in Holstein the press had always been free; but these were exceptions, and in most of the Roman Catholic states, especially in Austria, the press was most arbitrarily checked. The great exertions of the German nation to put down the power of Napoleon and re-establish most of their petty princes on their thrones, seemed to deserve some reward, and the princes consequently promised, in Art. 19 of the Act of Confederation, that the diet should occupy itself in its first meeting with fixing general rules concerning the press in Germany. The nation thought that such rules would be in favour of the liberty of the press, but it soon became manifest that they were greatly mistaken in forming such sanguine hopes. Several of the minor states however abolished the censorship as long as it subsisted, in Prussia, and in Holstein and Weimar in 1816. The political agitation of Europe after the downfall of Napoleon, and the desire of a new order of things, which seemed to take the same turn in Germany as in France, and at the Karlsbad Congress in 1819, to which the German periodical press was enslaved by the decision that all books or other printed publications under twenty sheets should be subjected to a censorship. The spirit which directed this censorship was most arbitrary and harsh, and led to collisions of the most dangerous kind between the representative bodies of the states and the rulers. Nor was the liberty of the press for books above twenty sheets respected, and political authors especially were persecuted. The general government, and especially the members of the new constitutions, of Saxony, Hanover, in Brunswick and most of the minor states. The most liberal regulations for the press were obtained by the chambers of the grand duchy of Baden, in December, 1831; but the fear of the French revolutionists having then subsided, the laws of Baden as to the press were declared by the diet, in 1832, to be contrary to the general law (the decree of Karlsbad of 1819), and the press in Baden was once more enslaved. On the 26th of June, 1852, the diet resolved that care should be taken to compel the editors of newspapers and other political productions to keep within proper limits in publishing the debates of the representative bodies, and that all public men and all political writers should publish no accounts of such debates except those published in the government papers, or extracts from them. Since that time there has been a visible reaction against the censorship, but an important feature of the new regime is much more severe against political and historical publications than against other works. It was hoped that the present king of Prussia, who manifested very liberal sentiments when his kingdom was threatened with a French invasion, would have no need to give fresh orders to adhere strictly to the decree of Karlsbad, so that now only books above twenty sheets are exempt from the censorship. There are however plenty of abuses in Prussia, as well as in the rest of Germany, for preventing authors from publishing works of a tendency contrary to the views of its government; for nearly all men of scientific attainments being in the service of government, expose themselves to dangerous consequences unless they act as Frederick the Great recommended, 'cum grano salis.' A proof of the influence of the government in this respect is the strange change in the spirit of so many Prussian authors since the accession of the present king. Previous to this time, the suppression of the press was absolutely necessary for obtaining places under government: the present king however was known to be opposed to Hegel, and no sooner was he king than Hegel was abandoned by most of the disciples, who were still punished as soon as they were attacked without mercy. Great numbers of Prussian authors were not known for their piety before the king's accession, became known for it after. The only country where the press was free, in spite of the decrees of the diet, was the duchy of Holstein, as mentioned above; and the most liberal German works were printed and issued by the publishers at Altona; but since the dissensions between the German and the Danish populations of the kingdom of Denmark, and the imperial decrees in that duchy have been enslaved to such a degree that even suspicious music has not passed the scissors of the censors, as we read in one of the last numbers of the 'Hamburger Correspondent.'

In the political systems prevalent in Germany, censorship is one of the various functions of the police, a word which among the German theorists has a much larger meaning than we are accustomed to give to it. The direction of the censorship was accordingly in the hands of the ministers of police. The present king of Prussia however established an Ober-Censor-Behörde, or a commission charged with the direction of the censorship and the superintendence of the different censorships in the provinces. A similar arrangement was lately made in Austria; the censorship was taken from the minister of state to the minister of police, which is under the control of the minister of the interior.

(Correspondence-Lexicon, Supplement, Art. Pressfreiheit; Lesar, Annuaire; Venturini, Chronik des Neuenzeitlichen Archivs.)

The Constitutions of the various States composing the North American Union, admit the absolute liberty of the press. There is of course in each State a law of libel, sufficiently strict, concerning which it may be entertaining to read Colebott's account of his own trial, entitled 'A Republican Judge,' under the assumed name of Peter Porcupine. In the slave States there are very severe laws against interfering by the press with the great question of slavery. It has been stated that abolitionist newspapers are seized at the post-office.

The republics of Spanish America likewise acknowledge the principle of the unfettered liberty of the press, however it may have been often violated in practice, amidst the never ending factions and civil wars of those countries. The constitution of the Brazilian Empire establishes the freedom of the press without any censorship; but an author is liable to punishment in such cases as are provided by law. (See Simiand, Encyclopédie méthodique, section 'Jurisprudence,' art. 'Censure des Livres.' Thibaudet, Histoire de la France et de Napoleon Bonaparte; Jacquet, Code de la Legislation Francaise, 1843; Collection de Actes et Documents de l'Histoire de l'Art, vol. 2, Paris, 1830; and the other works and pamphlets quoted in the course of this article.)

CENSUS OF 1841. In June, 1841, was taken the decennial census of Great Britain and Ireland, the results of which,
when compared with other statistical returns, afford the means of examining the condition and prospects of the country. It is not proposed, in this article, to enter with any minuteness either upon the manner in which the census was taken, or upon the detailed results appearing in the reports of the commission-ers; but it is intended to present a comparison of the increase and distribution of the population, with the means of employment, their command of the necessaries and conveniences of life, the growth of capital, the extension of manufactures; and make such indications of the progress of society as shall appear that in all these respects the means of enjoyment have increased more rapidly than the population; and such review of the national resources will be most encouraging; and may be generally acceptable to a tedious examination of the specific results of the census itself. As the selection of the various subjects of comparison will be made without reference to any preconceived theory, the accuracy of the facts may be relied on; and it is hoped that no conclusions will be drawn from them which they do not fairly justify.

In several particulars, it will be necessary to advert to Great Britain and to Ireland separately; but it will be convenient, in the first place, to present a summary of the population of the United Kingdom in 1831 and in 1841, with calculations of the rate of increase per cent.

<table>
<thead>
<tr>
<th>Year</th>
<th>England</th>
<th>Wales</th>
<th>Scotland</th>
<th>Ireland</th>
<th>Great Britain</th>
<th>Ireland</th>
<th>United Kingdom</th>
</tr>
</thead>
<tbody>
<tr>
<td>1831</td>
<td>15,091,006</td>
<td>806,183</td>
<td>2,665,114</td>
<td>7,767,401</td>
<td>16,643,028</td>
<td>230,760</td>
<td>24,610,429</td>
</tr>
<tr>
<td>1841</td>
<td>18,925,138</td>
<td>1,620,104</td>
<td>2,920,184</td>
<td>8,178,174</td>
<td>21,053,412</td>
<td>234,590</td>
<td>23,071,606</td>
</tr>
<tr>
<td>Increase per cent</td>
<td>14.5</td>
<td>13.7</td>
<td>10.7</td>
<td>5.2</td>
<td>14.2</td>
<td>15.0</td>
<td>10.6</td>
</tr>
</tbody>
</table>

The Irish census commissioners (Report, p. xii.) enter into certain calculations, by which they raise the per centage of increase in the population of Ireland from 5.25, as actually shown in the returns, to nearly 12 per cent. If the same principles of calculation are applied to the reports of the population of Great Britain, the increase would also be greater; but it will be sufficient, for the purposes of this inquiry, if the entire population of the United Kingdom, during the ten years from 1831 to 1841, is assumed to have increased 12 per cent.

In judging of the condition of the people, the first point which may be investigated is their consumption of those articles which are used more or less in proportion to their means. Unhappily there are no means of estimating the quantities of bread and meat or other staples of food produced in this country; but the quantities of auxiliary articles of food and luxury imported from abroad for home consumption, or manufactured in this country, are fair indications of the means possessed by the people of enjoying the comforts of life. If the increase in the consumption of such articles be in a greater proportion than the increase of population, it may reasonably be inferred that their means of enjoyment have generally increased; or, in other words, that the people enjoyed more comforts in 1841 than in 1831, relatively to their numbers.

The quantities of several articles which paid duty for home consumption in the United Kingdom, in 1831 and 1841 respectively, and the rate of increase, will appear from the following table:

<table>
<thead>
<tr>
<th>Year</th>
<th>Butter</th>
<th>Cheese</th>
<th>Coffee</th>
<th>Tea</th>
<th>Eggs</th>
<th>Tallow</th>
<th>Paper</th>
<th>Tobacco</th>
<th>Crowne</th>
<th>Plate</th>
<th>Glass</th>
<th>Bottle</th>
</tr>
</thead>
<tbody>
<tr>
<td>1831</td>
<td>121,135</td>
<td>1,350,389</td>
<td>22,715,807</td>
<td>29,997,055</td>
<td>58,464,690</td>
<td>518,738</td>
<td>108,960</td>
<td>19,335,840</td>
<td>105,803</td>
<td>14,019</td>
<td>284,760</td>
<td>519,595</td>
</tr>
<tr>
<td>1841</td>
<td>251,255</td>
<td>248,335</td>
<td>25,420,980</td>
<td>36,396,076</td>
<td>91,880,157</td>
<td>1,245,112</td>
<td>106,900</td>
<td>24,384,865</td>
<td>116,895</td>
<td>27,630</td>
<td>591,350</td>
<td>570,450</td>
</tr>
<tr>
<td>Rate per cent.</td>
<td>106.4</td>
<td>90.9</td>
<td>25.1</td>
<td>91.3</td>
<td>57.1</td>
<td>55.3</td>
<td>91.3</td>
<td>45.1</td>
<td>12.6</td>
<td>97.1</td>
<td>73.0</td>
<td></td>
</tr>
</tbody>
</table>

This list might be extended much farther; but it will suffice to show that the consumption of these articles (restrained in some cases by too heavy a taxation) was enjoyed in a larger ratio than the increase of population, and that the comforts of the people must have been proportionately greater in 1841 than in 1831.

Concurrently with this increased consumption of articles of comfort and luxury, it is worthy of special notice that the use of intoxicating drinks had apparently decreased. We are not aware of any causes which encouraged the smuggling or adulteration of spirits in 1841 which did not exist in 1831; and yet it appears, from the returns, that the consumption of duty-paid spirits of all kinds, whether British or foreign, had decreased in that interval to the extent of 7.8 per cent. In the same period the consumption of all wines had increased only 3.9 per cent. The consumption of beer cannot be ascertained, but the quantity of hops that paid duty decreased from 36,600,028 lbs. in 1831, to 30,604,108, or 19.6 per cent; and of malt, from 40,384,567 bushels to 35,656,718, or 13.1 per cent. From these facts, however, no certain inference can be drawn, on account of the great varieties in the natural produce of these articles in different years, and of the free use of other ingredients by brewers.

Our view of the evidences of increased consumption may be closed by the notice of the three articles of timber, cotton, and wool, all of which are used solely in giving employment to the productive industry. Taking all the different kinds of imported timber, there appears to have been an increase of 87.5 per cent. In cotton-wool there was an increase of 631 per cent; and in sheep and lambs' wool imported, of 787 per cent.

The next subject of comparison may be the exports of British and Irish produce and manufactures from the United Kingdom, in 1831 and in 1841, from which the manufacturing and commercial condition of the country, and the employment of its people, at those periods, may be collected.

The quantities and declared value of some of the principal articles of export are exhibited in the following table:

<table>
<thead>
<tr>
<th>Year</th>
<th>Quantity</th>
<th>Declared value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1831</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1841</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Article</th>
<th>1831</th>
<th>1841</th>
<th>Increase per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apparel</td>
<td>217,483</td>
<td>272,557</td>
<td>26.1</td>
</tr>
<tr>
<td>Linen</td>
<td>1,303,124</td>
<td>1,325,723</td>
<td>1.7</td>
</tr>
<tr>
<td>Cotton</td>
<td>22,123,050</td>
<td>23,438,900</td>
<td>5.9</td>
</tr>
<tr>
<td>Iron and steel</td>
<td>9,926,923</td>
<td>11,088,756</td>
<td>11.8</td>
</tr>
<tr>
<td>Tobacco</td>
<td>1,693,455</td>
<td>1,880,819</td>
<td>10.4</td>
</tr>
<tr>
<td>Copper</td>
<td>1,639,684</td>
<td>1,875,106</td>
<td>14.4</td>
</tr>
<tr>
<td>Coal</td>
<td>50,445,690</td>
<td>55,370,830</td>
<td>9.7</td>
</tr>
<tr>
<td>Iron</td>
<td>63,897,364</td>
<td>65,370,890</td>
<td>2.4</td>
</tr>
<tr>
<td>Ships and vessels</td>
<td>1,324,064</td>
<td>1,356,672</td>
<td>2.4</td>
</tr>
<tr>
<td>Plums</td>
<td>4,219,738</td>
<td>4,281,980</td>
<td>1.5</td>
</tr>
<tr>
<td>Sugar</td>
<td>1,089,300</td>
<td>1,128,573</td>
<td>3.5</td>
</tr>
<tr>
<td>Rye</td>
<td>1,275,300</td>
<td>1,302,573</td>
<td>2.1</td>
</tr>
<tr>
<td>Iron</td>
<td>2,925,690</td>
<td>3,024,890</td>
<td>3.3</td>
</tr>
<tr>
<td>Wool</td>
<td>520,142</td>
<td>520,142</td>
<td>0.0</td>
</tr>
<tr>
<td>Sacks</td>
<td>1,324,064</td>
<td>1,356,672</td>
<td>2.4</td>
</tr>
</tbody>
</table>

Other articles | 310 | 310 | 0.0 |

Total exports | 3,101,240 | 3,101,240 | 0.0 |

Exports from the United Kingdom.
On referring to the two last columns of this table, it appears that the value of the exports did not always increase in the same ratio as the quantities; but the total declared in 1831 was 20,578 ships, of 4,952,756 tons, and the average price was 46l. per ton. We shall, however, confine ourselves in 1831 and 1841; thus showing an aggregate increase of 38-9 per cent.

Another evidence of the increased commerce of the country is afforded by the returns of shipping. In 1831, 29,578 ships with 6,080,000 tons of British property were employed in the coasting trade, of which the tonnage amounted to 3,411,927. In 1841 the number of ships had increased to 29,682, and the tonnage to 4,692,767; thus showing an increase of 30 per cent. in this period of ten years. But it may be asked, how far is this increase in the productive industry of the country, in the value of its exports, in its shipping and commerce, been supported without prodigious additions to its capital? The best evidence of increase of productive power is increased consumption. Without a sufficient quantity, production and consumption could not continue to increase; and as capital is likely to be applied to production and consumption as much at one period as at another, all that seems necessary for ascertaining the increase of capital, is to know the increase of its immediate results.

In addition to the increase of importation and consumption which could only have been supported by a proportionate amount of capital, we see the price of all public securities so high, the interest of money so great, and capital seeking investment in every speculative enterprise, and devoted to religious and charitable objects over the whole world, it is absurd to doubt the abundance of capital. But in addition to this indirect evidence of the increase of capital, there are other indications of its accumulation, of a more direct nature, a few of which may suffice:—

Notwithstanding the discouragement of insurance caused by a duty of 200 per cent., the sums insured against fire in the United Kingdom amounted in 1831 to 596,655,329l., and in 1841 to 681,539,324l.; being an increase of 29-4 per cent. The accumulations annually made through the instrumentality of life assurance are known to be enormous, but no reasonable estimate has been made of the capital arising from the rate of increase in the period of which we are treating.

The most interesting evidence of accumulation is presented by the returns of savings’ banks. In 1831 there were 499.605 depositors who had amounted to 18,715,653l., and in 1841 there were 841,264 depositors and the amount of their deposits had increased to 24,274,496l.; so that, both in number and amount, the deposits may be said to have doubled in this short period of ten years. The capital invested in railways in the most prosperous part of the country is 1831 amounted to 95,248,497l.® In Scotland the real property was assessed in 1811 at 5,079,573l.; in 1824-5 at 9,481,732l. (Cal. Paper 102 of 1845.) In the absence of any immediate statements, though estimate can only be made of the value of property in the lock of 1831, but for 1841; but we are inclined to think it was not less than from 25 to 30 per cent.
C E N

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stone afford employment for the increasing population. While the increase upon the whole kingdom amounted, as already stated, to 13½ per cent., the increase in the manufacturing and commercial counties was greatly above that proportion, and the relative importance of these counties below. In Cumberland the increase was 18½ per cent.; in Durham, 27½; in Lancaster, 34½; in Middlesex, 16; in Monmouth, 36½; in Stafford, 24½; in Warwick, 19½; and in the West Riding of Yorkshire. In Buckingham the increase was only 6½ per cent.; in Cumberland, 4½; in Devon, 7½; in Dorset, 9½; in Essex, 8½; in Hereford, 24; in Norfolk, 5½; in Oxford, 6½; in Suffolk, 6½; in Westmoreland, 2½; and in the North Riding of York, 7 per cent. It is useless therefore to discuss the relative incapacity of agriculture and manufactures in the abstract; for agricultural counties cannot support their own population; while the manufacturing and commercial counties find employment for their own natural increase and for the surplus of other counties which the land cannot maintain.

The relative increase of the agricultural and commercial population is shown by the following proportions per cent.—

<table>
<thead>
<tr>
<th>Year</th>
<th>Agricultural</th>
<th>Commercial</th>
<th>Miscellaneous</th>
</tr>
</thead>
<tbody>
<tr>
<td>1831</td>
<td>28</td>
<td>42</td>
<td>30</td>
</tr>
<tr>
<td>1841</td>
<td>22</td>
<td>46</td>
<td>32</td>
</tr>
</tbody>
</table>

But in 1831 the returns referred to families, and in 1841 to individuals; and as a greater number of children are employed in manufactures than in agriculture, the difference may have been greatly augmented by this form of enumeration.

A point of the first importance is the relative increase of different classes of occupation in the same period of 10 years from 1831 to 1841. A comparative return of the Commissioners (Preface, p. 21) includes males only aged 20 years and upwards, and exhibits the following results:—The number of occupiers and labourers in agriculture had decreased in that period from 1,251,751 to 1,215,564; but the Commissioners explain this result by supposing that numerous farm-servants had been returned in 1841 as domestic servants instead of as farm-servants. Labourers engaged in commerce, trade, and manufacture had increased from 1,572,292 to 2,039,460 (or 39½ per cent.):—capitalists, bankers, professional and other educated men, from 216,263 to 286,175 (or 32½ per cent.); labourers employed in labour not agriculture had decreased from 611,744 to 610,157: other males 20 years of age, except servants, had increased from 237,337 to 392,511: male servants 20 years of age and upwards had increased from 79,757 to 144,354, including, however, as already noted, many farm-servants. For the purpose of instituting a just comparison of the relative increase of particular employments it must be understood that the total number of male persons 20 years of age and upwards (exclusive of the infant and male servant) had increased, during this period of ten years, from 3,969,142 to 4,707,600 (or 18½ per cent.). Making due allowance for the probable error in the return of agricultural labourers, we are forced to conclude that this class had either not increased at all or had increased in a very small degree; and that the class of labourers not agricultural had positively diminished: whilst capitalists, bankers, professional and other educated men, had increased 32½ per cent.; persons engaged in trade and in manufactures 20½ per cent.; and domestics servants 106½ per cent., or, allowing for farm-servants, say 90 per cent. Thus the two classes who earn the lowest wages were alone stationary or retrograde: the highest class in wealth and intelligence had increased 32½ per cent.; and the domestic servants, whose numbers are a certain indication of the means of their employers, had increased 90 per cent. Nor must another important fact be omitted in connexion with the decrease in the class of labourers, viz. the immense numbers of Irish who notoriously perform the most laborious parts of industry. In Lancashire the persons born in Ireland formed, in 1841, 6½ per cent. upon the whole population; in Cheshire, 3½ per cent.; in Middlesex, 3½ per cent.; in Yorkshire, 7½; in Dumbartonshire, 1½; and in Westmoreland, 1½ per cent. of the voters.

It would seem therefore that the class of British labourers are gradually raising themselves into a better condition and more lucrative employments; and that the demand for the lowest description of labour, caused by their withdrawal from it, is being met by their Irish brethren.

The number of female domestic servants increased in Great Britain from 670,491 in 1831, to 908,826 in 1841, or 35 per cent.

In concluding this statement of the industrial occupations of the people of Great Britain, it is gratifying to learn that the whole of the 'almsgivers, paupers, lunatics, and prisoners' amounted in 1841 to 1½ per cent. only upon the population. It must be understood, however, that this statement does not include persons receiving parochial relief, unless they be resident in workhouses.

We may now pass to some of the most material facts disclosed by the census of Ireland. The constant migration of labourers from the agricultural counties of England to the manufacturing districts, and the extensive emigration of the people, will be noticed; and precisely the same circumstances are observable in Ireland. In the period from 1831 to 1841 no less a number than 403,459 persons left Ireland, either to settle in the populous towns of Great Britain or to emigrate to the British Colonies. The same statements apply to the Irish States; while an extensive migration was taking place, within Ireland itself, to Dublin and to other commercial and manufacturing places.

The returns of house accommodation in Ireland present a very lamentable picture. The Commissioners have adopted a judicious classification by which the houses are distinguished under four classes, the last being that of the cabin or mud but with one room, and the third class but one degree better. The following statement shows the proportion per cent. of which the number of families in each class of accommodation bear to the total number of families:—

<table>
<thead>
<tr>
<th>Class</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural districts</td>
<td>1½</td>
</tr>
<tr>
<td>Civic districts</td>
<td>7</td>
</tr>
</tbody>
</table>

The value of this classification is obvious, and if hereafter adopted in England it will render the statistics of house accommodation of considerably greater weight in estimating the social condition and habits of the people. A mud hut upon a common ought not to rank even in the array of figures, with the mansions of wealthy cities.

Even in Ireland it appears that manufactures are attracting the agricultural population; for the number of families engaged in the manufacturing districts had increased since 1831; and the number employed in agriculture have diminished in a corresponding proportion.

The population have been divided by the commissioners into three great classes, nearly equivalent to the three ordinary grades of society: and the proportions of families appear as follow:—

<table>
<thead>
<tr>
<th>Class</th>
<th>Proportion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>1½</td>
</tr>
<tr>
<td>Civic</td>
<td>7</td>
</tr>
</tbody>
</table>

The occupations of all individuals above 15 years of age are classified: 1st, as ministering to food; 2nd, as ministering to clothing; 3rd, as ministering to lodging, &c.; 4th, as ministering to health, education, &c.; and 5th, as unclassified or miscellaneous; each class bearing respectively the following proportions to the entire population, viz. 23½: 11½: 2½: 17½: and 6. But as no similar classification bad ever been adopted before, no comparison is practicable with any preceding one.

The report of the Irish Census Commissioners abounds in highly interesting inquiries into the condition of the Irish people; but as they do not afford any comparison with the year 1831, the object which we had proposed cannot be carried any further with respect to that country.

This succinct view of the material progress of society, as far as it admits of elucidation by statistics, is certainly incomplete without a consideration of its advance or retrogression in religion, in morals, and in education; but those questions, in more ways than one, we have here considered, are not so immediately connected with the results of the Census.

I.—TABLES OF POPULATION, OCCUPATION, &c. : CENSUS, 1841.

1.—Total Population of each County in Great Britain, according to the Census taken 7th June, 1841; showing the percentage of the Total Population engaged in Commerce, Trade, and Manufacture, and in Agriculture.
<table>
<thead>
<tr>
<th>Country</th>
<th>Total Persons</th>
<th>No. per Cent. engaged in Trade, Commerce, Agriculture, &amp; Manufacture</th>
<th>No. per Cent. engaged in Trade and Manufacture</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aberdeenshire</td>
<td>192,337</td>
<td>14.5</td>
<td>13.1</td>
</tr>
<tr>
<td>Argyll</td>
<td>97,371</td>
<td>6.7</td>
<td>13.0</td>
</tr>
<tr>
<td>Caithness</td>
<td>36,343</td>
<td>8.7</td>
<td>14.1</td>
</tr>
<tr>
<td>Caithness</td>
<td>19,135</td>
<td>15.4</td>
<td>5.0</td>
</tr>
<tr>
<td>Dumfriess</td>
<td>44,298</td>
<td>25.6</td>
<td>5.9</td>
</tr>
<tr>
<td>Dumfriess</td>
<td>72,830</td>
<td>12.0</td>
<td>15.0</td>
</tr>
<tr>
<td>Edinburgh</td>
<td>225,445</td>
<td>19.4</td>
<td>13.4</td>
</tr>
<tr>
<td>Fife</td>
<td>70,029</td>
<td>22.2</td>
<td>5.9</td>
</tr>
<tr>
<td>Forfar</td>
<td>170,530</td>
<td>22.2</td>
<td>5.9</td>
</tr>
<tr>
<td>Inverness</td>
<td>95,727</td>
<td>12.1</td>
<td>16.1</td>
</tr>
<tr>
<td>Kirkcudbright</td>
<td>31,075</td>
<td>12.3</td>
<td>17.6</td>
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<td>3.1</td>
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<td>3,465,981</td>
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<td>10.8</td>
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**Whereof—On Mainland 3,450,764 On Islands 15,217**

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<td>19.8</td>
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</tr>
</tbody>
</table>

**Whereof—On Mainland 3,450,764 On Islands 15,217**
Number of persons employed in Textile Manufactures in Great Britain:

<table>
<thead>
<tr>
<th>Manufacture</th>
<th>Persons employed</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cotton</td>
<td>587,659</td>
<td>291,028</td>
<td>296,631</td>
</tr>
<tr>
<td>Hosiery</td>
<td>50,955</td>
<td>20,531</td>
<td>30,424</td>
</tr>
<tr>
<td>Lace</td>
<td>35,347</td>
<td>16,338</td>
<td>19,009</td>
</tr>
<tr>
<td>Wool and Worsted</td>
<td>167,299</td>
<td>71,883</td>
<td>95,416</td>
</tr>
<tr>
<td>Silk</td>
<td>83,773</td>
<td>36,990</td>
<td>46,783</td>
</tr>
<tr>
<td>Flax and Linen</td>
<td>35,213</td>
<td>15,255</td>
<td>20,958</td>
</tr>
<tr>
<td>Total</td>
<td>800,246</td>
<td>314,121</td>
<td>486,125</td>
</tr>
</tbody>
</table>

The age and sex of the above-mentioned 800,246 persons were as follows:

Age and sex of the above-mentioned 800,246 persons was as follows:

- **Males**: 344,121
- **Females**: 211,070

Total: 555,191

Number of Persons employed in some other branches of manufacturing industry:

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Persons employed</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pottery, china, and earthenware</td>
<td>24,774</td>
<td>6,464</td>
<td>18,310</td>
</tr>
<tr>
<td>Glass and china bottles</td>
<td>4,246</td>
<td>1,101</td>
<td>3,145</td>
</tr>
<tr>
<td>Gloves</td>
<td>9,225</td>
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Number of persons employed in Mines:

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<tr>
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III.---Ages of Persons living in England, Wales, and Scotland.

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<td>40 to 50</td>
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IV.---Population and Occupations in Ireland.

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Chiefly employed in Agriculture, Manufactures, and Other Trades, &c.

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*TheItalics of public institutions are not included.

*The population of the several parishes and places forming the metropolis with the limits adopted by the Registrar-General, was 1,072,978.*
<table>
<thead>
<tr>
<th>CENTRAL CRIMINAL COURT</th>
<th>316</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IRELAND</strong></td>
<td><strong>17,568</strong></td>
</tr>
<tr>
<td><strong>Boroughs</strong></td>
<td><strong>Total Persons</strong></td>
</tr>
<tr>
<td>Armagh</td>
<td>10,245</td>
</tr>
<tr>
<td>Athlone</td>
<td>6,293</td>
</tr>
<tr>
<td>Bandon</td>
<td>8,275</td>
</tr>
<tr>
<td>Baile</td>
<td>63,655</td>
</tr>
<tr>
<td>Carlow</td>
<td>10,149</td>
</tr>
<tr>
<td>Carrickfergus</td>
<td>5,379</td>
</tr>
<tr>
<td>Cashel</td>
<td>8,057</td>
</tr>
<tr>
<td>Cloyne</td>
<td>13,505</td>
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<tr>
<td>Cork</td>
<td>6,255</td>
</tr>
<tr>
<td>Downpatrick</td>
<td>4,866</td>
</tr>
<tr>
<td>Drogheda</td>
<td>19,250</td>
</tr>
<tr>
<td>Dublin</td>
<td>238,531</td>
</tr>
<tr>
<td>Dundalk</td>
<td>10,762</td>
</tr>
<tr>
<td>Dungarvan</td>
<td>3,801</td>
</tr>
<tr>
<td>Enniscorthy</td>
<td>3,518</td>
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</tbody>
</table>

**CENTRAL CRIMINAL COURT.**—This is a court established in 1834, by 4 & 5 Wm. IV. c. 36, for the trial of treasons, murders, felonies, and misdemeanours committed within the city of London and county of Middlesex, and parts of Essex, Kent, and Surrey. By § 22 the court is authorised to try offences committed on the high seas and other places within the jurisdiction of the Admiralty of England. The Justices of the Peace are prohibited by the act from trying at their sessions persons charged with capital, and a variety of other offences, alleged to have been committed within the jurisdiction of the act. This jurisdiction comprises the whole of Middlesex; in Essex the parishes of Barking, East Ham, West Ham, Little Ilford, Lcow Leyton, Walthamstow, Wanstead, Woodford, St. Mary, and Leytonstone; in Kent, Chatham, Dartford, Maidstone, Ton, Lee, Lewisham, Greenwich, Woolwich, Eltham, Plumstead, St. Nicholas Deptford, that part of St. Paul Deptford which is within Kent, the liberty of Kidbrooke, and the hamlets of Southrepps, in Southwark, the parishes of Battersea, Bermondsey, Camberwell, Clapham, Lambeth, St. Mary Newington, Rotherhithe, Streatham, Barnes, Putney, that part of St. Paul Deptford which is within Surrey, Tooting Graveney, Wandsworth, Merton, Morpeth, Kow, Richmond, Wimbeldon, the Clink Liberty, and the district of Lambeth palace.

The area and population of the different parts of the Central Criminal Court jurisdiction are as follows:

| Boroughs | Population, 1851.
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>Middlesex</strong></td>
<td>1,576,636</td>
</tr>
<tr>
<td><strong>Essex (parts of)</strong></td>
<td>534</td>
</tr>
<tr>
<td><strong>Kent</strong></td>
<td>101,719</td>
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<tr>
<td><strong>Surrey</strong></td>
<td>404,420</td>
</tr>
</tbody>
</table>

The judges of the Central Criminal Court are appointed by the act to be any two or more of the following persons: the lord mayor for the time being of the city of London, the lord chancellor or the lord keeper of the great seal, and all the justices for the time being of the courts of King's Bench, Common Pleas, and the Exchequer, the chief judge and the two other judges in Bankruptcy, the judge of the Admiralty, the dean of the arches, the aldermen of the city of London, the recorder, the common serjeant, the judge of the sheriffs' court of the city of London for the time being, and any person or persons who hath or shall have been lord chancellor, lord keeper, or a judge of any of his majesty's superior courts of Westminster, together with all such judges, baronets, knights, esquires, and justices, his heirs and successors, shall from time to time and appoint by any general commission. The power of selecting the judges from so extensive a list renders it unnecessary to issue a commission every year; and the period of holding the sessions is not interrupted when the judges of the courts at Westminster are absent on circuit. The sessions are held twelve times a-year at the Old Bailey and Clink.

No Court adjoining, and all judges are usually two of the common-law judges and the recorder of the city of London. Before the Central Criminal Court was established sessions were held at the Old Bailey eight times a year for the trial of offences committed in Middlesex, and bills 7 were returned by a grand jury sitting at Clerkenwell under the jurisdiction of the county magistrates. Offences committed at Southwark or Greenwich, both of which places may be regarded as parts of the metropolis, were, in the case of Southwark, tried at Guildford, and cases in Middlesex as it might happen, and from Greenwich an offender was sent for trial to Maidstone. From the great amount of population, the calendars were necessarily so heavy that a winter assise became necessary for parts of the Home Circuit; but it was still necessary to provide the whole metropolis with a justice of the peace, and to have a jail delivery every four or five weeks.

Juries are summoned by the sheriffs of the city of London and of the counties of Middlesex and Kent, and parts of Essex and Surrey, according to the parts of the district in which they reside. The jurors are selected from London alone; or from Middlesex and the parts of counties which are within the limits of the assize; or from both indiscriminately. Juries from Essex, Kent, and Surrey, who have served upon any jury at the Central Criminal Court are exempted, for the ensuing twelve months, from serving upon any jury in any court (except the sessions of the peace) held in the county in which they reside.

The area over which the jurisdiction of the Central Criminal Court extends is about the 13th part of the area of England and Wales, but the population is between 1-7th and 1-8th of that of England and Wales. Nearly as many prisoners are annually tried at the Central Criminal Court as at all the county assize courts in England and Wales. In 1858 the number of persons tried at all the different courts was as follows:

<table>
<thead>
<tr>
<th>Number</th>
<th>Proportion per cent.</th>
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<tbody>
<tr>
<td><strong>County Quarter Sessions Courts 13,157</strong></td>
<td>383</td>
</tr>
<tr>
<td><strong>Circuit Assize Courts 3,557</strong></td>
<td>144</td>
</tr>
<tr>
<td><strong>Boroughs Courts 4,593</strong></td>
<td>180</td>
</tr>
<tr>
<td><strong>Central Criminal Court 383</strong></td>
<td>143</td>
</tr>
</tbody>
</table>

The following is a statement of the number of persons convicted at the Central Criminal Court in the year 1844, specifying their offences and sentences:—arson, 1; burglary, 51; cattle stealing, 1; child stealing, 5; poisoning, 7; and stealing by uttering counterfeit coin, 6; cutting and wounding, 1; murder, &c., 16; embezzlement, 80; forgery and uttering forged instruments, 38; horse stealing, 19; housebreaking and larceny, 1; larceny, 2; larceny, 1; murder, 1; murder, &c., 9; murder, &c., 16; embezzlement, 80; forgery and uttering forged instruments, 38; horse stealing, 19; housebreaking and larceny, 1; larceny, 2; larceny, 1; murder, 1; murder, &c., 9. Of which criminals there were sentenced to death (of whom one was executed), 2; transportation for life, 22; for twenty years, 7; for fifteen years, 37; for fourteen years, 7; for twelve years, 9; for ten years, 18; for seven years, 527. Imprisoned in Newgate and the Houses of Correction, for three years, 2; for two years, 39; for eighteen months, 27; for one year, 259; for nine months, 90; for eight months, 1; for six months, 417; for three months, 132; for three months, 406; for two months, 135; for six weeks, 8; for one month and under, 260; total, 1,774. Fined, 2. Discharged on recognizance, 2. In 1848 the number sentenced was 2682.
CENTRANTHUS (from στερνα a spur, and ἀνθος a flower), a genus of plants belonging to the natural order Valerianaceae. It has a regular 5-lobed corolla with a spur, a single stamen with a long filament in a sickle-shaped or pinnate, and the limb of the calyx, expanded into a feathery pappus. The species are smooth herbs with undivided or pinnate leaves, and white or red flowers. One of the species is Valerian, red Valerian, which has ovate-lanceolate leaves, spur much shorter than the tube of the corolla and twice as long as the germen. It is a native of Great Britain, in chalk-pits and on old walls. It has purple flowers, and attains a height of one or two feet. It has many varieties.

C. Cacticarpa has radical leaves ovate entire, the stem-leaves pinnatifid, the spur very short. It is a native of the coasts of the Mediterranean, and of the more temperate parts of France. It grows wild at Etham in Kent, but there is little doubt of its being a naturalized plant there. The first species may have also been introduced, but it grows wild in many parts of Great Britain. Several other species are described, and some are grown in gardens. They are elegant border flowers, and will grow in any common soil, on walls or rock-work, and may be easily propagated by seed. (Babington, Manual of British Botany.)

CENTAURY. [Judea, Judicia, P. C.]

The Centaury of the Romans, or Polybius, corresponding to the natural order Primulaceae. It has a 4-parted calyx, corolla with a subglobose inflated tube and patent 4-parted limb, 4 stamens inserted in the throat of the corolla, the capsule many-seeded. It is a genus of the same family as Cephalospermum, genus C. minima, is a native of Great Britain. It is a very minute plant with a prostrate stem, the leaves alternate ovate acute, the flowers pale rose colour, subsessile, without glands at the base. It grows in damp sandy, and gravelly places, and is known by the common name of Bastard Pimpernel. (Babington, Manual of Brit. Bot.)

CENTURION. A centurion in the Roman army was the commander of a centuria, a term which we cannot conceive to have originally signified anything except a hundred; but there is no ground for supposing that the word centuria contains the elements of the word ‘viri,’ men. The term centuria was also applied to a hundred jugers of land, and Varro (L. L. v. 85) observes that the name was kept after the centuria contained two hundred jugers. But a different explanation of this is given by Niebuhr.

A centuria, as a division of an army, signified a number of men under the command of a centurion. The form of the word centurio is the same as that of the word curio. Niebuhr has endeavoured to show that the centuria originally consisted of thirty men (Roman History, vol. i. 471, iii. 100; Eng. Transl.). When the Roman legion contained thirty maniples, and in the centuries, the number of centurions would be sixty; but as the number of maniples increased, it would be more advantageous, Niebuhr must suppose that the officer called a centurio had at various times a varying number of men under him.

The passage in Livy (xlii. c. 32, &c.) seems to show that the centuria consisted of three maniples, and in the time of Polybius, in the fragment of his sixth book (c. 24), states that in his time twenty men were selected from the respective bodies of the hastati, principes, and triarii, who composed a legion: none were selected from the velites, or light troops, who were distributed among the hastati, principes, and triarii in just proportion. Polybius calls the Roman centurio tectarius (ratiopex), which is a translation of the Latin phrase ordinem ducentes. There were two centurions to each of the divisions of the maniples, and the division into two maniples, which was first chosen commanded the right of the manipulus, and the other the left. Each manipulus had its standards, which were carried by two of the bravest and strongest soldiers, who were appointed by the centurions. The centurion who was first chosen was called primipilus, and was a member of the general’s council: he was the first centurion of the first manipulus of the triarii, and he had the care of the eagle.

The pay of the soldier in the infantry is stated by Polybius at 500 solidi per annum. Where the leaves extend beyond the point of origin, there is a sixth part of the Attic drachma, or one-sixth part of 9id. This would therefore make the monthly pay of a centurio about 16s. a month.

The duties of the centurion were to command their several manipuli. They received their orders from the tribunes of the legion, who received theirs from the commander of the army, whom they visited every morning to receive their orders, which they then gave to the centurions. They also superintended the soldiers when they were engaged in the military works, such as castametra. They had also to go round to inspect the watches; at least this is stated as among the duties of the centurio in the ancient author, and the badge of office was a stick made of the stock of a vine (vitis).

The centurions had defensive armour, a shield, an iron helmet, with a crest placed transversely to distinguish them from other soldiers. They also wore a signium (signum) on their helmet, probably to denote the centurio with whom they belonged. (Vegetius, ii. 13; and the Notes of Ste- wachius.)

The grant of temporary leave from military service to the soldiers (centurio, which is sometimes reckoned among the privileges of the centurions, was only an abuse that got established at a late period. It appears to be first mentioned in the beginning of the reign of Tiberius (Tacitus, Ann. i. 17. However the practice had become so far established that Otho thought it prudent to pay the centurions out of the imperial treasury (fisco) such amounts as they had been in the habit of receiving from the soldiers on the account of the vacancies.

Under the empire it seems that the centurionships were generally given as a matter of favour and patronage.

The speech of the centurion Sp. Lusitius in Livy (xlii. 64), presents a lively picture of the laborious services of a Roman soldier who had worked his way up to the Primipilus.

CEPHALANTHES, a genus of plants belonging to the natural order Orchidaceae, and to the tribe Limodoreae. It has a converging perianth, the lip interrupted, the basal divaricate, and the lip recurved. The calyx is transverse without a rostellum, the anthers terminal, erect, moveable, shortly and thickly stalked, 2-celled, the cells with imperfect septa, the column elongated, the germen sessile twisted. Three species of this genus are natives of Great Britain.

C. grandiflora, with ovate-lanceolate or ovate-pointed leaves, bracts longer than the glabrous germen, lips obtuse, included. It has white flowers, with the lips marked with several elevated longitudinal lines. It is found in dense woods, usually on a calcareous soil. C. ensifolia, with lanceolate-pointed leaves, bracts much shorter than the glabrous germen, lips obtuse, included. The flowers are white, the lips marked with several elevated white lines and a yellow spot in front. It is a rare plant, and found in mountainous woods.

C. rubra has lanceolate, acute leaves, bracts longer than the downy germen, the lip acute, as long as the petal. The flowers are purple, the lip white with a purple margin, marked with numerous wavy longitudinal lines. It is a rare plant in mountainous woods. (Babington, Manual of Brit. Bot.)

CEPHALASPIS, a singular genus of fossil Placoid Fishes, established by Agassiz on specimens from the old sandstone of England and Holland. &c. The head covering is like the anterior part of a Trilobite. Cephalaspis Lyelli, C. Lloydii are British species.

CEPHALOTA/CEZ, a natural order of exogenous plants. It consists of 2 genera, Cephalotus, and Cephalothus foliculatus, New Holland Pfizer Plant. It has the following essential character: calyx coloured, 6-parted, with a valvate separation; no corolla; stamens 12; those opposite the sepal alternated, inserted into the edge of a deep glandular perigynous disk; anthers with a thick granular connective, carpels six distinct, 1-seeded, ovate, erect; achenia membranous, opening by the ventral suture, surrounded by the persistent calyx and stamens; seed solitary (sometimes many-seeded), in the achenium; the endosperm is feebly friable, somewhat oily, albumen. The Cephalotus foliculatus has small white flowers, with a simple scape, bearing a compound terminal spike; the leaves are exatipulate, and have angled margins that operculate pitchers. This plant, according to Laillartdrie, is allied to Roscensia, &c., and family is that of Jegou to Jussieu, to Crassulaeae. Brown places the order between Crassulaeae and Francoceae. Lindsay points out its relations through the last order to Pittosporaceae and Scrophulariaceae, by the absence of a column in the flower. (Babington, Manual of Brit. Bot.)

In cultivating the New Holland Pfizer Plant, it should be placed in turfy peat soil either in a box or pot. It should be kept rather moist, and this may be effected by placing the pots in pans of water. The plants are always the healthier
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The art of Caravaggio, the scholar of that painter formed a strong influence against Cesari, but the latter was not a painter of ability, his style was too rigid; but Cesari declined to cross swords with Caravaggio, as he was not a cavalier. He however himself sent a challenge to Annibale Carracci, who on his part responded, that his weapon was the pencil, and he would contend with no other.

The partisans of Caravaggio were called respectively Idealists and Naturalists.

The works of Cesari, in fresco and oil, are very numerous; the chief of them is the series in Illustration of Roman History in the Cappella Paulina of the Lateran, of which Clement VIII., but not finished until many years after that pope's death. Cesari undertook to complete the paintings in four years, by the year 1600; he did not complete them however until after a lapse of forty years. They are executed with great spirit, but with an utter disregard of nature; the design is slight and incorrect; the extremes have little variety, and are merely indicated; the draperies also are undecked, the heads want character, and the colouring is flat.

The horses, of which there are many in the designs, are better than the figures, yet they are heavy. Cesari was fond of and excelled in painting horses. Crowds of figures and horses, or general fulness of subjects, are distinguishing characteristics of his style. He must however have been a man of great industry, the intense efforts he has made, are by no means less solid than attractive, and his energies were wasted in the acquisition of a fleeting popular applause.

Baglione, Vite de' Pittori, &c.

CÉSPEDES, Fernando, painter, sculptor, and architect, the most learned artist and one of the most distinguished men of Spain, was born at Cordova in 1558, and was the son of Alonso de Céspedes and Olaya (Arroyo) his wife. After he had received as good a literary and scientific education at Cordova and at Arles de Henares as his country could afford, he went, in what year is not known, to Rome, where he devoted himself to the study of the arts, having already paid some attention to painting: previously to his departure from Spain. In Rome Céspedes distinguished himself during the pontificate of Gregory XIII. by some frescoes in the churches of Araceli, and Trinità de' Monti, and acquired the friendship of Federigo Zuccaro, which, however, some consider to have been a misfortune.

His fame reached his native place, and having been appointed to a vacant canony in the cathedral, he returned to Cordova in 1577 to fulfil the duties of his office. These duties however did not engross all his time; he persevered in painting, and also bestowed much study upon the history and theory of art, the fruits of which he made known in several valuable essays, the principal of which is a comparison between ancient and modern art, published in 1604—De la Comparacion de la Antigüedad con la Modernidad y Escultura. He has also been distinguished for his caricatures of himself during the pontificate of Gregory XIII. by some frescoes in the churches of Araceli, and Trinità de' Monti, and acquired the friendship of Federigo Zuccaro, which, however, some consider to have been a misfortune.

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Dictionary of Spanish Artists, about one hundred pages of fragments from the writings of Céspedes on painting, including the entire poem on painting, which contains 608 lines.

(CONCEJO HISTÓRICO, Rest.)

CÉSAREO DE BONANZA, in the pr# of Scotland, is the name given to a process by which, as by the insolvency system in England, the estate of an insolvent person who does not come within the operation of mercantile bankruptcy is administered. The procedure by which the estate is derived from the deed of secession, or the assignment by which, as the counterpart of the relief afforded to him from the immediate operations of his creditors, the insolvent convey his wholly, without consideration, to the Sheriff, for nomenclature and the early practice of the system are taken from the Roman law. (Dig. tit. 3, 'de cessione bonorum.') According to the more antient law, the person released from prison on a cesio bonorum was bound to wear a tonsured cap, thus called the habit. In the year 56 the stigma became the penalty of fraud, and it was subsequently dispased. Before the passing of the late act, the jurisdiction in the awarding of Cesio was entirely confined to the Court of Session, and the insolvent was required to be a month in prison before he could see out the process. By 6 & 7 Will. IV. c. 56, the system was remodelled. The process may now be sued out either in the Court of Session or in the sheriff's local court. It may be used against any person under any prison for civil debt, or against whom such a writ of imprisonment has issued. It proceeds on notice to the creditors, and an examination and surrender of the insolvent. Proceedings instituted in the sheriff's court must be reviewed in the Court of Session. A Cesio bonorum exhibits, like the insolvency system in England, this important difference from mercantile bankruptcy, that the person who obtains the privilege is not discharged from his debts, but only from proceedings against him for payment of past debts, his estate continuing to be liable to the operations of his creditors. In Scotland, however, the common law means of attaching a debtor's property are simple and effectual, and there does not appear to have been there the same inducement as in England to make the process for the distribution of the debtor's effects an instrument of their discovery. The Scottish system, moreover, cannot be used by the creditors as a means of compelling their debtor to distribute his estate. It is a privilege of the debtor, and being seldom resorted to except by persons in a state of destitution who are harassed by vindictive creditors, the improvement of the system has not been of a matter of much interest either among lawyers or legislators. [BANKRUPT LAWS OF SCOTLAND, P. C.; BANKRUPT, P.C.S.]

CÉSAR DE CASTRO, or CESTRÍN, a natural order of plants belonging to the class of monocotyledonous. It is nearly related to Solanaceae, and forms a tribe of that order in Don Quixote. They are mostly allied with the family of Solanum, a genus of corolla plicate, valvate or induplicate in maturation; calyx 5-toothed; corolla funnel-shaped, 5-lobed regular; tube elongated, limb usually spreading; stamens 5; anthers dehiscing lengthwise; ovary seated on a cupulike disk; peri- carp one-celled; placentae of the discise; ovule with a micropyle nearly straight with a cylindrical radicle, and roundish leafy cotyleidos. It embraces the genera Cestrum, Dunalia, Meyenia, Datura, Vestia, Leaea, Fiabilia, Laureria, La- ma. In the second edition of the 'Natural System' Dr. Lindley recognises the order Cestreae, and adds, 'I do not attempt to characterise this assemblage of plants, being uncertain what its real peculiarity is. According to Schlechtendah, it has affinity of some sort with the Solanum, except in its mode of being out of any stones.' Dr. Henderson (Four in Iceland) says that a porridge made of these lichen-flour is to a foreigner not only the most wholesome, but the most palatable, of all the articles of Icelandic diet. It is submitted to no other preparation than repeated steepings in cold water, and emits a perfume resembling that of bread made into cakes or boiled in milk. Unless it be steeped it is both offensive and bitter, and also to many persons picturesque, hence it has been called lichen catharticus. (Berries. Journeys to Shores of Polar Sea, 4to, p. 413, 414.)

The excellence of Iceland moss depends upon its usefulness and freshness. Its chef-d'œuvre is the accidental impregnation of the several parts; it should be carefully removed before it is used. In its natural state, it is still containing the bitter principle, it is tonic, stomachic, febrifuge, demulcent, and nutritious. It has acquired a high re-
potation, not merely as an article of diet, but as a medicinal agent in consumption. To obtain benefit from it, the use of it must be persisted in for a long time. This constitutes at once a difficulty in the employment of it, and casts a doubt on the chance of its success, when it is administered without regular serviceable. The unpleasantness of the bitter it contains renders it unpalatable to most persons, and also its heating qualities unfit it for those who have either much general fever, or a state of sub-acute inflammation of the stomach, a very frequent circumstance. But there is every reason for suspecting that in the instances where it has been used for a long time and proved beneficial, the disease was chronic bronchitis, in which bitters and de-mulcents are commonly employed. To dispel the disagreeable flavour many expediency have been had recourse to, such as uniting it with chocolate or cocoa, and flavouring it with orange-flower water, &c. (A full account of these may be found in England's Journal, August, 1894, p. 196, from the pen of Dr. Croll. Many formulas may be found in Geiger, Pharmacopoeia Universalis.) The only form official in Britain is the decoction, which is frequently made the vehicle of medicinal agents. Cetrarin has been given in a separate form as a succedaneum for cinchona bark, and, like many other very bitter articles, is of considerable efficacy in agues.

Many substitutes for Iceland moss have been proposed; one of the best of these is the Carrageen or Irish moss (Fucus edulis), which is caught under the surface of the sea or on the bottom of the sea. This can be procured not only from Ceylon, but abundantly from the east coast of Bengal. In the form of jelly, soup, lozenges, or other mode of preparation, it only agree better, but is more relished than any jelly, either animal or vegetable. It is to be hoped that it will become a regular article of commerce.

CHEROPELYUM, a genus of plants belonging to the natural order Umbelliferae, to the sub-order Campylaspermea, and the tribe Scandiceae. It has an oblong calyx, obcordate petals with an infixed point, a fruit not beaked; carpels with a flat style, and a single ovule. The species are annual, biennial, or perennial plants with decumbent leaves. Many plants formerly placed in this genus are now referred to Anthriscus. The Cheropehylum sympyllum is found in Egypt, where it has been used in medicine as a substitute for hemlock. The Cheropehylum sativum of Lamarck is the Anthriscus Cerefolium of Hoffman. It is the garden chervil of Great Britain, and is used in salads as a pot-herb. Three species of Cheropehylum are described by Babington in his recent 'Manual of British Botany.' C. tenuifolium has a rough stem swelling beneath the joints, the leaves hinnate, the leaflets ovate, oblong, pinnatifid, with obtuse mucronate segments, glabrous petals, styles equaling the stamens. It is a common plant on hedge-banks in Great Britain, attaining a height of three or four feet. C. aequale and C. aromaticum have been described as natives of Scotland, but it is very doubtful as to whether they have not both been introduced.

(Babington, Manual of British Botany; Lindley, Flora Medica.)

CHAIN RULE. This is the name given to a rule of arithmetic by which when a succession of equivalents is given, and one of the number is to be found, it is assumed that the next, a relation of equivalence is established between numbers of the first and last kind mentioned. Thus if 3 horses are worth 7 cows, and 10 cows are worth 39 sheep, and 2 sheep are worth 53 greeces, then 2 horses are worth 11 sheep, or how many horses are worth 1000 greeces. Such questions, and the mode still adopted of solving them, are found in the Hindu Lilivati (P. C.), and in the earliest European books on the same subject. In such cases of equivalents, each link of which is joined to the preceding and following one by the same names, and the first name of the first link is the same as the second name of the last; whence the name chain-rule. The process applies with great practical use to questions in the arithmetical of exchanges.

The process is nothing but that of composition of ratios; but it may be more easily exhibited thus:—Let it be that 3 horses are worth 7 cows; 10 cows, 39 sheep; 2 sheep, 53 greeces. How many greeces, 11 horses?

From the first, we find that 10 horses are worth 70 cows, which from the second, are worth 70 × 39 sheep; hence 2 × 10 horses are worth 2 × 7 × 39 sheep or 53 × 7 × 39 greeces. Hence 2 × 10 × 11 horses are worth 2 × 10 × 11 × 53 × 7 × 39 greeces. But by reducing the following rule is established:—divide the product of the numbers in the columns which has no vacancy by the product of the numbers in the column which has a vacancy for the unknown quantity, and the quotient is the number with which the vacancy is to be filled up.

It is obvious that any multiplier which exists in both columns may be struck out before commencing the process: this is the peculiar advantage of the rule, namely, that it points out at once all the simplifications which can be introduced by division.

The common rule of three, and various other rules, may be employed to solve these kinds of questions. If the case be made to reduce under it every question the answer to which is found by dividing one product by another. This has been done in all times, from that of the Lillivat to the present. For example, if 7 men can reap 3 acres in 10 days, how long would 12 men take to reap 15 acres? It is no doubt by dividing 7 × 19 × 10 by 15 × 3; but if we attempt to put these down in the chain form we have

10 days 7 men 15 acres
19 days 12 men 15 acres
7 men 12 days

Now even if we grant that 10 days are, in the first clause, an equivalent for (being the time of reaping) 3 acres, and that 19 acres are in the second clause an equivalent for (or the work of) 13 men: we must thus make the assumption that 7 men are not to be attacked by worms, or suffer much from seawater. In Saxon, in time of scarcity, it is advantageously added to wheaten flour. In some countries it is employed in brewings.

CHALICOMYS, a genus of rodent Mammalia, allied to the beaver, from Eppelsheim, in tertiary beds."

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CHAVER. The eminent painter of shipping was the son of a poor seaman of Whitby in Yorkshire, where he was born towards the close of the last century. After he had attended for a short time the free-school of his native town, he was, at the age of ten years, to sea in a small trading sloop, in which he served as cabin-boy for two years. He was afterwards bound apprentice to the master of a brig which traded in the Mediterranean and the Baltic seas. During this apprenticeship he gave evidence of that talent for which he was subsequently distinguished, by making sketches of various descriptions of shipping, for the amusement and gratification of the seamen. His master, Mr. Star, appears to have been induced by these efforts to cancel his indentures, when Mr. Chaver was engaged to paint a ship for Whitby in another vessel, with the determination of becoming a painter of ships. At Whitby he knew no better way of making himself acquainted with colours than by apprenticing himself to an old woman who kept a painter's shop. But at the time of passing through the business of a house-painter, he took lessons from an obscure drawing-master of Whitby, of the name of Bird, and applied what time he had to spare in painting small pictures of ships, which he found, if not of sellable, at least of ready market. He carried on this life for three years, when, being anxious to visit London, he again entered the seafaring life, and worked his way as a foremast-man in a shipping vessel, to more reliable and less perilous employment. In London, though very poor, he refused an offer of employment as a journeyman house-painter at thirty shillings per week, being bent upon painting shipping; and he shortly after

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The introduction to Mr. Horner, that gentleman employed him for seven years on the great panorama of London at the Colosseum. At the completion of this work he was engaged as scene-painter at the Theatre Royal Drury Lane, and during the summer of 1809, some of his works attracted the notice of Vice-Admiral Lord Mark Kerr, who became Chamber's sincere patron, and procured him an introduction to King William IV. and Queen Adelaide, who appointed him their marine painter. He returned at the close of the season, with his wife and family, a well-known and popular artist. The following account of his interview with the sailor-king and his queen is given in a memoir of Chambers which was published at Whitby. He was first united to Mary Taylor, the daughter of a private seaman, who eased his mind by telling him that no ceremonial formalities would be required of him, and then introduced him to their majesties. They looked over his sketches for a choice of subjects: the king chose a stormy scene, which the queen rejected as too dismal, when the sailor-king observed, "Oh ma'am, we sailors like those boisterous scenes the best—eh! Mr. Chambers?" The king chose a sea-fight, and the queen chose a calm coast scene near Dover. Chambers painted also a view of Greenwich Hospital for the queen, and the Opening of New London Bridge for the king.

He was now reaping the fruits of his persevering industry; he had acquired a considerable reputation at the Penitent Theatre, and he was in a fair way of establishing fame and fortune together; but a constitution originally very weak, and much shattered by a scarifying life, was unable to bear the incessant application his ambitious mind subjected it to. He was disabled by disease and trying cares, indigence, obscurity, and slavery, to honour and affluence—his remaining strength gave way, and he gradually fell into a disease which proved fatal to him: he died of aneurism of the aorta, in October, 1840, leaving a wife and three children.

Chambers' pictures are now beginning to be valued by collectors, though few appreciated them during his life time. He was a member of the Society of Painters in Water-Colours, in which style he drew with great elegance and truth, but his productions have been chiefly in oils, in which he was excellent, especially in the construction and rigging of his ships, though in his colouring there is an unnatural redness of effect pervading everything, the smoke in particular. There are in the hall of Greenwich Hospital three battles by Chambers: The Bombardment of Algiers by the squadron led by Viscount Exmouth, G.C.B., in 1816, presented in 1830 by the admiral's friends; Portobello taken by Admiral Vernon and Commodore Broke on the 23rd of March, 1739, drawn by H. Lockyer, Esq., commissioner; and a copy of West's picture of the destruction of the French fleet in the port of La Hogue by Vice-Admiral Sir George Rooke, Kt., in 1802.

JOHN B. DUMBER, 1840; Catalogue of the Naval Gallery of Greenwich Hospital.)

CHAMISSO, ADELBERT VON, a distinguished poet, naturalist, and traveller, was born on the 27th of January, 1781, in the château of Boncourt in Champagne. He belonged to a very ancient and noble family of Lorraine. Until the outbreak of the French revolution the family lived quietly on their estate, and Adelbert's brother Charles was one of the pages of Louis XVI., to whom he remained faithful to the last, and for whom he risked his life on several occasions. In 1790 the château of Boncourt was rased to the ground, whereupon the family of the Chamissoes quitted France; and after having wandered about in the Netherlands and the south of Germany, they ultimately went to Berlin, in 1796, where, together with other French exiles, he took up his residence. As they had lost all their property, the whole family lived upon the little income which two of the sons made by painting miniature portraits. Adelbert however was extremely fortunate in the favor and protection of Prince Frederick Wilhelm, who was the head of his family, and took great care of his education, which he received in one of the gymnasia of Berlin. He made himself thoroughly acquainted with the German language and literature, and the splendid works, all his own literary productions shows that he became so conversant in the language of the German mind, which are most foreign to the French, were in him most prominent. In 1798 he entered the Prussian army, and his parents accepting the offer of Napoleon, then First Consul, returned to France. Shortly after this he began writing poetry in German, and from 1804 to 1806 he edited a "Muen-Almanach," conjointly with Varnhagen von Ense. After the peace of Tilsit Chamisso quitted the Prussian service, and in 1810 he returned to France, where his family had recovered a great part of their property. For a short time he was teacher in a school at Napoleonville; but his personal independence and his independence of spirit, led him to quit this situation for one which he took back to that country. He now devoted himself almost entirely to the study of the natural sciences. In 1813 he wrote for the amusement of the children of a friend a little book called 'Peter Schlemihl,' containing the story of a man who lost his shadow. This work, which has been translated into English and most other European languages, was first published in Germany by Chamisso's friend de la Motte Fouqué (1814), which has led some persons to think that the author himself did not publish it. This work is accompanied by some lyric poems and ballads was published by the author himself in 1827. In 1814 Count Rumjanzow, chancellor of the Russian empire, prepared an exploring expedition round the world at his own expense. He invited Chamisso to accompany the expedition as naturalist, and the invitation was gladly accepted. In 1816 Chamisso embarked at Cronstadt under Captain Kotzebue; and returned thither in 1818. One of the main objects of the expedition had been the discovery of a north-east passage, in which the expedition failed; but in all other respects the discoveries were highly satisfactory. As account of the voyage was published by Kotzebue in two volumes, and Chamisso himself published 'Bemerkungen und Beschreibungen' (1821), containing the results of the journey. In 1831, 4vo., which forms an indispensable supplement to Kotzebue's book, and contains a most faithful account of everything that came within the range of his personal observation. After his return from this voyage Chamisso again took up his residence at Berlin, and entered on his work of putting in order his degree of doctor in philosophy; he became a member of the Royal Academy of Sciences, and soon after he received the appointment of inspector of the botanical gardens of the same city. While in this situation he wrote a book on a medical work, 'Uebersicht der in Norddeutschland vorkommenden nützlichen und schädlichen Gewächse, nebst Ansichten über das Pflanzenreich und Pflanzkunde,' Berlin, 1827. These subjects however did not estrange him from the cultivation of poetry; for during the last two years of his residence in Germany, he wrote about 200 small poems, many of which, especially his popular legends and ballads, belong to the best productions of the kind in German literature. He died on the 21st of August, 1838, at Berlin. His poems were collected, and published separately, Leipzig, 1831, in 1 vol. 8vo, and a second edition appeared in 1844. A collection of all his works, both in prose and verse, was published at Leipzig in 4 vols. 8vo, 1838, and a second edition in 1842 in 6 vols. 12mo, the two last of which was published after Chamisso's life and correspondence edited by J. E. Hitzig.


CHANNING, WILLIAM ELLERY, D.D., was the son of an eminent merchant of Newport, Rhode Island, of the United States; and the descendant of a professor of divinity, the Rev. Benjamin Ellis. From the time he was able to read every morning a chapter or two of the Greek New Testament till he was upwards of ninety; and his mental powers in general remained vigorous almost to the last—a circumstance which the multiplicity of his labours probably contributed to his extreme perseverance in regularly exercising them. Channing was born at Newport in 1780 or 1781. He was educated at Harvard College, and his first views are said to have been directed to the medical profession; but he was eventually induced by the example of his brother, the Rev. Dr. J. C. Ellis, to enter the ministry in the Unitarian communion, which however was scarcely as yet distinguished in the United States by that name, and at any rate was not separated in respect of doctrine from what is commonly called orthodox Christianity by so clear a line as now. Soon after taking his degree, probably
about the end of the century, he went to Virginia, and spent some time there as a teacher. But in 1808 he was appointed to the office in which he remained for the rest of his life, that of pastor of the Federal Street congregation in Boston. At this time he was considered to lean to what are called evangelical views of religion, and he is said to have used other persuasions used occasionally to preach from his pulpit. His own preaching early drew attention by its superior polish and eloquence; but, not, it would appear, to any remarkable degree till he had officiated for some years, when his theology assumed a more decided character, and his congregation, increasing considerably increased, built him a larger church, and gave him a colleague, the Rev. Mr. Gannett. What first brought him into general notice in his own country were several of his writings published in 1829 and 1830. These were followed by a number of papers in the 'Christian Disciple,' the 'Christian Examiner,' and perhaps other Boston reviews or magazines. In England however Dr. Channing's name was not much heard of till after the appearance of his Remarks on the Character and Writings of John Milton, originally published in the form of a review of the 'Treatise of Christian Doctrine' in the Christian Examiner for 1826. In the same publication for 1829 appeared his Remarks on the Character and Writings of John Milton, in the form of a review of the 'Treatise of Christian Doctrine' in the Christian Examiner for 1826.

In 1830 a collection of Channing's writings was published in a royal 8vo. volume at Boston, and in England in 1832. The most complete we believe is that published at Glasgow, in 6 vols. 8vo., of which the first five were printed at Edinburgh by John Homer by way of presentation to the Dr. Channing himself, and the sixth in 1844 under the authority of his son Mr. W. F. Channing. The subjects principally treated of, besides those already mentioned, are war, temperance, public education, the church, and especially the history and character of negro slavery, of which measure Channing was one of the warmest advocates, though he belonged, we are told, to no anti-slavery society, and even doubted the wisdom of these associations. His death took place at Birmingham, April 1842.

Channing is one of the most striking writers America has produced; and his works, besides their attractions of style, are all animated by a pure and lofty moral spirit. His eloquence however, though often imposing, has not much nature or real fire; its splendour is mostly verbal; the thoughts are true and just, rather than new or profound; it is excelling on a first perusal, but will hardly bear a second. Nothing that he has written therefore has much chance of retaining its reputation. This is the case in particular with his morbid and highly suggestive descriptions of negro slavery, of which measure Channing was an advocate. He was one of the warmest advocates of negro slavery, of which measure Channing was one of the warmest advocates, though he belonged, we are told, to no anti-slavery society, and even doubted the wisdom of these associations. His death took place at Birmingham, April 1842.

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Chapman, George, the earliest English translator of Homer, and known also as a prolific writer of drams, was born in the year 1559. His birth-place is uncertain. Some have supposed him to have been a native of Hartfordshire. In which county, at Hitching-hill, he is known to have for some time resided. Wood believes him to have been of a Kentish family. The same writer asserts that he studied at Oxford, and that, although eminent in classics, he neglected philosophy, a fact which has been referred to as accounting for his want of an academical degree. Coming to London, he entered the ranks of the professional authors, and became an esteemed member of the company of the Drury Lane Theatre, where he lived with Daniel, and with Shakspere, who was six or seven years his junior. He was patronized by Sir Thomas Walsingham and his son, by Henry Prince of Wales, and by Somerset the Earl of Worcester. The Duke of York, in his grant of the seals of Great Britain during the executing and completing of such works; it being his express direction that no work of art shall be purchased unless it shall have been executed within the shores of Great Britain: and further, that in making such purchases, the works of the highest merit shall be chosen, solely with regard to their intrinsic merit, and a liberal price be paid, wholly at the discretion of the president and council of the Royal Academy. The president and council however will not be obliged to lay out annually the whole or any part of the annual sum at their disposal, which may be allowed to accumulate for not more than five years. All purchases must be bona fide purchases of finished works. The will expressly provides for an anonymous purchase, and for the rejection of any purchase, whatever, to any extent as was Chapman's expectation that such building would be provided by the nation free of all charge upon his estate. In case of the complete dissolution of the Royal Academy, the trustees of the estate are empowered to sell all the paintings, and to carry out the same object. The property devoted by Sir Francis Chapman to this purpose is his residuary personal estate, over and above the property bequeathed to his wife, and all legacies; but he expresses a wish that at the decease of his wife all the property bequeathed to her should be by her devoted to the same purpose. Lady Chapman however, so long as she remains a widow, has a life-interest in this residuary personal estate: its amount is not publicly said to be as large as one of his friends supposed it to be. It is vested in five trustees, including the president and treasurer of the Royal Academy, Chapman left to his friend and principal assistant Allan Cunningham 200l., and, in a codicil, 100l. to his executors, and a codicil directed to his coparson. He left also to his frequent literary host, Richard Hurd, 100l. provided in both cases that they continued in their offices as assistants, until the completion of his unfinished works, or such as it was necessary to finish. Allan Cunningham however did not survive Chapman an entire year. Chapman died on the 23d of November, 1641; Cunningham died on the 6th of November, 1642. Chapman and Cunningham were great friends, and when Chapman was building his mausoleum, he said to the poet that he would make it large enough to contain him also: 'No,' said Allan Cunningham, 'I should not like, even when I am dead, to be so shut up. I would far rather rest where the daisies will grow over my head."

Chapman was buried in a vault constructed by himself in the church that contains the place of his birth, and he bequeathed 200l. per annum to the clergyman of the place, so long as his tomb shall last, to instruct ten poor boys, and to pay annually 10l. to five poor men, and to five poor widows or orphans, and to five poor children who were educated by the charity of the town. And the clerk of the parish of Norton; the residue to be reserved by the clergymen for his own use in consideration of his trouble.


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(Art-Union Journal, 1943; Catalogues of the Exhibitions of the Royal Academy; Waagen, "Künstler und Kunstsammler," 5th edition, 1860.)
Among the many speculations as to the authorship of the drama called 'The Two Noble Kinsmen,' in which Shakspere has been asserted to have assisted Fletcher, Mr. Knight, in his editions of the great poet's works, has conjectured that the parts attributed to him may really have been composed by himself.

Chapman's dramas, although works of much significance in the history of our old literature, are not the most valuable of his works. They are among the many productions of his time which were written by men tempted, through the failure of the day, into a walk of composition for which they were but indifferently qualified. In comedy, which had been formed into a native school more completely than tragedy, Chapman adapts himself readily, and without success, to the nature of the piece, whatever be the capacity of the author, while he gives to the tone of his works not unfrequently an elevation of thought and a fulness of descriptive imagery which make some amends for the pervading stiffness of his portraiture of character and the formal and artificial turn of his incidents. In his tragic dramas he is, in point of plan and form, a semi-classic. He attempts at once to gratify the taste of his age and nation for the direct and vivid representation of dramatic horrors, and to maintain that tone of narrative declamation and of didactic reflection which Seneca had taught him, and to which his cast of mind made him naturally prone. The latter part of his 'Byron' is, as we venture to think, the best of his tragedies, and might better have deserved the success of Futurity and Amodel as an original drama.

But Chapman's memory is best preserved, and his reputation as a poetical imagination and thinker most fully vindicated, by his free translations from the Greek, and especially by his spirited and vigorous version of the Iliad. The late republicans have done it justice, and the judicious assembly of a second edition of a portion of them is a patriotic tribute to the improved taste of our time in poetical literature. His Iliad, like his plays, is deformed by many faults. It is as unequal as careless. Indeed, he himself, on completing the work, recommended the first book entirely, and altered very much the other eleven that had previously been published. But his patience was not sufficient, either for correcting adequately what he had already written, or for carrying him carefully through the remainder of his task; the last twelve books of the Iliad are in several places at least a week's work apiece. And again, indolence and strong imagination concurred in tempting him to desert, in many places, the sense of his author, and to paint elaborately pictures for which Homer hardly gave him even the sketch. Yet for vigour of fancy, for a loose kind of faithfulness to the spirit of the original, for constant strength and frequent felicity of diction, the work is one of the finest poems which our language possesses. When Pope, who carefully read it, described it as 'a work of less work which Homer might have written before arriving at years of discretion,' his fastidious taste led him to do the old poet less justice than that which had been rendered by Waller, who confessed that he could never read Chapman's Iliad without a degree of rupture.

CHARISTUS, AURELIUS ARCADIUS, a Roman jurist, who is supposed to have lived about the time of Constantine the Great. It is certain that he lived at least after Martinus, whom he quotes, and Modestus lived under the Emperor Alexander Severus (A.D. 222-235). Charistus was Magister Libellorum Supplicium, a keeper of petitions, as we learn from the title of an excerpt from his own writings. (Dig. 1, tit. 11.) He wrote a work, in one book, De Testibus: a work which Homer might have written before arriving at years of discretion, his fastidious taste led him to do the old poet less justice than that which had been rendered by Waller, who confessed that he could never read Chapman's Iliad without a degree of rupture.

His writings contain some words that are perhaps not used by the moderns. Among them is the word 'Dicaostylus,' which is mentioned in a work of Pliny the Younger, and in another work of Pliny's, a work in one book, 'De Muneribus Civilius' (Index Florentius).

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attempts to subject the temporal authority of kings to the papal power, a principle always reproached by the Gallican Church. In 1827 a law was passed against the slave-trade, which contained, against those engaged in it, the penalties of banishment, fines, and confiscation. In the same session a bill was presented to the Chamber by the marquis of Caraman, by which no pamphlet of less than 21 sheets could be sold until five days after the prescribed copies had been deposited before the proper authorities. Editors of periodical papers were declared to be agents of the ministries of all the penal laws and give security to a heavy amount. Under the third head of the bill, severe penalties were inflicted for offences of the press against the person of the king, the royal dignity, the religion of the state, and other communications acknowledged by the court as unbecoming, which the courts of justice, &c. After a warm debate, ministers thought proper to withdraw their bill. This created a lively sensation in Paris. Soon after, at a grand review of the national guards, Charles X. was saluted by cries from the ranks, of 'Down with the Ministers!' The king looking on some of the most clamorous, told them firmly, 'I am come here to receive homage, and not lessons.' He then disbanded the national guards. In June of that year the previous censorship of journals and other periodicals was re-established by an ordinance. In November the king dissolved the House of Deputies, and directed new elections to be proceeded with. He then took off again the censorship of the press. The other Houses of Parliament created several new peers. In January, 1828, a new ministry was formed. M. Villele, Peyronnet, Corbière, &c. gave in their resignations, and were succeeded by Viscount Martignac, and Corbière, followed by Portalis. This change was considered as a sort of concession to liberal principles. A commission was appointed, at the suggestion of the new ministry, to frame a project of municipal administration for all France. Another commission was formed to inquire into the discipline and method of education which prevailed in the 'petits Sémillants,' or colleges for clerical students, which were said to have fallen under the direction of disguised Jesuits, as the Society of the Jesuits was not authorised by the law of 1827. For years past fear of the Jesuits had become a favourite topic of declamation for the organs of the opposition. The political importance of the Jesuits was ludicrously exaggerated; many people, who really knew nothing about the Jesuits, fancied these mysterious beings to be lurking everywhere—about the court, in every college, in every department of the state: 'Down with the Jesuits was the rallying cry of the day, as 'Down with the aristocrats' in the first Revolution. That at the opening session of 1828 was conciliatory. A law was passed in the Chambers concerning newspapers and other periodicals, fixing the amount of security to be given by the proprietors, and enacting other regulations for the police of the press. The commission on the Jesuits was to have the power of making propositions, and seven or eight of those establishments were actually under the direction of members of the Society of Jesus, the king issued an ordinance placing the establishments thus specified under the jurisdiction of the University, and ordering that in the future no director or teacher should be admitted in any clerical seminary, unless he declared in writing that he did not belong to any of the religious congregations not legally suppressed. In 1829 an elaborate project of a new municipal law was laid before the Chambers by the Martignac ministry. Under Napoleon the communal or municipal councils were no longer elective; the emperor and the prefects appointed to all municipal offices took the financial administration. The law of 1827 regulated at Paris. It was a system of despotism extending to the smallest details. The ministers of Charles X. proposed to apply the elective system with a property qualification, and the formation of the council of counsels, and restored to them the administration of their local interests, their decisions however being subject to the sanction of the prefect. This was no small boon in favour of municipal liberty, but party spirit rejected it. The so-called liberals thought that it did not go far enough, the exclusive royalists that it went too far, and between the bill was strangled, and ministers withdrew it. This was a fatal blow to the Martignac administration; it alienated the mind of the king, and he was ready to accept upon the ministry of the royalists. This new ministry was appointed in August, 1829, after the Chambers had been prorogued. It consisted of Prince Polignac, M.M. Mombrel, Habert, La Bouillane, Gueron Rainville, and others. As soon as the new appointments were known, a loud outcry was set up by the newspapers, who seemed determined that the king should dismiss the obnoxious ministers. A great association was formed to pay the taxes. Protestors were instituted by the king's attorneys against the more violent journals, but in several instances the courts acquitted the accused. Meantime the country was thriving, the new system of administration. The Chambers, by a majority of forty, told the king plainly that his ministers had not the confidence of the representatives of the nation. The deputies who voted this address were 221 in number. The king, on receiving the address, said that he had a right to expect the support of both the Chambers, in order to fall all the good which he intended, but that his heart was grieved to find that the deputies of the departments declared that, on their part, this support did not exist. His resolutions lessened, as had been expected, the gravity of the situation and of his intentions. The next day, the 19th of March, the Chamber was prorogued to the 1st of September, and some time after a dissolution was proclaimed, and new elections were made under the direction of the ministry of Normandy and other provinces, and the sufferers were mostly small farmers and cottagers. Among those who were seized as guilty of incendiaryism, the majority were women. Suspicions and mutual accusations were bandied about from one political party to another concerning these fires, but the clue was obtained as to the real instigators. The new elections increased the opposition majority to nearly two-thirds of the number of deputies. Meantime news arrived of the passage of the first act of the Chambers, the act of the state, and for the repression of any attempt against the dignity of the crown. An ably written report was drawn up by the ministers and laid before the king, to serve as a model for an address. A great difference was made in the form of the print against the newspapers, which kept the public mind in a feverish state, without any plausible cause, and prejudiced it against the king's servants, not for anything they had done, but for what it intimated that they might do. Some of the very many ordinances contrived by his ministers. The first ordinance suspended the liberty of the periodical press. No journal or periodical was to be allowed to appear without the royal permission. No pamphlet of less than thirty sheets was to be published without the permission of the secretary of state for the Home department, or of the local prefect. Ordinance 2 dissolved the newly elected House of Deputies, which had not yet convened. Ordinance 3 after a few weeks, reduced the number of the deputies from 430 to 224, and placed the new elections under the direct influence of the prefects. This last ordinance was decidedly an infraction of the constitution or Charter, for the king had no right to the legislative power. The king of the two royalists. That part of the editors of newspapers signed an energetic protest against the ordinances, and continued to publish as before, and the tribunal of first instance, and the tribunal of commerce, authorised the editors of newspapers to publish, and even the deputies, denouncing the ordinances as illegal, and proclaiming popular insurrection as a duty. Several master manufacturers turned out their men, and shut up their factories; and a mass of people took up arms. Meantime Charles X. dismissed Marshal Marmont from the command of the garrison of the capital, which consisted of about 10,000 men, one-half of whom could not be depended upon. On the 27th of July the first encounters took place between the troops and the people. The ordinance declared Paris to be in a state of siege, or in other words, under martial law. The fighting in the streets became
more general. Many of the national guards joined the people, who hoisted the tri-coloured flag, in opposition to the white flag of the Bourbon. The Hôtel de Ville was taken and retired. On the 29th the people attacked the Louvre and the Tuileries, the regents of the House of Orléans, and the Maréchal and Marmont with the guards evacuated Paris. On the 30th a number of deputies and peers proclaimed the Duke of Orléans lieutenant-general of the kingdom, and Charles X. confirmed his nomination on the 1st of August. On the 2nd of August the Sunday crowds assembled at the Duke of Bordeaux, and set out for Cherbourg. The Chambers however would not recognise the claims of the Duke of Bordeaux, and elected the Duke of Orleans. From Cherbourg Charles X. removed to Evreux, and line abandoned their residence at Holywood House. He afterwards retired to Prague in Bohemia, where the Emperor of Austria gave him the use of the royal palace. In the autumn of 1830 he removed to Goria in Styria, for the sake of a milder climate. He there resided the 'château' or mansion of Gräfenberg, but, soon after his arrival, he fell ill of the choler, and died on the 6th of October, 1836. He died resigned and at peace with all the world. His body was embalmed and buried in the vaults of the Franciscan Convent of Gorița. His son, the Duke of Anjou, as well as his grandson, the Duke of Bordeaux, had attended him in his last moments, did not assume the royal title, but went by the name of Count de Marnes. His son Abdol Kérim, died at Bordeaux, June 9th, 1849. [Facsimile, p. V., p. C.]. The Duke of Bordeaux was the only remaining male representative of the elder branch of the Bourbons.

(Ceuvre, Histoire de la Restauration; Lettr. Anonnaire Historique, etc., Montbéli, Dernier Époque de (Histoire de Charles X.).

CHARLES XIV. of Sweden, CARL X. JOHAN (JULY BAPTISTE JULES BERNADOTTE), born at Pau in the Allier, in January 1764, was the second son of a lawyer of that town. He was educated in his paternal home, till the age of seventeen, when one day he left it abruptly and enlisted as a volunteer in the regiment royal marine, in 1780. His first service was in the island of Corsica, where he distinguished himself, and was made colonel of the regiment he gradually through his own good conduct to the rank of major. He was doing garrison duty at Marseille in 1790, when the revolution began. Bernadotte had the good fortune to have his colonel, the Marquis d'Ambré, from the popular fury which was then excited against the nobles. Bernadotte was next promoted to the regiment of Anjou, and as the royalist officers emigrated in crowds, promotion became rapid for those who remained under their colours. Bernadotte was soon promoted to the rank of major general, and after the war in Austria and Prussia, he was sent to the army of the Rhine under General Custine, where he distinguished himself, was made chief of brigade, and afterwards became general of divi- sions in the army of Sambre and Meuse, under Kleber and Jourdan. He was at the Battle of Fleurus, 1794, in America, at Valenciennes, 1795-96, against the Austrian Generals Clairfait, Kray, and the Archduke Charles. At the beginning of 1797, he was ordered by the Directory to march with 50,000 men from the Rhine to Italy, to reinforce General Bonaparte. Bernadotte, after his first interview with Bonaparte, told some friends who were anxious to hear what he thought of the far-famed General of the Army of Italy: 'I have seen a young man of thirtyseven and twenty, who assumes the tone of a man of fifty; but he has no genius, no taste, no order, no discipline. There might be mutual regard, but there was no sympathy between the two men. Bernadotte commanded the advanced guard in the campaign of 1797, and distinguished himself at the battle of Marengo. He afterwards commanded the army against Austria and before the French Directory, Bernadotte was recalled from the war ministry; and he was living unemployed at Paris when Bonaparte arrived from Egypt. Bernadotte tried to cajole him into an acquiescence with his views previous to the revolution of Brumaire. Bernadotte however firmly refused to join him in upsetting the constitution of the republic, and would have opposed him by force, had the Directory so ordered him. A military man, he remained strictly within the line of military duty; and having been appointed by the Directory to the rank of major general, and after the war in Austria and Prussia, he was sent to the army of the Rhine under General Custine, where he distinguished himself, was made chief of brigade, and afterwards became general of divisions in the army of Sambre and Meuse, under Kleber and Jourdan. He was at the Battle of Fleurus, 1794, in America, at Valenciennes, 1795-96, against the Austrian Generals Clairfait, Kray, and the Archduke Charles. At the beginning of 1797, he was ordered by the Directory to march with 50,000 men from the Rhine to Italy, to reinforce General Bonaparte. Bernadotte, after his first interview with Bonaparte, told some friends who were anxious to hear what he thought of the far-famed General of the Army of Italy: 'I have seen a young man of thirty-seven and twenty, who assumes the tone of a man of fifty, but he has no genius, no taste, no order, no discipline. There might be mutual regard, but there was no sympathy between the two men.

Bernadotte commanded the advanced guard in the campaign of 1797, and distinguished himself at the battle of Marengo. He afterwards commanded the army against Austria and while in France, he was appointed to the command of the army of the West, for the purpose of pacifying La Vendée and the other disturbed districts. After Napoleon's assumption of the empire, he made Bernadotte Marshal of France, and sent him to Italy, which was stationed in Hanover. He there put a stop to the irregularities and arbitrary acts which had taken place in consequence of the military occupation, and contrived to provide for the wants of his soldiers without disgracing the inhabitants. This was the beginning of the good reputation which he acquired in North Germany, and which afterwards contributed materially to raise him to the throne of Sweden. In 1805 Marshal Bernadotte left Hanover with his troops to join Napoleon's army against Austria. He was present at the battle of Austerlitz, where he broke through the centre of the Russians. In June, 1806, Napoleon created Bernadotte Prince of Pontecorvo, which he designated as 'an immediate heir of the imperial throne. In the war against Prussia of 1806, Napoleon supported the first corps. He had some altercation with Davoust about precedence, on the eve of the battle of Jena; afterwards defeated the Prussians at Halle, and pursued Blücher as far as Lübeck, where he fought at Lipsk in 1807. He was wounded in the battle of Lübeck, and was wounded just before the battle of Friedland. After the peace of Tilsit, Napoleon appointed him Command-er-in-Chief in North Germany, from Embledon to Lübeck, with orders to take possession of the whole country. He included the English coast, entirely along that line, and to induce Denmark to make common cause with France. The English expedition against Copenhagen deserted, in part, Bernadotte's calculations. In March, 1808, Napoleon ordered Bernadotte to march into Denmark, and to be in concert with the Danes, by passing over the ice. But the Danes were slow, the thaw came, the English cruisers appeared again
in the Sound, and Bernadotte remained in Denmark. Part of the troops under him consisted of two Spanish divisions, one of which, under the Marquis of Fuentes, was stationed in the island of Finsheend. The marquis, having learned the invasion of Spain by the French, embarked his men on board the English fleet, and Bernadotte had just time to prevent the other division from following their example. In April, 1809, Bernadotte was made a general and formed the army, for the purpose of fighting against Austria. He took the command of the ninth corps, chiefly composed of Saxon troops. At the battle of Wagram, 5th of July, whilst opposed to the principal body of the Austrian army under the Duke of Wagram, Bernadotte arrived at the Battle of Hermannstadt, which received another destination. The consequence was that he was obliged to fall back and evacuate the village of Deutsch Wagram. The following morning he expostulated in very strong words with Napoleon, on the order he had given to his reserves: 'What do I mean by reserves? I mean men, and not mere numbers of men. He did so, but Napoleon soon after took away his command from him, and replaced him by Marshal Bessieres. He was, or pretended to be, offended at some sentence of a proclamation which Bernadotte had addressed to his men, and after which the marshal was not satisfied that the war sent him back to the army at Vienna. There he had again a warm explanation with Napoleon, who reproached him with having granted an armistice to the Swedes. 'Why?' replied Bernadotte. Bernadotte hesitated and the Poles are the only two nations in Europe that retain still some affection for your majesty. What sentiment do the French feel for me, then?' asked Napoleon with bitterness. 'That of admiration, Sire, due to your astonishing success.' Napoleon seemed pleased. When he set out for Austria, he left Bernadotte in command at Vienna, till the ratification of the treaty of peace with Austria. At the beginning of 1810 Napoleon offered him the government-general of the Roman States, but Bernadotte hesitated, but at last accepted, and began making his preparations.

Meantime important events had taken place in the North, in which Bernadotte was to act an unexpected part. Gustave IV., King of Sweden, had been obliged to abdicate the crown in March, 1809, on account of his incapacity; and the States of Sweden had declared him and his descendants excluded from ever re-entering the throne. His uncle, the Duke of Sodermanland, assumed the government under the title of Charles XIII., as the preceding childless prince of the royal and heir to the throne, Augustus of Holstein-Augustenburg, brother of the reigning Prince of Augustenburg. But in less than a year Prince Augustus died suddenly, whilst reviewing some troops at Helsberg, 20th of May, 1810, and the crown fell on to another heir, the Prince of the crown of Sweden. Several candidates presented themselves; the brother of the deceased prince, and the King of Denmark, among others; but none of them seemed to suit the circumstances of Sweden. Sweden required a man of firmness, a good administrator, and of tried military abilities. Bernadotte had displayed all these qualifications during his command in North Germany in 1808 and 1809. The people of Hamburg and the other Hanseatic towns spoke highly of his justice and moderation. He had behaved with kind regard towards the Swedish prisoners of war, and had readily granted an armistice on the first application of the Duke of Sodermanland, afterwards Charles XIII., who on the present occasion cast his eyes upon the crown. Bernadotte, on this occasion, landed at Oerobre in August, 1810, Marshal Bernadotte, Prince of Pontecorvo, as Prince of Royal Sweden. 'His majesty,' said the message, 'having consulted the Secret Committee, as well as the assembly, on this important point, has been pleased, with a great majority in the first and a unanimity in the second of these bodies in favour of his proposal. The Prince of Pontecorvo being once entrusted with the future destinies of Sweden, his estimate of military reputation, whilst not the only test of the worth of a prince, will make him avoid useless wars for the mere sake of renown; his mature experience and energy of character will maintain order in the interior; and the love of justice and humanity which he has exhibited in hostile countries are a guarantee of his conduct towards the country which should adopt him; and lastly, the existence of his son will put an end to any further uncertainty concerning the rights of the new sovereign, for the crown is devolved to a prince from this house.' Bernadotte was to be sent to Paris to sound Bernadotte on the subject of his election. Bernadotte asked the Emperor Napoleon, who told him, that if he were elected by the free choice of the Swedish people (the emperor) would consent to his accepting the crown. 'I hope, sire,' said Bernadotte, 'that you will do nothing that may prejudice the result of the elections.' Napoleon, having learned the result of the elections, exclaimed, 'At the last moment, the French and Swedes have made the same mistake.' It was being rumoured before that the French minister at Stockholm supported the claim of the Duke of Holstein, Bernadotte frankly told Napoleon of this, who, however, returned to him, and in the end, he did not at all oppose Bernadotte's election, but rather approved of it. On the 11th of August, 1810, the Diet voted unanimously, and the ministerial acclamations, Jean Baptiste Jules Bernadotte, Prince of Pontecorvo, was exasperated to him to be crowned King of Sweden, Norway and Denmark, and was raised to the throne, on condition of his adopting the communion of Augsburg. Charles XIII., at the same time, formally adopted him as his son. A Swedish envoy carried these documents to Paris, with letters from the King the next elected price and to the Emperor Napoleon, who both answered in the affirmative. Bernadotte however could not leave France without having received letters of emanicipation, referring to the abdication of the King of Sweden, and to the opposition of the latter. After a month, Bernadotte returned to the King of Sweden, and the latter told him, that by a decision of his council of Ministers, the letters of emanicipation should only be delivered to him after he had signed an engagement never to wage war again against France; and that Napoleon, in his next letter, had threatened to decide the question. Bernadotte then went to the King, and in a moment, said, hurriedly, 'Well! go let our destiny be accomplished.' He then reverted to the continental system, and said that Sweden must conform itself to it. Bernadotte observed, that he must have time to examine things as the council of Ministers had been instructed to examine the conference with the Emperor, and that he could not acquaint himself with the treaty. 'How long do you require?' cried out Napoleon. 'Till next May,' said the prince. 'This was at the beginning of October. 'I trust you this delay,' replied Napoleon; 'but then declare yourself, either friend or enemy.' Bernadotte hastened to leave France, but did not think himself safe until he had crossed the Sound. The day of his departure from Paris, Napoleon told Dunois, that he wished that Bernadotte had refused; but that Bernadotte did not like him; that they had never understood another; and that it was now too late.

The Prince Royal was met at Elsinor by several Swedish high dignitaries, and the Archbishop of Upsal among the foremost. At Stockholm a grand meeting of the clergy was held, and instructed in the reformed religion, which was professed by many in his native Born, that he had since conferred on Germany with protestant clergymen on religious subjects. The King declared to the assembled the dangers in which the country was, and the necessity of maintaining the Constitution of the Kingdom. Such was the reception which was presented by the Princes and States of Germany to the Emperor Charles V. On the 20th of October he landed at Helsingborg, and entered Stockholm on the 2nd of November, and the salutes of the artillery. On the 5th he attended the Assembly of the States, in which Charles XIII., presided. He addressed the King and the States in succession, declaring his intention to live entirely for the good of his adopted country. "I am a stranger, and have been familiar with war, and am acquainted with all its calamities; no conquest can console a country for the blood of its children shed in a foreign land. Peace is the only glorious object of a wise and enlightened government. It is the foundation of the prosperity of industry, and above all its national spirit, that constitute in strength. Sweden has of late experienced great losses, but the honour of the Swedish name remains unaltered. I have never held that a nation can do itself justice, but to defend ourselves. Two days after, dispatches came from Napoleon, demanding in the most imperious tone that Sweden should declare immediately war against England. The winter was spent in preparing for war, and the emperor in case of an attack by the French troops through Denmark. In this emergency the King declared war against England, but his situation was well understood by the British Cabinet, and the result was a state of non-intercourse rather than hostilities. But Napoleon did not stop here; he demanded
draft of Swedish sailors for the French fleet, a body of Swedish troops for the French army, the introduction of French custom-house officers at Gothenburg, and lastly the formation of a Northern Confederation consisting of Sweden, Denmark, and the Duchy of Rügen, under the protection of France. All these demands were respectfully but firmly refused; but the Prince Royal became convinced, that with such a man as Napoleon, Sweden could not remain at peace and retain its independence as a nation. He wrote several letters to his brother, and afterwards to his father, in which he expressed the position in which he found himself. Sweden could not live without maritime trade. After three months, Napoleon answered by fresh demands of hostilities against Great Britain, and the right of depositing his embassies and consuls in Sweden. Meantime, French privates in the Baltic and Northern Seas seized the Swedish vessels, whilst the French authorities confiscated the Swedish ships in the German ports, and marched their crews into France to serve in Napoleon’s dock-yards. 

The year 1811 was a dreadful period for Sweden and the Prince Royal in particular, and his health was affected by his anxiety. At last a fresh act of violence of Napoleon put an end to all uncertainty. In January, 1812, French troops invaded Swedish Fomernia and the island of Rügen, arrested the public functionaries, who were sent to the prisons of Hamburg, and replaced them by Frenchmen, disarmed two Swedish regiments which had been surprised under the appearance of peace, and then dispersed them. Napoleon confiscated all public property and all Swedish vessels in the port of Stralsund. All Sweden was roused at the news. The Prince Royal wrote a strong remonstrance to Napoleon upon this new act, and the French emperor returned the right of the port to Sweden as the price of his good offices. Charles XIII. sent an envoy to Petersburg to conclude an alliance with the Emperor Alexander, which was signed on the 24th of March; and from that time, the Prince Royal, having renewed friendly relations with England, excited himself to promote peace between Russia and England, and Russia and Turkey. All this was well known at Paris, while Napoleon was preparing his gigantic expedition against Russia. It was a very bold step for Sweden thus to throw the balance of power into the hands of the great conqueror, who was taken with the courage of despair; for Napoleon would not let any nation live independent. Those who have talked of Borodin’s treachery, as they call it, of his taking advantage of Boraparte’s Russian disasters to give him an inglorious blow, forget dates and misrepresent circumstances. They have confounded the treaty of Petersberg in March, with the treaty of Abo, in August, 1812. Sweden had chosen her part, forced to it by Napoleon’s outrageous injustices, long before the former treaty of Abo, that had begun, and about the middle of August, the Prince Royal repaired to Abo in Finland, to have an interview with the Emperor Alexander, who was delighted with his manner and conversation. It was then agreed that Sweden should take the fortress of Enisala, and the expense by that treaty should be borne by the government of Russia, Germany, which would be joined by a corps of Russians. At the same time it was stipulated that Norway should be detached from Denmark, a power closely and perniciously allied with the common enemy Napoleon, and be annexed to the crown of Sweden in compensation for the loss of Finland. The accession of Great Britain to the treaty was solicited, and after a time obtained. The treaty was signed at Abo, 18th of August. The Prince Royal having reviewed a body of his troops, in a magnificent manner, delivered his address at his disposal, told Alexander, ‘They are very fine troops, and you can ill spare them just now. Send them instead to Riga, to reinforce Wittgenstein, who has great difficulty in maintaining his field against the Prussians, and his return to French succeed there; they will march on Petersburg.’ ‘That is very handsome of you,’ said Alexander; ‘but how will you obtain possession of Norway?’ ‘If you succeed,’ said the Prince, ‘you will keep your promise. If you succumb, as is the case of all invasions, I am satisfied that the subjection to Napoleon. Better then go and till a field than reign under that condition.’ The troops were sent across the Gulf of Finland to Wittgenstein, just in time to save Riga and defend the N. D. R. The Prince Royal, on his return to Stockholm, kept up a familiar correspondence with Alexander during the whole of the memorable Russian campaign, gave him the best advice, and supported his spirits. After the French retreat from Moscow, the Swedish cabinet signified to the French charge-d’affaires at Stockholm, that all diplomatic relations with France had ceased, and sent him his passports. This was resented in a note by Maret, Napoleon’s secretary for foreign affairs, to which the Prince Royal replied by an elegant letter addressed to Napoleon, in March, 1813, which was afterwards printed and circulated throughout Germany. He told him that the lessons of history reject the idea of universal monarchy; that his continental system deprived nations of the exercise of their natural faculties, of mutual commerce, mutual intercourse, mutual friendship and assistance; that every nation had a right to govern itself by its own laws and institutions. He added, that no state existed without maritime commerce. Napoleon is said to have written in his note, that he could not, therefore, conform to that policy of neutrality, which he thought would place the Swedes in a position of easier alliance with his friends. He took the liberty of informing him that if he did not exist without maritime commerce. Napoleon is said to have written in his note, that he could not, therefore, conform to that policy of neutrality, which he thought would place the Swedes in a position of easier alliance with his friends. He took the liberty of informing him that if he did not exist without maritime commerce.

In May the Prince Royal landed at Stralsund with about 25,000 Swedes, and advanced towards the Elbe. Soon after, an armistice having been concluded between the Russians and the French, the Prince Royal had an interview with the Emperor Alexander and the King of Prussia, at Trachenberg in Silesia. He laid before them a plan of operations for the various allied armies during the ensuing campaign, pointing out the place and time where the allies should meet in the ensuing campaign, pointing out the place and time where the allies should meet in the mass in order to repel the French. Napoleon sent a letter by a courier named Duwsich, who delivered it to one of Napoleon’s aides-de-camp on duty, and Napoleon was so enraged at its contents, that he ordered the poor courier to be shut up in Vincennes, where he remained for a considerable time. (Touchard Lavois, Histoire de Charles XIV. livre iii. ch. 5.)

Leaving to others the pursuit of the French to the Rhine, the Prince Royal turned towards the north to attack Davoust and his allies the Danes on the lower Elbe. He defeated the Danes, who demanded an armistice, and then blockaded Davoust in Hamburg. On the 14th January, 1814, a treaty was concluded at Kiel between Denmark and Sweden, by which they agreed to leave Davoust and his allies to the Prince Royal, and joined the coalition. The Prince Royal then hastened to the Rhine, and fixed his head-quarters at Cologne and afterwards at Liege, from whence he urged the Emperor Alexander to make peace with France, having the Rhine, the River Moselle, and the whole of the Rhineland, in the same state to the Swedish minister at the Congress of Châtillon, and he also advised Napoleon, through an indirect channel, to make peace, or he would lose his crown. He himself would take no part in the campaign in France in 1814. He always strongly opposed the idea of any dismemberment of France, or of forcing any particular dynasty upon the French. ‘Let Germany and Holland be free,’ he said, ‘and let the French choose their own government.’ And the Emperor Alexander entertained the same opinion by rejecting all proposals, hurried on his own will. The Prince Royal’s paramount duties however were towards his adopted country, Sweden, which expected a compensation for all her out sufferings and her present exactions by a common cause. He went to Paris, in conclave, with an agreement on the subject of Norway, as Denmark seemed little inclined to fulfill the treaty of Kiel. The emperor, faithful to his word, obtained the sanction of all the allies, and placed at the disposal of his troops the whole of the Baltic, which he ordered to be occupied by the allies. The Prince then set off for Brussels, where he collected his Swedish troops, and marched them back to the shores of the Baltic.

Christian Frederic, Prince of Denmark, had hoisted in Norway the flag of independence. The Norwegians, said he, were freed from their allegiance to the crown of Denmark, but they were not bound by the conditions of the treaty of Kiel. He assembled a sort of diet at Eidsvold, the majority of the members of which consisted of officers and other salaried individuals. This assembly framed a liberal constitut
tution, and elected Christian for their king, who soon after dissolved the assembly. The King of Denmark sent commissioners to the diet to ascertain the will of the city of Kiel, but little attention was paid to this formality. Four commissioners, of England, Russia, Prussia, and Austria, came to remonstrate in favour of the same treaty, but they obtained only evasive answers. A Swedish army and fleet were then put in motion against Denmark, but Charles XI. was commanded in person. After some trifling actions on the frontier, the Swedes entered Copenhagen; an armistice was concluded, and the Storting, or general assembly of Norway, being convened, received Christian, to resign the authority with which he had been intrusted by the nation. Christian abdicated and returned to Copenhagen. The Storting then entered into communication with the Swedish commissioners, and after some deliberation, elected unanimously Charles XIV. as the new king of Sweden to succeed the king of Norway, and Carl Johan as prince royal. The king and prince on their part swore to the constitution of Norway as voted by the Storting. Norway remained much more free than when a mere dependency of Denmark, as it had been for three centuries. The Prince Royal entered Christiansia in the midst of acclamations, and received the oath of allegiance of the deputies to Charles XIII. in November, 1814. The Scandinavian peninsula was now united under one sceptre, and Charles IV. founded the commonwealth of union, meaning that the natural boundary of the Dovre, or mountains between the two countries, was no longer a political barrier.

In July, 1817, Prince Oscar, son of the Prince Royal, stood on the balcony which was celebrated by a proclamation exposing the solemnity. This great prince, who had followed his father to Sweden in 1810, had been educated as a Swede in every respect. At the end of that year Charles XIII. fell ill, and on the 5th of the following February, 1818, he expired, happy in the character of his adoptive country. Carl Johan, was immediately proclaimed, both in Sweden and in Norway, and was in due time acknowledged by all the princes of Europe. Even the deposed Gustavus wrote him a letter of congratulation from Switzerland. The new King was crowned at Stockholm in May, by the archbishop of Upsal, and afterwards at Drontheim in September, by the Bishop of Aggerhus, with unusual splendour.

The twenty-six years of the reign of Charles XIV. have been for Sweden and Norway a period of peace and internal improvement. Every branch of the administration, the finances, the army, the roads and canals, public instruction, all have been improved. The great canal of Gothia, which joins the Baltic to the Northern Sea, was opened in 1832. Sweden, which was obliged to import large supplies of corn, now produces enough for itself, and even exports corn. The breed of horses has been greatly improved; the public debt has been reduced to a small sum, nothing less than 8,000,000thaler. The crown has made more than 2,500 merchant ships, exclusive of coasting vessels, which is double what she had in 1810. For other details we must refer to the works quoted at the end of this article. It may be easily supposed that the military service in all its branches received the especial attention of Charles John. In his speech on the opening of the Swedish Diet, in January, 1840, he recapitulated with honest satisfaction all that had been done for the country under his reign.

The attachment between Alexander of Russia and Charles John lasted till the death of Alexander, whose successor Nicholas, the present emperor, wrote to the King of Sweden, 'I look upon the continuation of your friendly sentiments as one of the most important legacies which I receive from my brother.'

Charles John had completed his eightieth year when he was seized by an illness, in January, 1844, which brought him to the grave on the 5th of March following. His son, Oscar I., succeeded him. Upon the death, the life of Charles John Bernardito is one of the most instructive biographies of our own times; it affords subject for serious reflection, and is a useful comment on the history of Napoleon.

(Charnock, Stephen, CHARTABLE USES. [Use, CHARTABLES AND CHARITABLE, F. C.]

CHARTABLES. [TRUST AND TRUSTEE, F. C. p. 322]

The word 'chartable' is derived from Latin charta, a sort of uncertain origin: the Greek form of the word is charita.

Charters appears to have signified writing-material made of papyrus. The term was afterwards applied not only to the materials for writing, but to the writing itself, as a grant or deed. The word 'charter' is now applied to any written instrument conferring or granting any right or franchise. These instruments did not differ in form from letters patent, being usually addressed by the king to all who should take part in the event. Occasionally, they bear the name of any public instrument, deed, or writing, being written evidence of things done between man and man, and standing as a perpetual record. (Bracton, lib. 2, c. 26.) Among the Saxons such instruments were known as genitive, or writings.

Charters are divided into—1. Charters of the crown; 2. Charters of private persons.

1. Royal charters were used at a very early period, for grants of privileges, exemptions, lands, honours, pardon, and protection. At one time they were as numerous as the grants of the law of the land, and governed the government, and, as such, were very useful, as the charters were the only written records of proceedings of the crown. This state of things did not last long, for the charters became restricted to such instruments as conferred some right or franchise. These instruments did not differ in form from letters patent, being usually addressed by the king to all who should take part in the event. Occasionally, they bear the name of any public instrument, deed, or writing, being written evidence of things done between man and man, and standing as a perpetual record. (Bracton, lib. 2, c. 26.) Among the Saxons such instruments were known as genitive, or writings.

The term 'charter' of the Crown, for observing the laws throughout England, was in the nature of a public law. It settled the religion of the state, and provided for its peace and government, for the administration of justice, the preservation of public order and peace, for the colonisation of the British colonies, for the extension of the crown and the exemption of the tenants in chief of the crown from all unjust exaction and from tallage. The words are those of a lawyer appointing and commanding: 'Statutum,' 'voluma et fermater precipitatum, 'interdictum.' The rights of the citizens of the kingdom were granted by the charters, and the common law was confirmed and enlarged by them. The charters were ordered or prohibited. (Fadler's Rec. Comm. Ed., vol. i. p. 1.)

The charters of liberties granted by Henry I., Stephen, Henry II., John, Henry III., and Edward I., are all mere privileges, in the nature of public laws, either making new provisions, or confirming, enlarging, and explaining existing laws, and relate to the freedom and good government of the people, and all the most important interests of the country. Some of them are still regarded as authoritative declarations of the law of the land, and are the basis of the laws of my brother.

Charles John was the most perfect model of a Prince Royal, for observing the laws throughout England, was in the nature of a public law. It settled the religion of the state, and provided for its peace and government, for the administration of justice, the preservation of public order and peace, for the colonisation of the British colonies, for the extension of the crown and the exemption of the tenants in chief of the crown from all unjust exaction and from tallage. The words are those of a lawyer appointing and commanding: 'Statutum,' 'voluma et fermater precipitatum, 'interdictum.' The rights of the citizens of the kingdom were granted by the charters, and the common law was confirmed and enlarged by them. The charters were ordered or prohibited. (Fadler's Rec. Comm. Ed., vol. i. p. 1.)

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They are printed at length in the first volume of 'The State of the Realm,' published by the Record Commissioners. With the exception of the charter of the City of London, dated December 12th, 1215, there are charters of the City of London and the City of London, where there are charter rolls of all royal charters from 1191 to 1210, and the Royal Chapel from 1425 to 1468. A part of these rolls has been published by the Record Commissioners.
himself, whose power had been restrained by the popular concessions made in the charters of liberties, but it was also directed against all his subjects who should violate the liberties of the people. [Magna Charta, P. C.]

CHARTERS. Between 1368, their parliament, commerce. Parliamentary that the kingdom, for, or, an act by the crown, which they emanated, from the charters of earlier kings, but gradually assuming their present character as acts agreed to by the entire legislature.

But, in view of the discontinuance of the practice of promulgating general laws by royal charter to bind the whole kingdom, the exercise of prerogative, by means of charters, has persisted of a legislative character throughout the entire history of the British government. Some of the most antient and important of these were charters to boroughs and municipal bodies, conferring immunities and franchises, of which the greatest was that of sending representatives to parliament. There are still extant municipal charters of the Saxon kings, and of the Norman kings, of which any one chartered corporation was the inhabitants of boroughs, of which an exclusive jurisdiction was always one; but the first charter of incorporation to any municipal body appears to have been granted in 1349, in the reign of Henry VI., to Kingston-upon-Hull; although in the absence of records it is not impossible that charters confirming existing usages had been lost.

But though the king's charters have conferred upon boroughs the right of sending members to parliament, it was held in several cases by the House of Commons, that the right of voting by the common law could not be varied by charters from the crown. (Glanville's Reports, p. 47, 63, 76.) Between the reigns of Henry VIII. and Charles II.

less than 180 members were added to the House of Commons, which in 1349 was not yet formed, in this manner, having been Newmarket, in 1673. Several of these were antient boroughs which ceased to send members, and whose right was thus restored by charter; while some towns, expressly created boroughs by charter, did not send members to parliament for centuries afterwards, as Queenborough for example, to which a charter was granted in 1368, but which did not return members until 1578. Hence it has been argued that, notwithstanding the practice of adding members by charter, and the most important urban corporation of a city in law to entitle a town to send members to parliament, although expressly created a borough, to which, by the common law, the right of sending members was incident. (Mere
ever and Stephen's History of Boroughs and Municipal Corporations, A.D. 1674.) This view deriveth confirmation from the acknowledged law that the crown was unable, by charter, to exempt a borough from returning members, since that right was always held to be exercised for the benefit of the whole realm, and not for the advantage of the particular place. (Coke, 4th Inst. 46.) Upon these grounds a charter of exemption to the citizens of York was declared void by act of parliament, 29 Henry VI. c. 2.

But as parliamentary representation has, at length, been completed in this country, and the United Kingdom of Great Britain, and the United Provinces of the Low Countries, have each, respectively, been divided into 300 electoral districts, so as to give uniform constituencies of about 20,000 voters each. III. That the votes be taken by ballot. IV. That a new parliament be elected annually; that the elections take place on the same day in all districts; and that elections vote only for the representative of the district in which they are registered. V. That no other qualification be required for members than the choice of the electors. VI. That every member be paid 500l. a year for his services. VII. That a register be kept of the daily attendance of each member.

There is nothing new in the principles or details of the People's Charter. They have, either separately, or some of them in company, been the subject of discussion at various intervals within the last seventy years. In 1780 the Duke of Richmond introduced a bill into the House of Lords for annual parliaments and universal suffrage. In the same year the electors of Westminster petitioned for the right of the people to vote within seven years; and at the same time the members of the House of Commons, and in their report recommend...
mented the identical points which now constitute the main features of what is called the People's Charter. The Society of the People, established in 1839, three years after published a declaration which recommended a very large extension of the suffrage. In seasons of national distress, the amendment of the representative system has always been warmly taken up by the people of this country.

The object of a large frame of middle classes was realized by the passing of the Reform Act. A season of political repose, and, as it happened also, of commercial prosperity, followed the excitement which preceded the passing of the Reform Act. The people had been led to believe that the war was a temporary fit of policy, and the effect of it was to be foreseen. In the next period of distress which arose, the amended state of the representative system and the advantages which it had brought about were widely scanned; and the consequence was, the formation of a party which was dissipated into a multitude of similar arrangements, and sought to attain the ends of political and social good by a more extensive change. This is briefly the origin of Chartism and of the People's Charter. The middle classes were, however, well satisfied on the whole with the overthrow of the rotten boroughs and the enfranchisement of the large towns, and therefore the Chartists stood alone, and began to regard them with a feeling of hostility. Chartists were sometimes found, as in all other parties, ready to assist the object of thwarting the political objects which the middle classes had at heart. In 1838 they had become a large party and embraced a great many of the working classes employed elsewhere in the agitation of the year. The number of signatures attached to the petition presented at the commencement of the session of 1839 in favour of the People's Charter was upwards of one million and a quarter. Unfortunately the idea began to be entertained amongst a certain class of the Chartists that the physical force might be justly resorted to or necessary for obtaining political changes; and the party became divided into the Physical Force Chartists and the Moral Force Chartists. The former became implicated in disturbances which took place at various times in several parts of the country; and many persons of this class never having had correct views respecting the wages of labour, it appeared as if they had adopted the cry of "a fair day's wages for a fair day's work" as an additional point of the People's Charter. The disturbances in 1842 in the midland and northern counties were to some extent encouraged by the less intelligent of the Physical Force Chartists. At the close of 1841 however an attempt was made to combine the middle classes with the Chartists in their attempt to obtain an extension of the suffrage. Early in 1842 a Complete Suffrage Union was formed at Birmingham; and in April of the same year a conference, consisting of eighty-seven delegates, was assembled at Birmingham, which sat for four days; three of which were spent in the consideration of the limits of union, the definition of working classes, and the last day in adopting plans of practical organization. The six points of the People's Charter were adopted by the conference, and the details were left for settlement by the conference. It was decided also, by this conference to establish a National Complete Suffrage Union. The proposed National Conference commenced its meetings in December, 1842, and was attended by 374 delegates. Here a rupture took place between the Chartists and the Complete Suffrage party, and the latter yields the ground on the question of adopting the People's Charter instead of the Complete Suffrage Bill. The minority however proceeded to act upon their views as developed in the Complete Suffrage Bill. This bill as it is now is quite free from any disadvantageous features. It respects it differs from the People's Charter only in matters of detail. These are the only two plans connected with the extension of the franchise which are at present supported by any large class in this country. The Chartists and the Complete Suffragists are the only notionally distinct parties; but the former may be characterised as possessing a greater hold on the working classes than the Complete Suffragists, whose ranks are chiefly recruited from the middle classes: their objects are very similar, that they may at any time unite without any sacrifice of principle.

CHANGING OF METALS. The process termed chassing, or encharging, as applied to working in metals, so far resembles a kind of stamping, as to admit of the two processes being described here together.

Metallic goods are generally made in one of three ways—by casting in moulds, by forging or turning in masses, or by pressing or stamping out of thin sheets. The last of these three has been greatly developed at Birmingham within the last few years. Either the entire article receives its form by being stamped out of a thin sheet metal, or it receives an ornamental device by a sort of fine punches. For the latter variety of work, steel blocks, punches, or bosses, are provided, each one presenting at the end a definite form, such as curved, angular, square, &c.; and these are fixed in their places, after which the finished surface is to be ornamented, which is always a thin hollow kind, a placed uppermost on the punch; a pattern or designs is drawn on the face of the article, and the adjustment is so made that the metal in contact with the punches will be brought over the punch, and by changing the form of the punch when necessary, a protecture design or pattern is relief is formed on the article of metal.

But a more extensive kind of manufacture is that is that is which article receives its form by being stamped or pressed from a plain piece of sheet metal. The hammer, the swage, the roll, the stamp, and the lathe, are all employed to effect such work, according to the thickness of the metal and the nature of the article to be formed. Whatever is formed is to be fashioned out of thin sheet-metal by the hammer, it constitutes bending; the metal is rested upon bosses or metal supports of different kinds, and hammered on the upper surface to bring it into the required form. When the metal is fashioned out of any other kind of gauge or pattern which possesses the requisite form to the sheet metal by pressure rather than by percussion. Let us suppose (as a familiar mode of illustrating its action) that a pair of scissors has the two blades so curved that the convexity of the one may fit into or correspond with the concavity of the other; if these blades were nearly closed, and a thin piece of metal were drawn between them, it will be forced into a curved form similar to that presented by the blades. The arrangement of the different parts of this process is so managed as to lead to some such result as that here indicated. The same presses and hollows or the edges of disc-forms similar articles are produced by means of swages. Many articles, such as large plain hollow vessels, are brought into form mainly by rollers. Timniths often employ three rollers to bring their tin to the proper form for tubes and cylindrical vessels. There are two rollers placed nearly in contact, and in the same horizontal level with another above them, equidistant from both; all are capible of revolving, and if a piece of tinned iron be drawn between them, it will be forced to conform to the size and shape of the cavity existing between the upper and the lower rollers: by varying the sizes and mutual distances of the rollers, the vessel is formed in the required shape. The lathe is employed in rather a singular way, in the production of various kinds of articles from thin sheet-metal, principally from soft white yielding alloys of tin and other metals. A sheet metal so formed is held on the upper end of this lathe, and brought to the shape of a box, a cup, a hemisphere, or any one among numerous fanciful forms. The disc is attached to a lathe provided with a boss or block of the required shape, and a blunt tool is pressed against it while revolving; the soft and ductile metal yields to the pressure and conforms to the shape of the boss against which it is placed. By little and little the workman effects the transformation of the flat piece of metal to a shape which it could not assume unless it were soft and ductile.

The most important however of these modes of working sheet-metal is by stamping. In this process the thin metal is suddenly and very forcibly compressed between two steel die or stamps, each of which is engraved with a pattern or design. One die is fixed on a flat plate and employed while the other is fixed face downwards to the lower end of a heavy hammer or weight. The thin piece of metal is placed on the lower die; the hammer with the upper die is raised by a my, and pressed down; and the considerable compression suddenly to full, the upper die forcibly compresses the thin piece of metal which lies between it and the lower, compelling it to assume alternate convexities and concavities according to the pattern. Each die is an exact counterpart or negative of the form of the object on which the part of the metal cannot conform to the convexity of the one without falling into the concavity of the other; and it is by this double action that the result is produced. Spoons, forks, and tridents
in numberless variety are produced by stamping between two dies modified in various ways according to the particular object in view.

This mode of stamping requires as many dies as there are different patterns. Dr. Ure, in illustration of the heavy stock which the manufacturers at Birmingham are thus forced to keep by them, and of a difference in this respect between them and the French manufacturers, remarks: "M. Parquin, the great heavy stamp manufacturer of Paris, has as many as one hundred and thirty-six dies, only twenty-nine of which are for this business is monopolized by the capital," who makes to the value of 700,000 francs per annum, out of the 1,500,000 which he says is the whole internal consumption of the kingdom, states that the internal consumption of the United Kingdom is to France its national consumption of fifty years times five of France. He adds that our common laminated copper costs 25 sous the pound, while theirs costs 34. Their plated goods are fashioned not in general with stamps, but by the pressure of tools upon wood moulds in the turning-lathe, which is a great economy of capital to the manufacturer. The factories at Birmingham which possess a heavy stock of 300,000 different die-moulds. This pressure of tools upon wood moulds in the turning-lathe corresponds with one of processes above described.

For different applications of the above processes to manufactures, see BRIGHTON, C. J., and COVINGTON, C. F. For the mode of making the dies, DYE-SYSTEM, P. C. S.; and for stamping, COVINGTON, P. C. S. ELECTRO-METALWORK, P. C. S.

CHATHAM ISLANDS are a group of islands situated in the Pacific, east of New Zealand, between 43° 40' and 45° 20' S. lat., and 170° and 177° 30' W. long. They consist of a large mass of the islands, of which there are several, and of several smaller islands. The largest is called Wairauki, and is in the form of a hammer with a short handle. The northern part, which represents the iron portion of the hammer, is about forty-eight miles long from east to west; that which extends from southward does not exceed thirty-six miles in length. Dieffenbach, by a rough computation, gives the area at 477 nautical miles, or 305,280 acres, of which however 57,600 acres at least are water, being lakes, lagoons, &c., with an average depth of 247,890.

The southern shores of the southern peninsula of the island are rocky, but the remainder terminates in a low sandy beach, with the exception of a few headlands along the northern coast, which are formed by low rocky masses. The country rises gradually from the beach for one or two miles, when it extends on an undulating level. The central part of the island is occupied by a large lake, called Te Waung, which is about twenty-five miles long, and between six and seven miles broad by sea, either at high or low-water.

On its eastern side it is separated from the sea by low sandhills about a hundred yards broad, and at one place the intervening hills disappear, and between the lake and the sea there is only a point or neck, or isthmus, of land known in New Zealand as Te Waung, which separates the sea, so that since that time the lake has become a portion of the ocean, if the opening has not again been filled up. Before that event the water of the lake was slightly brackish, which was ascribed to infiltration of sea-water; otherwise it must have been fresh, as two large streams empty themselves into the southern part of the lake.

The surface of the tract which lies west of the northern part of the Te Waung lake is diversified by a considerable number of hills of a pyramidal shape, and consisting of basalt. None of these hills are more than 800 feet in height. In their vicinity the soil is very fertile, being in its natural state covered with a vegetation of fern and trees, mixed together, and appearing like oases in the surrounding bog. The intervening tracts are covered with bog, which however does not appear to be deep, and it is supposed that if they were drained they would be productive, and fit for grain or pasture. Wherever the superabundant water has been carried off by a natural outlet, a kind of lowland form a level shape in Zealandia (Platyrrhina, plan) has sprung up, which gives additional firmness to the soil by the decayed leaves, and yields a rich harvest to the native planter. This is particularly the case on the low hills along the lake, which are intersected, and extend from the beach like a broad tongue. Where these tongues of land extend far inland, the decayed leaves from the trees have formed a light black soil, which the natives prefer for agriculture. In this part several lakes occur at the back of the low hills which run parallel to the eastern shore of the lake, which gives generally an outlet for their waters into the sea. In the interior of the northern tract, east of the lake of Te Waung, there is an extensive tract of dry soil of considerable fertility, which is well wooded, but near the sea it is covered with sand, and this is also the case with the narrow band of land that separates the lake from the sea. The best portion of the land is that south of the lake, for this part is not so boggy as the rest, and is either covered with an open forest of moderate sized trees, or with high fern, in which case the land can be brought under cultivation with the utmost labor. The country is rich and very rigorous.

The winds which sweep over these islands are not violent enough to injure vegetation, and it is only in a few exposed places that stunted shrubs appear.

On the western side of the island is a large bay, called Wanga Bay, where has been formed a large river, behind some projecting headlands. On the southern shores of the bay is Wanga Harbour, which has excellent anchorage in between five and twelve fathoms. Though open to the north-west, the swell of the sea is broken by the projecting peninsulas which lies north of the bay and by a reef. This harbour receives the largest river in the island, the Mangatu, which comes from some hills on the south; though its whole course does not exceed twelve miles, it is navigable for boats for about three miles from its mouth, even at low-water, as the depth is often twelve feet, though the channel is narrow: but it has a bar across its mouth, which is passable for boats only at high-water. On the northern side of Wanga Bay are two good harbours, from one of which a road leads to west, Wangaichi, Wangumoe, Wangaos, and Pohans. The third named is frequently visited by vessels, and affords complete protection against all winds. The three others are not much known, but reported to be good. The northern end of the island is composed of four small hills and a larger headland, with the bay six miles from the north-eastern extremity of the island, called Kaiangara, which is stated to have good anchorage in ten to twelve fathoms of water. There are no harbours on the eastern and southern coast except at the eastern headland of the island, where the hills offer some protection against wind and sea: this place is frequently visited by whalers.

The climate is very mild. In winter (from May to July) the thermometer never rises above 60°, nor descends below 45°, after eight o'clock in the morning. The air is always moist and cool, but never mysty, the vapour being carried off by the constant breezes. Even during the winter the sky is generally cloudless, and of the deepest blue; but there is no want of rain. In winter at least there are showers for a few hours every week. The prevailing winds are north-east and south-west. The climate appears very favourable to Europeans.

The natives cultivate potatoes, different kinds of turnips, cabbages, taro (Arum esculentum), some tobacco, and abundance of pumpkins, which form a great part of their food. There are several kinds of trees, which are of the species of the large elder (Sambucus); of these, the' species in which the cream (zebra) or the milk (zefara) forms the largest part of the forest. No kind of quadruped occurs, except the Norwegian rat. Birds are numerous: in the lakes and on the sea-shores are ducks, snipes, plovers, curlews, and redshills; in the forests the mocking-bird, a little green parrot, the moko-moko, a singing-bird, and the large New Zealand pigeon. Fish is very abundant. All the spermaceti and black whales are seen in great numbers off the shore, and visit the east coast, especially in June and the following months.

These islands were discovered in 1791 by Broughton, of his Majesty's ship Chatham, who took possession of them in the name of the king. They were afterwards frequently visited by whalers, and in 1840 by whaling-stations establishe at Onaga. Broughton found them inhabited by a people belonging to the Malay race. They are not so tall, muscular, and well proportioned as the New Zealanders. They are often short necks, thick heads, and, when young, prominent muzzles. Two prominent, the cheekbones prominent, the eyes narrow, and the nose flat and clumsy. All have black glossy hair, which is sometimes curly. Their complexion is darker than that of the New Zealanders, and was at one time found in very few individuals; but Dieffenbach thinks that in 1840 not more than ninety of the aboriginal inhabitants were found there. The reduction of their number is to be ascribed to the state of slavery and degradation to which they have been subjected by the New Zealanders. There are about 450 marine miles distant from Port Nicholson, and Cook's Strait, two New Zealand chiefs visited the Chatham
Islands in whaling vessels. They soon saw that it would not be difficult to take possession of the islands, and to reduce the inhabitants to slavery. As their tactics had been driven from their original possessions by their more warlike or more powerful neighbours, they induced them to go to the Chatham Islands, and effected their enigma by hiring a British brig for that purpose, which carried them over in two trips. The natives, who had a reputation for piracy, were divided among the New Zealand tribes, as well as the land. The number of the New Zealanders who thus settled in the Chatham Islands is stated to have been eight hundred: and, by means of the labour of their slaves, a portion of Waiwareki was soon brought into cultivation, that they could furnish supplies for the three or more vessels which annually resort to the island. The aborigines possessed neither dogs nor pigs; the New Zealanders introduced dogs, together with potatoes and different kinds of seeds. A part of Waiwareki has been purchased from the chiefs by British citizens, and the island is considered an appendage of the colony of New Zealand.

South-east of Waiwareki lies Rangi-hau-te, or Pitt's Island, which is about twelve miles long and eight broad. It consists principally of a hill of moderate elevation, having a flat top, whose declivities terminate near the coast. It has no harbour, and is stated to be inhabited by a small number of aboriginal natives. The other islands are mere rocks, and only frequented by the seamen. (D'Urville's 'Account of the Chatham Islands,' in London Geographical Journal, vol. xi.)

CHARDET, ANTOINE DENIS, a celebrated French sculptor, born at Paris, in 1768. He was the pupil of Stoul, and purchased the grand prix for sculpture, by a bas-relief of Joseph sold by his Brethren. He studied some time in Rome, and returned to Paris in 1799, when he was elected an Acréé of the Academy of Painting and Sculpture, of which he became later a member and professor of sculpture. He was a made a member of the Institute in 1805, and took part in the preparation of the Dictionary of the French Academy; he edited the 'Dictionnaire de la Langue des Beaux Arts.' He died in 1810.

The most famous work of Chaudet is the statue of Napoleon in public buildings of Paris, but one of his chief performances, the colossal bronze statue of Napoleon in the heroic or Roman costume, which stood on the column of the Place Vendôme, was melted down in 1814 by the government of Louis XVIII., and the metal was used to form part of the horse of Henry IV. on the Pont Neuf. The present statue in Napoleon's own costume, by Seurre, was fixed on the column in May, 1838, in place of the figure-de-lis and flag-staff, which were originally substituted by Chaudet, but this work was disliked, and a painter of considerable merit; and his widow also, Madame Chaudet, distinguished herself as a genre and portrait painter.

(Chaudet, Dictionnaire des Artistes, &c.)

CHIEBA, a genus of Mammalia Allied to the bears and porcupines.

CHIEBACANA'THUS, a genus of fossil fishes from the old red sandstone of Gamrie in Orkney, and the Orkneys. (Agassiz.)

CHIEGRRANTHUS, [WAL.FLOWER, P. C.] a genus of fossil fishes from the old red sandstone of the Orkney Islands and Morayshire. The scales are very minute. (Agassiz.)

CHIEORRHEUM, the foot-prints on the red sandstone of the Ambleside, were formerly ascribed to Kaup to a mammiferous animal under the above title. The same origin many similar remains in England have been referred. Professor Owen is of opinion that the animal was reptilian, and that it may be regarded as identical with the Leptinotrichon, of the same group, which the type of this animal was probably a Batrachian Reptile. The foot-prints occur with ripple marks, and what are called rain marks, on the flaggy red sandstone of the Mersey.

CHIPELIFER, a genus of Arachnotis remarkable for the resemblance which the species composing it bear to scorpions. Hence Lamarck styled the order in which he placed them 'les faux scorpions,' associating them with Galeodes. The mandibles of Chelifer are short, with didactylos extremities. The palpi and legs, long, and咸ed, provided with eight rings, and having claws at their extremities. The maxillae are connivent, and two in number. The eyes are two in the Chelifers proper, as distinguished by Hermann from the species of the genus Oblium of Leach, which have four; they are projected, and admitted of the things. The animal is oval, anteriorly acute, and depressed. The feet are eight.

These curious animals are very small and resemble minute scorpions deprived of their tails. They run fast, moving backwards, forwards, and often sideways like crabs. They are a sluggish feeders, feeding on bark of trees, and houses among old papers and old furniture. They feed upon insects. They are found in all parts of Europe.

CHENOLODUS, a genus of fossil Mammalia proposed by Koenig. It is to be placed to the bear and porcupine family, and occurs in tertiary beds at Eppelhame, near Mayence.

CHEMISTRY. It can hardly have escaped the notice of even the most casual observer of the progress of science in general, that the advance of chemical knowledge within the last few years has been much greater than has ever previously been made in an equal time.

This observation applies with peculiar force to the discoveries which have been made in the chemistry of organic bodies, whether neutral, acid, or alkaline in their nature: and therefore, in addition to the statements contained in the volumes of the Penny Cyclopaedia, there is now presented a nearly unbroken view of the properties and analyses of the organic bodies alluded to.

For the facts connected with this part of the subject we are chiefly indebted to the elaborate work of Liebig on Organic Chemistry, and any one who will refer to it cannot fail to observe how great has been the rapid and incessant advance which we can give in the space to which we are limited.

Although this supplement contains so large a proportion of organic chemistry, we trust it will be found that other material points, in so vast and important a field as that of science treated of in this Journal, have not been neglected.

ACETAL, a compound first formed by Döbereiner, and called by him oxygengated ether. To prepare it, put into a tall wide-mouthed bottle about an inch of alcohol, and suspend over it some warm-glass. In the glass (plataque black) moistened with water, and near the surface of the alcohol.

After the bottle has been left for some months in a warm place, it is found to contain an acid liquid consisting of acetic acid, alcohol, and water. The acid and alcohol are separated by the addition of chalk, and to be repeatedly treated with chloroform of calcium, till it is no longer moistened, and as soon as the boiling-point rises to 202° the product is pure acetic, possessing the following properties:—It is a colourless liquid, of a pungent aetherial odour: its density is 0·928, and its boiling-point 204°. It is soluble in seven parts of water, and miscible with alcohol in all proportions. When mixed with an alcoholic solution of potash, it gradually absorbs oxygen from the air, and reduces to alcohol, being saturated by the addition of an alkali, and then rectified from chloroform of calcium in a water-bath; acetic acid is also formed, with other products, when acetic acid in vapour is passed through a red-hot iron tube. The precise mode of change in the compound is that it is a colourless limpid liquid; its odour is peculiar, penetrating, and somewhat aromatic; its specific gravity is 0·792; it boils at 192°, and the density of its vapour is 2·019. It mixes in all proportions with alcohol, ether, and oil of turpentine. It is very inflammable, and is not affected by exposure to the air.

Its formula is CH₂O, and may be regarded as a compound of ether and aldehyde. It is composed of

<table>
<thead>
<tr>
<th>Equation of Carbon</th>
<th>.6</th>
<th>x</th>
<th>3</th>
<th>=</th>
<th>18</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nine equivalents of Hydrogen</td>
<td>.5</td>
<td>x</td>
<td>9</td>
<td>=</td>
<td>45</td>
</tr>
<tr>
<td>Three equivalents of Oxygen</td>
<td>.8</td>
<td>x</td>
<td>2</td>
<td>=</td>
<td>16</td>
</tr>
</tbody>
</table>

Equivalent . . . 81

ACETONIC, Pyrocetic Spirit, is obtained by the decomposition of acetic acid. It is best prepared by heating dry acetic acid, lead, and a small amount of charcoal in a glass retort, to which a receiver is adapted and kept cool. Carboxonic acid is evaporated, and in the receiver there condenses a volatile product contaminated with tar. This, which is the crude acetone, is to be saturated by the addition of an alkali, and then rectified from chloroform of calcium in a water-bath; acetone is also formed, with other products, when acetic acid in vapour is passed through a red-hot iron tube. The precise mode of change in the compound is that it is a colourless limpid liquid; its odour is peculiar, penetrating, and somewhat aromatic; its specific gravity is 0·792; it boils at 192°, and the density of its vapour is 2·019. It mixes in all proportions with alcohol, ether, and oil of turpentine. It is very inflammable, and is not affected by exposure to the air. It is composed of

| Three equivalents of Carbon | .6 | x | 3 | = | 18 |
| Three equivalents of Hydrogen | .5 | x | 9 | = | 45 |
| One equivalent of Oxygen | .8 | x | 2 | = | 16 |

Equivalent . . . 29

Its formula is CH₂O, and results from the separation of acetic acid into acetone and carabolic acid. Acetone may be obtained by boiling dry acetic acid, sugar, starch, or gum, with eight times their weight of lime.
Alcebrin and Alcebrin. [Caggidy, in Chemistry, P. C. S.]

Aldehyde, or Hydrated Oxide of Acetyl, the hypothetical base of acetic acid. When the vapour of alcohol or ether is passed through a red-hot tube, aldehyde is one of the products. It may be procured also by mixing 6 parts of sulphuric acid, 4 of spirit, and 4 of water, to which mixture is to be added 6 parts of powdered binoxode of manganese, contained in a large retort, with a cooled receiver adapted to it: by a gentle heat about 6 parts are to be distilled; the product is to be twice distilled from an equal weight of chlorid of calcium, and then to be mixed with twice its volume of ether, and saturated with dry ammonical water. When these means a white crystalline compound is obtained, which is to be dried by exposure to the air. This is to be distilled from a water-bath with a mixture of equal parts of sulphuric acid and water, and when rectified a temperature of not exceeding 87°, the aldehyde is obtained in a state of purity.

The properties of aldehyde are—that it is a limpid colourless liquid, having an ethereal and suffocating smell; its specific gravity is 0.790; it boils at 72° Fahrenheit, and mixes in all proportions with water, alcohol, and ether; it decolorizes test-paper: but when exposed to oxygen it is partly converted into acetic acid. Its formula is C₂H₄O₄, or AëO₄+HO; or it consists of

| Four equivalents of Carbon | 6 x 4 = 24 |
| Four equivalents of Hydrogen | 1 x 4 = 4 |
| Two equivalents of Oxygen | 8 x 2 = 16 |

Its name is derived from alcohol dehydratenaturus, it being equal to 2 equivalents of alcohol when deprived of 2 equivalents of hydrogen.

When combined with ammonia, aldehyde-ammonia is formed, which, as already noticed, is a crystalline body; when heated with potash, a brown resin-like substance is produced called ethanide, which, on being kept in a test-paper: but when exposed to oxygen it is partly converted into acetic acid.

Aldehtacidic Acid is obtained by dissolving oxide of silver in aldehyde, and the solid substance that is obtained is the hydrosulphuric acid. An acid liquid is obtained which is very readily decomposed; its formula is C₂H₄O₄+HO; it appears to contain the elements of acetic acid minus an equivalent of oxygen.

Alizarin. [Madder, P. C.]

Allotcon, Allatic Acid. This substance exists in the allatico liquid of cows, and has since been obtained by Liebig and Woehler artificially by treating uric acid with binoxode of lead; one part of the acid is to be be added in 16 parts of water, and the binoxode of lead is to be added in small portions at a time, as long as it continues to alter in colour; the solution is to be filtered and evaporated until crystals begin to form at the surface; the crystals obtained on the cooling of the liquor are to be purified by repeated crystallization; it may also be procured from the allatico liquid of cows by evaporating it with a gentle heat to one-fourth of its volume. The crystals obtained on cooling, are to be treated with animal charcoal, and are

The phosphorus and sulphur, though small in quantity, have been considered as in chemical combination, and the formula of allatcon has been stated to be C₂H₄O₂. O₄N₂ P₈ S₄; so complex a constitution is, however, highly improbable.

Vegetable Alumen is composed of

Carbon | 65-01
Hydrogen | 7-23
Oxygen, sulphur, and phosphorus | 21-84
Azote | 15-92

100-
CHE 336 CHE

It is decomposed into ammonia and oxalic acid, which combine.

By analysis allantoin appears to be composed of

<table>
<thead>
<tr>
<th>Equivalents of Carbon</th>
<th>Equivalents of Hydrogen</th>
<th>Equivalents of Azote</th>
<th>Equivalents of Oxygen</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 × 4 = 24</td>
<td>1 × 3 = 3</td>
<td>14 × 2 = 28</td>
<td>8 × 3 = 24</td>
</tr>
</tbody>
</table>

Equivalent 79

Its formula is C₂H₆N₂O₂.

**Alloxan.** This substance is obtained by the action of nitric acid on uric acid in the following manner: Add, by small portions at a time, 1 part of uric acid to 4 parts of nitric acid of specific gravity 1:41 or 1:5; the uric acid dissolves with effervescence and the disengagement of heat, which must be moderated by cooling the vessel. Small white granular brilliant crystals are gradually formed, and the liquor soon becomes a mass of them; this is to be allowed to drain in a funnel, and then dried on a porous brick; they are to be purified by repeated crystallisation from solution in boiling water.

When alloxan crystallizes from a solution which is not saturated, the crystals have the form of an octahedron with a rhombohedral base, and they are colourless, transparent, very brilliant, often an inch in diameter; they are very efflorescent, and lose 25 per cent. = 6 equivalents of water. When a hot saturated solution of alloxan is made to crystallize, anhydrous alloxan is obtained in opaque rhombohedral prisms.

Alloxan is very soluble in water; it possesses a disagreeable smell, and a somewhat astringent saline taste. It reddens vegetable colours, and renders the epidemis purple. The alkals decompose it with the formation of alloxonic acid, and when heated to ebullition with an alkali it is converted into urea and mesoxalic acid; it is converted into alloxanit by sulphureted hydrogen; when subjected to the combined action of an alkali and a protosalt of iron, an indigo blue liquor is produced.

It contains

<table>
<thead>
<tr>
<th>Equivalents of Carbon</th>
<th>Equivalents of Hydrogen</th>
<th>Equivalents of Azote</th>
<th>Equivalents of Oxygen</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 × 8 = 48</td>
<td>4 × 4 = 16</td>
<td>14 × 2 = 28</td>
<td>10 × 8 = 80</td>
</tr>
</tbody>
</table>

Equivalent 160

Its formula is C₂H₈N₂O₄.

**Alloxanous Acid.** This is produced by the action of the alkals upon alloxan, and when sulphuric acid is added to alloxanate of barytes, the acid remains in solution, which is very sour, and by evaporation yields crystals in needles radiating from a common centre. It neutralizes bases perfectly, and decomposes the carbonates; when neutralized by ammonia it gives a white precipitate in solution of silver, which becomes yellow by effusion, and afterwards black with effervescence. It dissolves zine with the evolution of hydrogen gas.

It is composed of

<table>
<thead>
<tr>
<th>Equivalents of Carbon</th>
<th>Equivalents of Hydrogen</th>
<th>Equivalents of Azote</th>
<th>Equivalents of Oxygen</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 × 4 = 24</td>
<td></td>
<td>14 × 2 = 28</td>
<td>8 × 4 = 32</td>
</tr>
</tbody>
</table>

Equivalent 71

Its formula is C₂H₄N₂O₂.

**Alloxatin.** This substance was first observed by Dr. Prout during the decomposition of uric acid by nitric acid. It may be obtained from alloxan, but the best method appears to be that of boiling uric acid in 52 parts of water, and then adding a little nitric acid until it is perfectly dissolved; the solution is then to be evaporated to two-thirds; in a day or two alloxatin is deposited in crystals, which are to be purified by co-crystallisation. The crystals are colourless, and in the form of oblique four-sided prisms; they become red when exposed in the air to ammonia; they are hard, fragile, easily reduced to powder, and may be heated to 212° without losing weight; but at 302° they lose 3 equivalents, or 15½ per cent. of water.

Alloxatin is slightly soluble in cold, but more soluble in hot water; the solution reddens litmus; when heated in a solution of chlorine, it is converted into alloxan; with the salts of iron it forms a black precipitate of metallic iron. The alkals decompose it; barytes water produces a violet urapatite, which is destroyed by heat.

It is composed of

<table>
<thead>
<tr>
<th>Equivalents of Carbon</th>
<th>Equivalents of Oxygen</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 × 8 = 48</td>
<td></td>
</tr>
</tbody>
</table>

Eight equivalents of Carbon

Ten equivalents of Oxygen

Five equivalents of Hydrogen

Two equivalents of Azote

Equivalent 161

Its formula is C₂O₄H₄N₂O₄.

**Alammine.** The compounds of this substance with the alkalis have been called *aluminates*, this earth, or metallic oxide, being assumed to act the part of an acid in such combinations; and nature presents us with compounds in which it is combined with the alkaline earths, lime, and magnesia.

Laterly, however, a crystalline and definite aluminate of potash has been formed: it may be prepared either by dissolving alumina, precipitated by carbonate of ammonia, in potash, or by fusing in a silver crucible anhydrous alumina with excess of potash. If the solution, obtained in either mode, be evaporated under the receiver of a tin-foil, until sufficiently concentrated, readily deposit hard brilliant crystals of aluminate of potash; this salt always retains one alkaline solution, and may be crystallized a second time.

Aluminate of potash is white, very soluble in water, but insoluble in alcohol; it has a caustic taste and an alkaline reaction; a certain quantity of water decomposes it, precipitates alumina nearly pure, and retains in solution a very small quantity of the base.

One hundred parts of this salt, previously dried in vacuo, yielded—

<table>
<thead>
<tr>
<th>Product</th>
<th>Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alumina</td>
<td>40-6</td>
</tr>
<tr>
<td>Potash</td>
<td>37-5</td>
</tr>
<tr>
<td>Water</td>
<td>21-2</td>
</tr>
</tbody>
</table>

Equivalent 99·3

It appears therefore to be a teraluminate of potash, consisting of

<table>
<thead>
<tr>
<th>Equivalents of Alumina</th>
<th>Equivalents of Potash</th>
<th>Equivalents of Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 × 3 = 54</td>
<td>8 = 48</td>
<td>9 × 3 = 27</td>
</tr>
</tbody>
</table>

Equivalent 129·100

Aluminate of soda may be formed in the same way as aluminate of potash, but it crystallizes less readily.

**Ammonide** is prepared by dissolving ammonium, melam, or melamine, in concentrated sulphuric acid, and treating the solution with alcohol; the precipitated ammonide is to be washed with cold water till all adhering acids are removed; it must then be purified by dissolving in nitric acid and precipitating by carbonate of ammonia.

The properties of ammonide are—It is at first white powder, insoluble in water, alcohol, and ether, but dissolved by the alkalis and the powerful acids, with nitric acid it forms a crystalline compound which is decomposed by water; when exposed to the action of nitric acid or of sulphuric acid, it gradually decomposes into ammonia and cyanamidic acid. When nitrate of silver is added to a slight excess, and afterwards ammonia are added to a hot and saturated solution of ammonide in nitric acid, a white flocculent precipitate is formed: this consists of ammonide in which two equivalents of water are replaced by two equivalents of oxide of silver. This compound is insoluble in water, blackens by exposure to the light, and dissolves in nitric acid.

The formula of ammonide is C₂H₂N₄O₄.

**Alkylone.** This substance may be obtained by more than one process when melam or dissolved in boiling dilute hydrochloric acid, there are obtained by evaporation crystals of hydrochlorate of melamine and of melamone, which are to be dissolved in boiling water. When ammonia is added to the solution, a precipitate of ammonide is obtained, which is to be separated.

The properties of ammonide are, that it is a splendid white colour, and is composed of very fine silky needles: it is insoluble in water, alcohol, and ether, but soluble in solutions of alkali and of alkalis; it is not subjected to dry distillation; there are produced ammonia, melam, and a crystalline sublimata. It dissolves in acids, and yields crystallizable salts, especially with nitric acid, with which it forms large laminar or flower quadrangular prisms. It is however a weak basis, being only weakly soluble in water, and never in cold solutions. When fused with hydrate of potash, ammonide is converted into ammonium and cyanate of potash.

Its formula is C₂H₂N₄O₄.

**Amides and Ammonic.** Under Ammonium, P.C., they have mentioned the supposed existence of a substance called, derived from ammoniun, possessing metallic properties.
and consisting of 4 equivalents of hydrogen and 1 equivalent of azote. It has also been supposed that another compound exists, though it has never been isolated, which consists of 2 equivalents of hydrogen and 1 equivalent of azote; this is imagined to exist in certain compounds called amides, and as being their base it is termed amidog, so that ammonium, on becoming ammonium, gains 1 equivalent of hydrogen, while in becoming amidogen, it loses 2 equivalents of the same element. When potassium is heated in amoniacal gas, the mixture is converted into a fustile green matter, which appears to contain the amide of potassium, an equivalent quantity of hydrogen being disengaged during its formation.

Amides are also produced by the abstraction of the elements of water from compounds of the oxygen acids and ammonia; the azot, or azotic acid in vapour, on combining with amoniacal gas, a salino substance is produced, which, when dissolved in water, does not give the usual indications of containing sulphuric acid, nor does it contain ammonia, but it is supposed to be a mixture of a sulphamide, containing water, and the changes which occur appear to be these. The sulphamide yields one of its 3 equivalents of oxygen to combine with one of the 3 equivalents of hydrogen which the ammonia contains, and these consequently form an equivalent of water; there remain 3 equivalents of oxygen, which in combination with 2 equivalents of sulphur, or 4 equivalents of oxygen, and a compound of 1 equivalent of azote + 2 equivalents of hydrogen, constituting amidogen, and this unites with the compound of sulphur and 2 equivalents of oxygen yields sulphanide, represented by \( \text{NH}_4 \text{SO}_4 \cdot \text{H}_2 \text{O} \), which, differently arranged, is the equivalent of anhydrous sulphate of ammonia, or \( \text{NH}_4 \text{SO}_4 \).

In the same way, when oxalate of ammonia is heated, the acid losing an equivalent of oxygen and the ammonia an equivalent of nitrogen, there is produced what is termed oxamide.

**Oxamide, P. C.**

Thus:

\[
\text{Oxalate of Ammonia} \quad \text{NH}_4 \text{C}_2 \text{O}_4 + 2 \text{H}_2 \text{O} \\
\text{Subtract the elements of Oxamide} \quad \text{NH}_4 \text{C}_2 \text{O}_4 \\
\text{There are left} \quad \text{H}_2 \text{O} + 2 \text{H}_2 \text{O} \\
\text{Amgdalin, a substance obtained from bitter almonds after the fixed oil has been expressed.} \quad \text{Its properties are—that it has no smell, white, pearly, crystalline plates, which are inodorous and nearly tasteless. Amgdalin is decomposed by heat, exhaling a peculiar odour and leaving a bulky coal. It is very soluble in water, both hot and cold; a hot solution deposits brilliant prismatic crystals in cooling, which contain water. When heated with dilute nitric acid, or with a mixture of dilute sulphuric acid and binoxoide of manganese, it is resolved into ammonia, bitter almond oil, and benzoic, formic, and carbonic acids.

\[
\text{Il} \quad \text{is} \quad \text{g} \quad \text{i} \quad \text{n} \quad \text{e} \\
\text{Forty equivalents of Carbon} \quad 6 \times 40 = 240 \\
\text{Twenty-seven equivalents of Hydrogen} \quad 1 \times 27 = 27 \\
\text{Twenty-two equivalents of Oxygen} \quad 8 \times 22 = 176 \\
\text{One equivalent of Azote} \quad = 14 \\
\text{Equivalent} \quad 457 \\
\text{In formula} \quad \text{C}_4 \text{H}_4 \text{N}_2 \text{O}_4 \\
\text{Astilbe, the poisonous principle of the spars astilbe. It forms small pearly crystals, soluble in 27 parts of boiling water, and also in alcohol, but scarcely in ether; it cannot be sublimed without decomposition. Introduced into a wound it rapidly brings on vomiting, convulsions, and death.

\[
\text{It is} \quad \text{i} \quad \text{i} \quad \text{f} \\
\text{Fourteen equivalents of Carbon} \quad 6 \times 14 = 84 \\
\text{Ten equivalents of Hydrogen} \quad 1 \times 10 = 10 \\
\text{Five equivalents of Oxygen} \quad 8 \times 5 = 40 \\
\text{Equivalent} \quad 184 \\
\text{In formula} \quad \text{C}_4 \text{H}_4 \text{N}_2 \text{O}_4 \\
\text{Aphis, the name given by its discoverer, M. Braconnot, to the peculiar principle of parsley, obtained from it by solution in alcohol.} \quad \text{In cold water and alcohol it is nearly insoluble, but dissolves in ammonia; when it is boiled with dilute acids, it separates, and when oxidised in air, the solutions obtained gelatinizing as they cool. The solution has a yellow colour. Aphis is soluble in the alkalis and in lime-water; the solutions are yellow, and when an acid is added, a precipitate is produced. When it is boiled with dilute acids, aphis undergoes a peculiar modification. If a small quantity of sulphuric acid be added to a boiling solution of aphis, it soon becomes turbid, and is converted into a thick yellow fluid. On filtration after cooling, and saturation of the acid with chalk, a small quantity of sugar remains

P. C. S., No. 43.

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in solution; the portion precipitated becomes a yellowish white colour after washing and drying, and weighs less than the aphis submitted to experiment: it is neutral, inodorous, insoluble, and insoluble in cold water, but it dissolves in boiling water or alcohol; the solutions do not gelatinize on cooling, but precipitate in white opaque flocculi.

Aphis dissolves in concentrated sulphuric and hydrochloric acids, and is precipitated from them by water in the state above described: M. Braconnot inclines to the opinion that it is pure aphis, and that which gelatinizes is a compound of aphis with one of the substances which the acids convert into sugar, an operation after which the aphis is exhibited in its proper character. Aphis produces a characteristic action with protosulphate of iron, producing with it a greenish yellow colour as intense as that of iron; when it is dissolved in five gallons of water visibly colour it. The aphis which does not gelatinize produces the same effect: a solution of it in boiling water gives a blood-red precipitate with a solution of the salt of iron. With nitric acid aphis yields carboxylic acid and some traces of oxalic acid.

**APOPHILIC Acid is obtained from cotarium [CHEMISTRY, P. C. S., p. 342], and is not formed with certainty. It crystallizes with or without water; in the latter case the crystals have the form of coarse crystals, which are colourless: the cleavage faces have a peazly lustre resembling apophyllite, and hence the name bestowed on this acid. The crystals lose water, when heated, even under water, and become white without altering their form: they contain 9 per cent, of water, and are but little affected by boiling. A saturated boiling solution yields long prismatic crystals on cooling, which do not effloresce; the acid which crystallizes from a solution that has not been boiled, has the cube-octahedral form, and contains water.

This acid has a slight and salutary taste; it resists litmus-paper, and it is insoluble in alcohol and in ether. The salts which it forms with bases are soluble: the ammoniacal salt crystallizes in tables, and is very soluble; the salt of silver, formed by double decomposition, is after a certain time deposited, in which crystals are incrusted with nitrate of silver.

ARABIN. [Gum, P. C.]

**Arisenic, Detection of.** In addition to the modes of detecting arsenic already given, we may describe that proposed by Mr. Marsh, which is of unquestionable decided, and may be adopted in conjunction with that of reducing the oxide to its metallic state; indeed it is such in point of fact. The liquid suspected to contain the poison is acidulated with sulphuric acid and placed in contact with metallic zinc, both of which must be previously ascertained to be free from arsenic; if any arsenic be present in the liquid, the hydrogen gas generated reduces and dissolves it, forming arsenuretted hydrogen gas. This gas is to be lighted at a jet, and a piece of white porcelain or glass is to be held over the flame of the jet. If any arsenic be present, a brilliant black spot of metallic arsenic is deposited on the glass or porcelain. It has been supposed that antimony will produce similar results, but it is stated in reply to this, that arsenic when received on glass is insoluble by transmitted light, while that from antimony is grey-black, and both are opaque at the centre. The annexed drawing represents a convenient form of instrument for the purpose: it consists of a bent tube, having two bulbs blown upon it, fitted with a stopcock and narrow jet. Slices of zinc are to be put into the lower bulb, which is afterwards to be filled with the acidulated liquid to be examined; on replacing the stopcock, closed, the hydrogen gas, or arsenuretted hydrogen gas, as the case may be, collects and forces the fluid into the upper bulb, which then acts by its hydrostatic pressure upon the glass and gas through the jet as soon as the stopcock is opened.

The other method of proceeding is to blow a slip of bright yellow paper into the fluid suspected, previously acidulated with hydrochloric acid. If arsenic be present, the copper is covered with a whitish alloy, and then by heating the metal in a test tube, the arsenic is volatilised.
338 and insoluble it is slowly lues short the tube, contracted.

This is done, until the arsenic is collected, and it is placed in a small glass containing fuming nitric acid, in which the arsenic is dissolved with the assistance of heat. The solution obtained is then evaporated over a water-bath on a watch-glass to dryness, to drive off the nitric acid. Arsenic acid is soluble, while antimonious acid, or oxide of antimony, is insoluble. The arsenic acid, when mixed with a portion of silver, yields a brick-red precipitate of arseniate of silver. The arsenic collected in the second tube is not employed in this manner, but sealed at both ends, and preserved to be presented as evidence.

The third tube should be of rather greater diameter, in order that after the arsenic has been collected in it the hydrogen gas expelled by air, the arsenic may be asd in it and sublimed as arsenic acid, when the usual octabed form of the crystals may be resolved from the mass of glass. The arsenic acid may be then washed out with water containing a little ammonia to test it with nitrate of silver.

The zinc and sulphuric acid employed in these experiments are previously submitted to examination in the apparatus, in order to ascertain that they are free from arsenic.

The great advantage of the above-described apparatus is stated to be that none of the arsenic is lost, as the experimenter has it in his power to regulate the passage of the gas through the heated tube as slowly as he chooses, and the engagement of gas may be stopped at pleasure, if any circumstance should require delay.

Arsenic, a peculiar substance obtained from arsenopyrite, and also from marshmallow root; it is also contained in the potato, liquorice-root, and beet-root.

It crystallizes in transparent, limpid, colourless prisms. It is insidious, has a mawkish disagreeable taste, and is rather hard: it dissolves more plentifully in hot water than in cold, and is dissolved by dilute alcohol, but is insoluble in absolute alcohol, ether, and in oils, both volatile and fixed.

Acids, as well as the alkalis, decompose it when heated, but not when cold: the results are aspartic acid and ammonia.

It is an alloy of copper and tin, to which small proportions of zinc, and it is even stated of lead, are sometimes added. According to Dumas, the most famous copper consists of four parts of copper and one part of tin, which are not far from four equivalents of copper and one equivalent of tin. [BRONZE, P. C.; BELL-CASTING, P. C. 8.]

Benzil. In order to obtain this compound a current of chlorine is passed over a mixture of benzil in a solution of hydrochloric acid and sodium. The mass obtained by cooling is to be dissolved in boiling alcohol, which as it cools deposits benzil.

Benzil crystallizes in six-sided prisms; they are transparent, inodorous, and tasteless, and of a sulphur yellow color; they fuse at about 200°, are insoluble in water, but dissolve in alcohol and ether; volatile without decomposing, insoluble in an aqueous solution of potash, when boiled in 8, but dissolve in an alcoholic solution. The alcohol decomposes with the production of a blue colour and of benzilic acid. Formula C₆H₄O₁, which is the same as that of benzil.

Benzilic Acid.—Formed by boiling benzil or benzil in an alcoholic solution of potash, in which they dissolved with a violent hiss, which disappears on continued boiling; small portions of potash are to be added occasionally as long as it causes any blue color, after the previous portion has been decolorized by boiling; the solution is then to be cautiously
neutralised by hydrochloric acid, which separates a resinous matter; to the filtered solution excess of hydrochloric acid is added, and on cooling the benzilic acid crystallises.

It is refined in the form of colourless, bright, transparent, rhombic crystals, or in long prismatic crystals; it is sparingly soluble in cold water, but dissolves more readily in boiling water. It melts at 248°, and its aqueous solution is very slightly soluble in alcohol; benzilic acid is obtained, accompanied with yellow vapours, and a residue of charcoal. Concentrated sulphuric acid dissolves it cold, and acquires a bright crimson colour.

The formula of benzile is C\(\text{H}_4\)\(\text{O}_2\)\(\text{N}_2\), or two equivalents of water.

Benzilic acid combines with bases to form salts, and of these the potash and silver salts have been examined: the former crystallises in large transparent crystals, which are soluble in water and in alcohol; the latter salt is a white crystalline powder, insoluble in water; its formula is C\(\text{H}_4\)\(\text{O}_2\)\(\text{Ag}\)\(\text{O}\).

Benzilide is one of the ingredients of crude bitter almond oil; it crystallises in lamine or white acicular crystals, which are very light and have a pearly lustre. Benzilide is insoluble in water, very slightly dissolved by boiling alcohol, and rather more soluble in pyridine spirit; it melts at 323°, is very inflammable, and burns with a red sooty flame; it is dissolved and decomposed by concentrated hydrochloric, nitric, and sulphuric acids; the latter solution has a deep indigo blue colour, and becomes green on adding excess of acid. The characterisation of benzilide is its formula C\(\text{H}_4\)\(\text{O}_2\)\(\text{N}_2\).

**Benzil. Hydroxyl of.** When the residue of bitter almonds from which the fixed oil has been expressed is distilled with water, the product of the operation is bitter almond oil, which does not appear to exist previously in the almonds. This oil contains benzeno, benzilic acid, and hydrocyanic acid; to purify it, it is made into a thin paste with water, hydate of lime, and chloroide of iron, and redistilled; the oil which passes over from the air is free from a peculiar smell, due to chloroide of calcium. Hydrate of Benzil, when pure, is a transparent limpid fluid, of a strong peculiar odour, and burning taste; its specific gravity is 1-043; it refractions light strongly, and it is soluble in alcohol and water; it mixes with alcohol and ather; its vapour is inflammable, and burns with a smoky flame; when exposed to the air it absorbs oxygen and is converted into a mass of benzilic acid.

When treated with solid hyrate of potash, it dissengages hydrogen and yields benzilic acid of potash. The crude product, which is extremely poisonous, is however sometimes used for flavouring custards, &c.

It is composed of benzil combined with an equivalent of hydrogen, and its formula is C\(\text{H}_4\)\(\text{O}_2\)\(\text{H}\) + 2\(\text{H}_2\); its equivalent is 106.

**Benzil, Chloride of.** This is prepared by passing a current of chlorine through anhydrous hydreur of benzil, until hydrochloric acid ceases to be evolved; the yellow mixture obtained is to be heated until it becomes colourless.

The chloroide of benzil is a colourless liquid, which possesses a peculiar, very strong, and disagreeable odour, and it affects the eyes; its specific gravity is 1-060; it boils at 417°; its vapour is inflammable, and it burns with a sooty flame which is green on the edges. Cold water slowly, and hot water more readily, converts it into hydrochloric and benzilic acid. When treated with the alkalia, an alkaline benzoate and chloroide are produced. It dissolves phosphorus and cyanure of phosphorus and nitric acid, slightly soluble in sulphuric acid; in hot alcohol, slightly soluble in cold alcohol, and insoluble in ether.

It is composed of 14 equivalents of carbon = 84, 5 equivalents of hydrogen = 5, 2 equivalents of oxygen = 16, 1 equivalent of chloride = 36; its equivalent is 141, its formula C\(\text{H}_4\)\(\text{O}_2\)\(\text{Cl}\), or Be Cl.

**Benzil, Bromide of.** is prepared in the same way as the chloride. Its properties are— that it forms colourless crystals, which by exposure to the air become brown; water and the alkaus decompose it, as they do the chloride; ether and boiling alcohol dissolves it without change. Its formula is C\(\text{H}_4\)\(\text{O}_2\)\(\text{Br}\), or Be Br.

**Benzil, Iodide of.** is prepared by distilling a mixture of chloride of benzil and iodide of potassium; the result of their action is a crystalline mass, colourless brown by an excess of iodine; when water and the acids are combined, but they become brown by exposure to the air; water and the alkaus decompose it. Its formula is C\(\text{H}_4\)\(\text{O}_2\)\(\text{I}\), or Be I.

**Benzil, Sulphuret of.** is obtained by distilling a mixture of sulphuret of lead and chloride of benzil: the product is a soft crystalline mass, which has a very unpleasant smell; boiling water acts but little upon it, but potash converts it into sulphuret of potassium and benzilic acid. It dissolves unchanged in alcohol and ether, and is combustible. Its formula is C\(\text{H}_4\)\(\text{O}_2\)\(\text{S}\), or Be S.

**Benzil, Cyanide of.** is prepared by distilling chloride of benzil with bichyanide of mercury. The product is a yellow oil, which is rendered colourless by rectification. It has a very strong smell, similar to that of cinnamon, which causes a burning sensation in the eyes; its taste is similar to that of an after taste of hydrocyanic acid: it is very inflammable.

**Blu B. Prussian. [Blue, P. C.]**

**Bromil, the colouring-matter of Brazil wood, or Fernambuck.** The crude product, for the colouring principle is a compact mass, of a deep yellowish red colour, very soluble in water and in alcohol. The aqueous solution is a reddish yellow colour, and becomes more red by exposure to the air, and paler by the addition of a little sulphuric, or nitric acid, but reddens by excess of acid, and is precipitated in floculi. Sulphuret of hydrogen and sulphuric acid decolourizes it; strong acids restore the red colour of the solution. Alkalis alter the colour to violet.

**Bromine, acid, hydrochloric, hydrobromic, nitric, and citric acids, &c.** First render Brazil-wood paper red and then yellow, or even at once yellow; sulphuric acid bleaches it. It is composed of carbon 63-324, hydrogen 3-967, oxygen 34-709, in 100 parts.

According to Chevreul, pure bresilin crystallises in small acicular crystals of an orange colour, which are partly volatileised by heat, and partly decomposed into a liquid containing acid and ammonia. Nitric acid converts it partly into carboxylic acid.

**Bromine, vegetable.** From water. From vegetable matter, and by reduction of bromine with alcohol, or by exposure to the air. It is a colourless, oeguline liquid, obtained by the action of bromine upon alcohol; it possesses a very strong and peculiar odour, which excites tears; its taste is caustic; its density 3-34; boils below 102°. It does not act upon vegetable oils and waxes, and is not attacked by the alkalis. Chlorine and fuming nitric acid decompose it. It dissolves sulphur and phosphorus without altering them. Caustic alkalis convert it into an alkaline formate and perbromide of formule. Its formula is C\(\text{H}_4\)\(\text{O}_2\)\(\text{Br}\). It forms a crystalline solid when combined with water.

**Bromine, P. C.** Some late experiments seem to prove that the equivalent of bromine is 80, rather than 79 adopted in Bromine, P. C.

**Bromiform.** This compound is obtained by distilling a mixture of bromide of lime with alcohol and water. It is a heavy liquid, its specific gravity being 2-10. It is volatile. By potash it is converted into bromide of potassium and formate of potash. Its formula is C\(\text{H}_4\)\(\text{O}\)\(\text{Br}\).

**Bucaille, a vegetable alkaloid discovered by Pelletier and Cantou.** It exists in the bark and seeds of the nux-vomica and in St. Ignatius's bean. Brucia crystallises by spontaneous evaporation from dilute alcohol, in prismatid crystals, which are colourless, transparent, and often some lines in thickness, and sometimes in stellated needles, or in poorly scales. Brucia is inodorous, has a very bitter taste, and is poisonous. It is unalterable in the air, requires 550 parts of cold and 500 parts of boiling water for solution; it is very soluble both in cold and boiling alcohol, and in ether and fixed oils.

According to Liebig, brucia consists of 44 equivalents of carbon = 284, 26 equivalents of hydrogen = 23, 2 equivalents of oxygen = 16, and 2 equivalents of chlorine = 35. Its equivalent is therefore 359. Its formula is C\(\text{H}_4\)\(\text{O}_2\)\(\text{Br}\).

Anhydro brucia, obtained by fusing the crystals, has a 2 X 2
easy appearance; the crystals contain about 16.6 per cent. of water.

It combines with acids to form salts, which are readily obtained by dissolving it in them previously diluted. They possess the following properties:—They are mostly soluble and crystallizable, and have a bitter taste; they are decomposed by heat and the fixed alka
ds, and by morphia and strychnia, all of which precipitate the brucia; on the addition of tannic acid tannate of brucia is thrown down; nitric acid renders the salts of brucia red.

Caramus is the peculiar principle of bryony-root to which its power is owing; it is a yellowish, it is a substance, sometimes with a red or brownish tint; its taste is at first rather sweet, then styptic and extremely bitter. It is soluble in water and in alcohol, but insoluble in ether; chlordone does not form a chloride of arsenic and silver, acquiring first blue and afterwards a green colour. When decomposed by heat it yields ammonia. Alkalis do not alter it: the aqueous solution is precipitated white by nitrate of silver, and yellow by chlorid of gold, while by protentrate of mercury and by dis
carbonate of lead; tincture of galls precipitates it of a bright grey colour. It is a drastic purgative, and poisonous in too large doses.

Cacodyl and its Compounds.—Arsenious acid and acetate of potash are obtained by the decomposition of cacodyl, which is precipitated into a glass retort, to which a cooled receiver is adapted, with an apparatus to carry off the insoluble gaseous product, which is chiefly carbot
nic acid. When the heat has been long continued, some metallic arsenic and two liquids are found in the receiver: the lighter is a solution of water and acetone, and the heavier is impure oxide of cacodyl, or alicasin, formerly called the liquer of Cadet.

The product is obtained in a pure state by repeated washing with alcohol. Ether extracts the oxide of cacodyl from hydrous potash in a retort containing hydrogen gas; this operation, on account of the poisonous nature of alicasin, must be conducted in the open air.

The properties of this substance are,—that it is a colourless liquid; its density is 1.462; it smells extremely disagreeable, and the vapour affects the eyes and nose. Water dissolves little of it, but alcohol takes it up readily; it boils at about 500°, and solidifies, becoming a white crystalline mass, at 9°. By exposure to the air a dense white smoke is emitted, the alicasin becomes hot, and afterwards burns spontaneously with a pale flame, producing arsenious acid, carbonic acid, and water. It is composed of 4 equivalents of carbon =24, 6 equivalents of hydrogen =6, 2 equivalents of arsenic =76, 1 equivalent of oxygen =8. Its formula is C(II)AsO=2Kd O.

Chloride of Cacodyl.—Mix a dilute alcoholic solution of oxide of cacodyl with one of bichloride of mercury, avoiding an excess of the latter; by their mutual action a colourless inco
donous precipitate is obtained, which is filtered off and then distilled with hydrochloric acid; there are formed water, bi
cloride of mercury, and chloride of cacodyl, the latter coming over; this is subjected to the action of lime and chloride of calcium. A solution of the precipitated in a retort contains a gas of carbonic acid. The chloride of cacodyl thus produced is a colourless acid; its odour is more disagreeable and its vapour more poisonous than that of the oxide of cacodyl; it does not fume when exo
dosed to the air, but its vapour, which is colourless, is sponta
neously inflammable in water; alcohol combines with it readily, but ether does not; its boiling-point is a little above 212°. Its formula is KdCl2

Cacodyl. It is from the chloride of cacodyl that this base is immediately obtained. Digs a tube in chloride of cacodyl for three hours, in a glass bulb blown out, and fill with water; the gas of cacodyl dissolves in it, and is rendered pure by careful distillation from a fresh portion of zinc.

Its properties are,—that it is a thin, transparent, colourless liquid, which may be boiled in air, and is so very strongly flammable, that when poured into oxygen, chlorine, or the air, it immediately takes fire; it boils at 338°; when cooled to 21° it crystallizes in large transparent square prisms. It is heavier than water, and being nearly insoluble in it, sinks in alcohol and ether dissolves it. Its formula is C(H)AsO=Kd.

Cacodylic Acid. Alergen.—When cacodyl or its oxide is left under water to the slow action of the air, they oxidize and become cacodylic acid; or it may be prepared by adding oxide of mercury to oxide of cacodyl, covered with a layer of water, and artificially cooled until the mixture loses all odor; any cacodylate of mercury, which may have been formed, is to be decomposed by the cautious addition of more oxide of ca
codyl; by evaporation to dryness and solution in alcohol crystals of cacodylic acid are obtained, which have the following pro
perties:—1. They are more or less yellow in color, prismatic, permanent in a dry atmosphere, but deliquescent in a humid one. Cacodylic acid is insoluble in ether, but dissolved by alcohol, and the solution has an acid reaction; it yields by combination with the alkals and evaporation a gum mass: 2. It forms a crystalline compound with the oxides of silver and mercury. Its symbol is KdO.

Cacodyl combines with iodine, sulphur, cyanogen, and various other bodies, yielding compounds which have been particularly described by Boasen, and which an account may be seen in Turner's 'Chemistry' and Graham's 'ele
ments,' and also in Liebig's 'Organic Chemistry.'

Catharmin. Spanish flies contain a crystalline principle discovered by Robiquet. In order to isolate it, the flies are to be digested in water; the solution is to be evaporated to dryness, and treated with boiling alcohol; the alcoholic sol
ution is to be evaporated to dryness, and treated with ether, which dissolves the catharmin and by spontaneous evaporation is obtained a crystalline substance which is purified from some yellow matter by washing with alcohol.

The properties of catharmin are,—that when pure, it is insoluble in water; but very soluble in boiling alcohol, and crystallizes from it the solution cools. It is also very soluble in alcohol, ether, and chloroform; on heating it boils and dis
solves it; when melted, and sublimates without decom
posing, at a high temperature. It is to this principle the catharmin owe their blisting power.

According to Bognahl, Catharmin consists of carbon
61.98, hydrogen 6.04, and oxygen 32.98, or C4H8O4.

Captorom is a colourless, limpid, volatile oil, obtained by Reichenbach, with several other products, from the heart of tar: its odour resembles that of ginger, and it has a styptic
action. Dens. 0.9049; its titre is 345°; when boiled in alcohol, it boils at 545° Fahrenheit, and distils unattarcted; it burns with a sooty flame; it is very slightly soluble in water, but dis
solves in alcohol, ether, essential and fixed oils. It dissolves phosphoric acid, sulphur, and selenium. It combines with chlo
rine, emitting hydrochloric acid. It mixes with sulphur
ic acid, and imparts to it a red colour; nitric acid converts it into oxalic acid, carbolistic acid, and another crystalline substance which has not yet been examined. Acetic acid takes up captorom, and it dissolves several organic acids; poses and sodium act but slightly upon it, and the alkals and alkali
eárth decompose it but slowly. It has not been ana
lysed.

Carrham and Catharmin. The yellow colouring
matter of carthamus is to be extracted by water, and it is then to be sprinkled with a very dilute solution of carbonate of soda, which dissolves the carthamin; this to be precipitated by a
salt of lead, and the oxide of lead separated by hydri
carmine. The oxide of lead, which is obtained which by spontaneous evaporation yields small prismatic crystals of pure carthamin. Its properties are,—that it has a slightly bitter taste, and is only sparingly soluble in alcohol.

When exposed to the air it becomes yellow. Sulphuric acid, when cold, dissolves it without alteration, but when heated it blackens; hydrochloric acid and nitric acid do not alter its colour, but dissolve it when heated; when exposed over mercur
cy to oxygen gas, it becomes yellow. By the action of ammonia, upon a glass tube, enclosed in a current of air, it becomes in
mediately yellow, and then passes rapidly to a rose colour. It is in this state that the acids, and particularly citric acid, precipitate it from the alkali, possessing the well-known for
mula C4H8O4. By the action of lime, or milk of lime, it is called M. form
thamin. When carthamin is mixed with an alkali, it does not become coloured without the presence of oxygen. Ammonia produces this effect but slowly; neutral acetate of lead added to a solution of carthamin, produces a white precipitate, which, after being filtered off and then washed with cold water, will not change its colour by the air.

Carthamin submitted to analysis appeared to be com
posed of Twenty-six equivalents of Carbon 160 or 76.00
Nine equivalents of Hydrogen 9 4.39
Five equivalents of Oxygen 40 19.44

Formula C4H8O4 Equivalent 205 100
CHE 341 CHE

The crystals contain 2 equivalents of water = 18, which they lose when heated.

Carthamin is composed of
Twenty-six equivalents of Carbon 156 or 70-59
Nine equivalents of Hydrogen 9-97
Seven equivalents of Oxygen 55 25-34
Equivalent 221 100

Its formula is C\textsubscript{34} H\textsubscript{34} O\textsubscript{34}. Carthamin which has been decolorized and rendered yellow by exposure to the action of the sun and air, consists of
Twenty-four equivalents of Carbon 144 or 69-57
Seven equivalents of Hydrogen 7-35
Seven equivalents of Oxygen 56 27-05
Equivalent 207 100

Its formula is C\textsubscript{34} H\textsubscript{34} O\textsubscript{34}. It results from the proceeding analysis, that carthamin in contact with air and an alkali combines with two equivalents of oxygen and becomes red carthamin; and when exposed to an alkali and the sun's rays, it absorbs six equivalents of oxygen, and is rendered yellow.

Caras is the basis of the various kinds of cheese, and closely resembles albumen in many properties. It is insoluble in water, but a small portion of alkali renders it soluble; it may be prepared by adding dilute phosphoric acid to fresh milk when it is heated; but this process of separation is dissolved in a weak solution of carbonate of soda, and this is to be kept in a warm place to allow of the separation of the butter; these re-solutions in carbonate of soda and precipitations are to be repeated several times, and the insoluble casein is then to be precipitated with boiling water, and dealt with either, to remove any remaining butter or fatty matter.

Casein thus prepared is a curdy white substance, insoluble in water or alcohol, but soluble by water containing an alkali or its carbonate; dilute acids also dissolve a small portion of it. When moist, it reddens litmus-paper, and leaves about 0.8 per cent. of ashes by incineration. Casein is coagulated by certain animal membranes, as is shown in the process of making cheese, in which, by the action of a piece of the stomach of the calf, it is converted into a gelatinous incoherent mass, which, on the addition of lime, is coagulated, and, on being washed, a solid white coagulum which contains all the casein of the milk with portions of some of its other principles.

According to the analysis of Mulder, casein consists of
Carbon 54-98
Hydrogen 7-15
Azote 15-80
Oxygen 21-73
Sulphur 00-36

It is found that albumen, fibrin, and casein differ only in these particulars—the two first contain both phosphorus and sulphur, but in different proportions; while the last contains only sulphur.

Catalase, Catalytic Action. An Action of Presence. The term catalysis has been applied by Berzelius to a very close class of phenomena, in which a substance, by its mere presence, effects certain changes, either of composition or decomposition, without itself undergoing any change whatever. Thus when chlorine of potash and binoxide of manganese are mixed and heated, it is decomposed, and yields oxygen gas at a much lower temperature than it would do without the presence of the metallic oxide, which however suffers no decomposition or change whatever. This affords an instance of decomposition by catalytic force. An example may be given in which combination is perhaps occasioned by the same force; thus when a small particle of finely divided platinum is dropped into a mixture of oxygen and hydrogen gases, they immediately combine with explosion and the formation of water, and this is effected at any place in the state of the platinum; it has however been supposed, that in this case the combination is effected by the power of the platinum, owing to its greatly extended surface, in condensing the gases so as to form the water within the sphere of their mutual attractions. The action of yeast in fermentation has been considered also as an illustration of catalytic action; the presence of this substance, though invisible, is sufficient to cause the resolution of sugar into alcohol and carbonic acid gas, an effect which cannot be produced by any other means whatever. An example of the action of catalytic power in an organic secretion is afforded by the presence of the minute quantity of the vegetable principle diastase, which appears in the germination of barley and other seeds, and converts their starch into sugar and gum, which, being soluble, form the sap that rises into the germ, and nourishes the plant.

Cheddite, a new substance obtained by Roebenbach from the lighter oil of hard-wood tar: this is to be treated first with carbonate of potash, and afterwards with caustic potash, to separate the euphon and other substances, and the potash is then treated with acetic acid; by this an oil separates, of which some remains in solution with the acetate of potash, and may be obtained by distillation. As soon as the liquid which comes over precipitates protosulphate of iron red, it is to be preserved, and is cedretite.

The properties of this substance are—-that it crystallizes in a solution of protosulphate of iron, in red, slender, inflammable crystals. Heat decomposes it; sulphuric acid dissolves it with a blue colour, and nitric acid decomposes it completely. It is insoluble in water, alcohol or ether, oil of turpentine or petroleum, but dissolves in some in a purple colour, and is precipitated from it by alcohol in a crystalline state. It is probably to the presence of this substance that the different colours of wood-tar are owing. It has not been analyzed.

Chamisso Mineral. [Manganese—Manganic Acid, P. C.]

Chlorine. M. Pelouze has found that 100 volumes of water dissolve then mentioned volumes of chlorine gas at the temperatures stated:

<table>
<thead>
<tr>
<th>Volumes of Chlorine Gas</th>
<th>175 to 180</th>
<th>at 32° Fahrenheit.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>270 275</td>
<td>48°</td>
</tr>
<tr>
<td></td>
<td>270 275</td>
<td>50°</td>
</tr>
<tr>
<td></td>
<td>250 255</td>
<td>53°</td>
</tr>
<tr>
<td></td>
<td>200 210</td>
<td>57°</td>
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<td></td>
<td>155 160</td>
<td>86°</td>
</tr>
<tr>
<td></td>
<td>115 120</td>
<td>104°</td>
</tr>
<tr>
<td></td>
<td>50 55</td>
<td>149°</td>
</tr>
</tbody>
</table>

Dr. Draper has found that when chlorine gas is exposed to the direct solar rays it undergoes a permanent change, which is obtained in the course of a liquid, the liquid is heated so hot that it is decomposed into chlorine and an acid; it has been observed that the acidity of its solution arises from the presence of hydrochloric and iodic acids, generated by the decomposition of water.

Iodine, when dry, absorbs chlorine at common temperatures with the evolution of heat; when the iodine is perfectly saturated with chlorine, the compound is orange-yellow, but red-dish-orange if the iodine be in excess. By heat it is converted into a yellow-coloured liquid, yielding a vapour of the same colour when the temperature is increased. It is readily soluble in water, and forms a colourless solution which is very sour to the taste, first reddens and then destroys vegetable blue colours. It probably consists of 1 equivalent of chlorine 36, and 1 equivalent of iodine 126 = 162.

Chlorobenzoic, a compound produced by the action of chlorine upon oil of cinnamon. When pure, it exists in the state of brilliant, colourless, acicular crystals, which fuse and volatilize by heat without change. Even when heated in concentrated sulphuric acid it is not decomposed, nor is it altered by boiling in ammonic gas. It consists of 18 equivalents of carbon, 4 of hydrogen, 4 of chlorine, and 2 of oxygen. Its formula is C\textsubscript{18} H\textsubscript{18} C\textsubscript{18} O\textsubscript{4}. It appears that its formation depends upon the decomposition of hydrogen from oil of cinnamon by 4 equivalents of chlorine.

Chlorocyanic Acid. [Cyanogen, Chloride of, in Chemistry, P. C. S.]

Chloromated, Chloromalic Acid. This compound is prepared by causing chloroform of salticly to absorb dry ammoniacal gas. The result is a yellow mass, which is insoluble in cold water, and decomposed by it when boiling. It is soluble in boiling ether; and, as the solution cools, it separates in iridescent crystals of a yellow colour. It is soluble also in absolute alcohol. When heated in an acid it is decomposed,
yielding an ammoniacal salt of the acid employed, and chlor-ide of salicyle. By the action of the fixed alkalis ammonia is evolved, and chlor-ide of salicyle remains in solution. It results from the combination of 2 equivalents of ammonia with 3 of the acid, and the separation of 3 equivalents of water. Its formula is \( \text{C}_6 \text{H}_5 \text{N}_2 \text{O}_5 \text{O}_4 \text{C}_6 \text{O}_6 \).  

CHEBEN. This substance was obtained by Laurent from pitch or gas tar by repeated distillation. The products which come over last consist of a soft reddish or yellow mass, and of a yellow crystalline matter which is visible. The reddish mass, which condenses in the neck of the retort consists principally of chrysian, so called from its golden colour, while the receiver contains pyren. [Pyren, in Chemistry, P. C. S.]

The products are separated by ether, in which the pyren only is soluble. When the ether solution is placed in a freezing mixture the pyren crystallizes. Chrysian is yellow, crystalline, inodorous, and tasteless. It is insoluble in water or alcohol, and not very soluble in ether. Boiling oil of turpentine dissolves a small quantity of it, which afterwards separates into crystals. Warm concentrated sulphuric acid dissolves it, and it assumes a beautiful green colour. Nitre acid, chloric acid, and bromine all decompose chrysian. It melts at about 450° Fahrenheit, and at a higher temperature volatilizes, with partial decomposition. Its composition is similar to that of iodrallin; or it is a tereartebute of hydrogen, composed of 18 carbon and 1 hydrogen. Its formula is \( \text{C}_6 \text{H}_5 \text{N}_2 \text{O}_5 \text{O}_6 \).

CHEMIASTRA, a vegetable alkali discovered by Manzini in cinchona ovoa; it is extracted in the same manner as quina and cinchonia. Cinchovatina is insoluble in water, but dissolves in alcohol; and the solution yields large colourless inodorous prisms, which after some time have a bitter taste. It is an alkaline reaction. It melts between 359° and 374° Fahrenheit.

The salts of cinchovatina are soluble, and crystallize very readily, especially on the cooling of a saturated boiling solution in water is insoluble in ammonia, and crystallizes from the solution by evaporation. It appears to consist of 45 equivalents of carbon = 276, 27 equivalents of hydrogen = 27, 2 equivalents of azote = 26, and 8 equivalents of oxygen = 64, giving 305 as its equivalent. Its formula is \( \text{C}_6 \text{H}_5 \text{N}_2 \text{O}_5 \text{O}_6 \).

COTAKNINA, an alkali discovered by Rohivet in opium, is obtained as an accidental product in the preparation of hydrochlorate of morphia by Gregory's process. This salt is to be dissolved in water, and the morphia is to be precipitated by caustic ammonia. This alkali does not throw down the cotedia; and it therefore remains in solution. By evaporating the solution, a double salt of hydrolchlohte of cotedia and hydrochlorate of ammonia is obtained; and this, after being suspended in the water, is precipitated with a small quantity of water, and then treated with a solution of potash, which separates the cotedia in the form of a tenacious mass, which eventually hardens and becomes crystalline: this is to be treated with water and dried, and the cotedia is obtained by evaporation, especially if a little water be added.

Cotedia crystallizes in regular octohedrons, which are colourless and transparent. They have a bitter taste, a strong alkaline reaction, are very soluble in alcohol and in ether, but insoluble in solutions of the fixed alkalis, which distinguishes cotedia from morphia. It does not reddens nitrice acid, nor render chlorine of iron blue.

Cotedia is much more soluble in water than morphia, 1 part requiring about 60 parts of cold water, and 17 of boiling water for solution. When heated in a small quantity of water it liquefies, and forms oleaginous drops, which are heavier than water. Its composition is denoted by the formula \( \text{C}_6 \text{H}_5 \text{N}_2 \text{O}_5 \text{O}_6 \).

Cotedia forms salts with acids, some of which crystallize, as is the case with the nitrate. Their solutions are precipitated by tincture of gall, which produces no effect on the salts of morphia.

COTAKNA, CONCINC, an alkali obtained from hemlock (Connicina) is procured from the juice of the plant by distillation with water holding some potash in solution. When pure, it has the following properties:—It has the appearance of colourless volatile oil, and is lighter than water, its specific gravity being 0-99. Its odor is powerful, diffused, and peculiar; and the taste is of hemlock. It is intensely acid to the taste. It has a strong alkaline reaction on turmeric-paper. It combines readily with and neutralizes acids; and some of the salts which it forms with them have been obtained in a crystalline state. It is sparingly soluble in water, and what is remarkable is, that it is more soluble in cold water than in hot. It imparts its odor and taste to water. Alcohol mixes with it in all proportions; and it also dissolves readily in ether. With about one-fifth of its weight of water it forms a hydiate. By exposure to the air it quickly becomes of a dark colour, and spontaneously decomposes, which is the evolution of ammonia and the formation of \( 370^o \) Fahrenheit. It distils however with boiling water, but suffers partial decomposition.

It is one of the most virulent poisons known, destroying small animals by a very small quantity and in a very short time. Its composition has not been determined with certainty, but it is probably represented by \( \text{C}_6 \text{H}_5 \text{N}_2 \text{O}_5 \text{N}_2 \), or 18 equivalents of carbon, 16 of hydrogen, and 27 of oxygen.

COTAKNA is a salt of organic acid obtained from narretta by the action of sulphuric acid and oxide of manganese, and subsequent tedious operations.

Cotarnina assumes the form of a radiating mass. It is readily soluble both in water and in alcohol, and imparts to them an intense yellow colour. It has a very bitter taste, and a slightly alkaline reaction. When it is heated, it melts, carbonizes, and emits a disagreeable odour. The charcoal which it leaves is difficult of incineration.

It combines with ands ammoniac.

When treated with hydrochloric acid it dries into a yellow amorphous mass in which crystalline nuclei are occasionally visible. The alkalis do not precipitate it from solution in hydrochloric acid; but it is decomposed by bi-chloride of mercury, and nitric acid, and by tannic acid. M. Wehler, who discovered this acid, states that he is not quite satisfied with the analytical results which he has hitherto obtained. These gave carbon, 60; hydrogen, 61; azote, 60; oxygen, 18, in 100 parts.

CRAYOGEN, CHLORIDES OF, ChloREOACID. This compound is obtained when anhydrous hydrocyanic acid is exposed to chlorine gas acted upon by the sun's rays; hydrochloric acid being all at once. The properties of this substance are, that it has the form of long colourless needles, which have a powerful and disagreeable odour. The crystal fuse at 254°, and sublimes unaltered at a higher temperature. It dissolves in alcohol and ether without decomposing; but when it is boiled with water, it is decomposed into cyanide and hydrochloric acids. It was probably owing to the formation of these acids that chloride of cyanogen was originally supposed to possess acid properties; and hence the name of cyanogenic acid. It may be obtained by decomposing 3 equivalents of chlorine 108 + 3 equivalents of cyanogen 78 = 186. Its formula is \( \text{Cl}_2 \text{P}_2 \).

Chlorine and cyanogen form another compound, which is gaseous. It is obtained by passing chlorine gas into strong hydrocyanic acid; or by decomposing nitrochlorine over moist cyanide of mercury excluded from the light.

This compound is a colourless gasous body, extremely pungent, and soluble in water, alcohol, and ether. At room temperature and pressure it melts into a liquid which boils at 11°. When subjected to a pressure of four atmospheres it assumes a liquid form; and if kept it is converted into the solid chlorole cyanogene just described; so that the two compounds are isomeric. It is composed of 1 equivalent of chlorine 26 + 1 equivalent of cyanogen 26 = 62. Its formula is \( \text{Cl}_2 \text{P}_2 \).

CRYSTIC ACID. This acid was discovered by Scheele in the distillation of uric acid; more lately Serullus obtained it by another process, and described it under the name of curse acid; and lastly Wehler and Liebig examined its constitution and properties.

This acid is formed under various circumstances, as by the decomposition of solid chlorine of cyanogen by water. The decomposition of soluble cyanates by dilute acid, and the distillation of uric acid, &c.

In order to prepare it, the best process seems to be to dissolve dry melam [MELAM, in Chemistry, P. C. S.] with a gentle stream of boiling water, and the solution is to be poured into 20 or 30 parts of water, and the mixture is to be kept for several days, at a temperature near ebullition, or until small portions yield no white precipitate with ammonia. The solution is then to be evaporated to its crystalline state, and the crystals obtained are to be purified by recrystallization.

Cyanuric acid forms rather small colourless prismatic crystals, which are efflorescent. It is very slightly soluble in cold water and requires 24 parts of boiling water to 1; it is inodorous, has but little taste, and reddens litmus bed
feebly. It is a remarkably permanent substance, being soluble without decomposition in concentrated sulphuric or nitric acid, though when heated in them it is eventually decomposed.

According to Liebig, the crystallized acid consists of 3 equivalents of cyanogen, 7 equivalents of oxygen 24, 7 equivalents of carbon and 16 equivalents of the water he considers to constitute the acid a hydrate, and that 4 equivalents are water of crystallization. It combines with 3 equivalents of base to form cyanamates, and is therefore what is termed a trisubiacid. By exposure to a very high temperature, fuming water in solution is decomposed into 3 equivalents of hydrated cyanic acid; and uric acid is heat converted into cyanic acid and ammonia.

Dextrine. An isomeric modification of starch procured by boiling the ordinary starch in water also in some other acids; by this treatment the starch soon loses its consistence and becomes thin and limpid, being converted into dextrine, so called from its action on polarized light, in causing the plane of polarization to deviate to the right. When sulphuric acid is used, it is to be saturated by the addition of chalk, and the liquor, filtered from the sulphate of lime formed, is to be evaporated to dryness in a water-bath.

Dextrine thus obtained is a white gum-like mass, without agreeable smell, soluble in cold water and precipitable from it by alcohol. Iodine is stated by some authors sometimes to produce no change in the solution of dextrine, and on other occasions to give a purplish red tinct.

The non-production of colour has, however, been stated to be a sign of impurity. Dextrine may be prepared by the action of an infusion of malt kept some time at 150°. Its composition is similar to that of starch. Dumas gives its formula C_6H_10O_4.

When the solution is continued after the formation of the dextrine, this substance is converted into grape sugar, and this effect is produced with great readiness.

Dextrine, but not quite pure, is used by calico-printers as a substitute for gum; it is obtained merely subjecting starch by the action of heat, and thus prepared is known by the name of British gum.

Diatase, a substance formed during germination. It is prepared by reducing freshly germinated barley into a pulp, with half its weight of water, and then pressing out the liquor strongly. To the clear liquid just sufficient alcohol is to be added to destroy its viscidity, and allow of its being filtered; by this an anesoterized substance is precipitated, which must be considered as vegetable albumen, since it coagulates at 167° F. Having separated this, alcohol is to be again added as long as the liquid becomes turbid; the precipitate is to be purified by solution in water and precipitation by alcohol repeatedly; the precipitate is last to be dried in thin layers upon glass at a temperature between 164° and 123° F.

The action of heat or of the acid has the following:—It is solid, white, not crystalline, soluble in water, but insoluble in alcohol unless it be weak; the aqueous solution is nearly tasteless, and without any chemical action, not precipitating subacettese of lemons. In aqueous solution quickly changes, becoming acid; dry diastase undergoes the same change in a longer time, but when boiled in water the alteration is immediate. Common malt is stated in general not to contain more than 1-600th of its weight of diastase; one part of it is sufficient to convert 2000 parts of starch, thickening the water, into a mixture consisting of much dextrine and a little sugar.

It has not yet been obtained absolutely pure.

Ditymium is a metal recently discovered in cerite. Cerite is a mineral with sulphuric acid, large red crystals, which are salt bars of ditymium; when potash is added to a solution of this salt, hydrated oxide of diitymium is precipitated; it has a bluish violet colour, and during washing it absorbs carbonic acid from the air, and when dried it consists mostly of carbonate of diitymium and is of a light reddish violet colour; by exposure to a red heat the carbonic acid is expelled, and the oxide is obtained in small lapses of a brown or blackish colour; the powder is light brown; if this oxide be heated at a white heat it assumes a bright greyish green colour. It has no alkaline reagent, and is very readily even by dilute acids, and they yield salts of an amethystine red colour; they are not precipitated by hydrosulphuret of ammonia unless heated; the oxide is insoluble in carbonic acid.

By the blowpipe the oxide mixed with the salt of phosphorus becomes amethystine red with a tint of violet; when heated with carbonates of soda or plumbago, it swells into a greyish white mass. It does not appear to have been reduced to the metallic state.

Dimorphone [Hominemorph, P.C.]

Elaterin, a vegetable principle extracted from the wild cucumber (Momordica Elaterium). To obtain it the evaporated juice of the fruit is to be treated with water, and the residue with alcohol, and the juice of grade 0–920 and the solution is to be evaporated to the consistence of a syrup; the elaterin then crystallizes; more is afterwards obtained by adding potash to the mother water; the matter obtained is to be purified by means of ether. Another process consists in treating the extract of the juice of elaterium, by which the elaterin is precipitated in the state of small silky crystals.

Elaterin has a bitter and somewhat astringent taste. It is insoluble in water and acid solutions; it is soluble in 5 parts of cold alcohol and 2 parts of boiling alcohol, and also in ether and fixed oils. It melts at a few degrees above 212°, and at a higher temperature it is volatilized in very acrid white vapours.

Concentrated acids decompose it: nitric acid converts it into a yellow gummy mass; sulphuric acid dissolves it, and assumes a deep blood-red colour.

Elaterin acts strongly as an emetic or purgative, in doses of 1–2th of 1–10th of a dram. It has not been analyzed.

Erasum, a metal discovered by Moore and associated with yttria. Its properties are but little known; some of them are as follows:—Its oxide becomes a dark orange colour when heated in contact with the air, which colour it loses with a little water; it is converted in hydroxide; it is to the presence of this oxide that yttria owes its yellow colour, when prepared as hitherto directed; the sulphate and nitrate of erbium are free from colour. It does not appear to have been reduced to the metallic state.

Fibre, Animal. The bodies of animals contain this substance both in a fluid and a solid state; in the former it exists in the blood, and in the latter form in muscular fibre, but that of venous differs from that of arterial blood. To obtain the former, human blood is to be triturated in a mortar with 10 times its weight of water, and one-third of its weight of nitre; and the mixture is to remain, during at least 24 hours, exposed to a temperature of about 100° to 190° F., by this it is rendered slimy and gelatinous, and at length it becomes liquid, exhibiting the properties of albumen which has been treated with acetic acid. When the blood is mixed with water, a flocculent substance is thrown down, which closely resembles congregated albumen. When arterial blood is employed in the same way similar changes are not produced, and the fibrin of venous blood loses the property if it has absorbed oxygen.

Solid fibrin is procured by washing thin portions of muscular flesh in cold water until they are rendered quite white, or in a purer state by stirring fresh blood with a stick to which has been attached a fibrin adheres. It is to be rendered pure by washing first with cold water, and afterwards by treatment with ether.

Fibrin, when fresh, exists in the state of long, white, elastic filaments; it is inodorous, tasteless, and insoluble in water whether cold or hot, but by long continued boiling a portion is dissolved. When dried at a gentle heat it loses about four-fifths of its weight, which loss is water, and it becomes then horny and translucent, and very much resembles albumen which has been congregated; acetic acid and fresh fibrin when kept for some hours in contact form a transparent gelatinous mass which is soluble in water; solution of potash dissolves fibrin, and the composition possesses many of the characters which belong to albumen.

According to Bertrand dried fibrin consists of 54.56
Carbon
Hydrogen
Azote
Oxygen
Phosphorous
Sulphur

100-

If it is admitted that the phosphorus and sulphur are in its definite combination, the formula of this substance will be

If this be admitted the phosphorus and sulphur are in a very unusual amount of equivalents. Its composition is precisely similar to that of congregated albumen, and, as already remarked, they have seven or seven and a half equivalents. A

Fibre, Vegetable. Is obtained from wheat flour by the following process:—Make the flour into a paste, and wash it on a fine sieve with a small stream of water; the gluten of the flour...
will remain, and a milky liquid will pass through the sieve, which when suffered to rest will in a few hours become clear by deposit of the ashes, by which it was rendered turbid. If this clear liquor be boiled, a flocculent precipitate is formed in it, which, when washed, dried, and purified by boiling ether, has the same composition as animal fibrin. When heated, it consists of a mixture of alkaline and hydrated fumaric acid, and an unhydrated form of the latter, and contains a trace of the former, in a state of hydrated fumaric acid, which is converted into the former by exposure to air or water. On standing, a white precipitate is formed, which is hydrated fumaric acid, and on evaporation of the liquid it is converted into the former. It has an agreeable odour and taste, and possesses a peculiar property of being solidified in masses of confused crystals of a white colour, at a temperature—120° Fahr. Euclorhine was easily converted from the viscous state into a solid crystalline body, which very slowly decomposes by the action of heat, and is changed to a dark orange red fluid. Nitrous oxide was obtained solid at the temperature of the carbonic acid bath in vacuo, and then appeared as a beautifully clear and colourless crystalline body.

Mr. Faraday conceives that in this state it might, in certain cases, be submitted to advantage in frigid processes, for arriving at degrees of cold far below those hitherto attained by the employment of the latter substance. Ammonia was obtained in the state of solid white crystals, but on being exposed to the atmosphere, this form was converted into a fluid.

The following liquids could not be made to freeze at—166°:—chlorine, ether, alcohol, sulphuret of carbon, camphor, and rectified oil of turpentine. The following gases were converted into a fluid state by liquefaction with carbonic acid bath, even when subjected to great pressure:—hydrogen and oxygen at a pressure of twenty-seven atmospheres, nitrogen and nitric oxide at fifty atmospheres, carbonic oxide forty atmospheres, coal-gas thirty-two atmospheres.

GLUTEN. [SUGAR, P. C.; GRAPE, P. C.]

Glutin, a peculiar natived vegetable matter which exists in small quantity with the gluten of wheat, and to which its adhesive properties are owing. It may be separated by boiling alcohol, together with the fluid oil which is separable by ether.

Glutin is adhesive, insoluble in water, when dried it is hard and translucent like horn; it dissolves in acetic acid and solution of potash. No analysis of this substance has been made, and the following is merely a conjecture from the habits of the plant.

The following is the result of an analysis of glutin, made by Mr. Faraday:

<table>
<thead>
<tr>
<th>Substances</th>
<th>Amounts</th>
<th>Per Cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sodium</td>
<td>0.77</td>
<td>0.5</td>
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<tr>
<td>Carbonic oxide</td>
<td>12.61</td>
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<tr>
<td>Calcium</td>
<td>2.92</td>
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<td>Nitric oxide</td>
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<td>Sulfuric oxide</td>
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<td>Phosphoric oxide</td>
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<td>Other Elements</td>
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GLYCERINE. [SUGAR, P. C.; LIQUORICE, P. C.]

Hæmatostin, the red colouring-matter of the blood; it has not however been obtained in a perfect state owing to the difficulty of separating it from other substances, and to the facility with which it undergoes change: when the corpuscles of blood which has been drained, is put into water, the colouring matter dissolves and forms a fine crimson coloured solution; this being further heated, the red solution is rendered black by carbonic or sulphurous acid, but its colour is heightened by air on account of the oxygen which it contains; nitrous oxide renders it purple, and sulphuretted hydrogen greenish black.

A peculiar peculiarity of hæmatostin is its containing oxide of iron, which does not occur in other parts of the animal system; when the clot of blood is decomposed by exposure to heat and air, the residue treated with hydrochloric acid exhibits by the usual tests the presence of peroxide of iron, unaccompanied by
HEMPHIC ACID is formed by the higher oxidization of opisic acid (OPILACI ACID, in CHEMISTRY, P. C. S.), one equivalent of which, by the addition of one equivalent of oxygen, gives rise to the equivalents of hemipnic acid; this addition is effected by heating either opisic acid or narcosin with dilute sulphuric acid and hydroxide of lead, care being taken not to decompose the hemipnic acid as it is formed.

Hemipnic acid crystallizes in colourless quadrilateral prisms. The crystals contain two equivalents of water, which are expelled below 212° Fahr. It has a slight taste, is soluble in water, melts at 356°, and sublimes like benzoic acid in shining laminae. It forms with ammoniac a readily soluble and even a soluble, hygroscopic, white, pulverulent powder, the composition of which is represented by that of the hemipnic acid, C<sub>10</sub>H<sub>6</sub>O<sub>2</sub> + AgO.

HERSPERIDIN, a neutral vegetable principle obtained from the spongy part of the peel of oranges and lemons, by digesting it in water, and afterwards treating the residue with alcohol, and evaporating the filtered solution. The matter left is to be treated with twenty times its weight of distilled vinegar, and the solution set by for a week, when the herperrdin is deposited, and is to be purified by recrystallizations from alcohol.

The properties of Herpereridin are:—It forms white silky masses, grouped in tufts or in massed forms; they are tasteless, and acquire a greenish hue as they become warm, and the substance which becomes electrical by friction; at a higher temperature, this substance decomposes without yielding ammoniac, and burns with flame and an aromatic colour. It is insoluble in cold water, and requires sixty parts of boiling water for solution; it is very soluble in boiling alcohol, but insoluble in ether. Nitric acid renders herperrdin yellow; sulphuric acid gives it first a yellow and then a red tint; hydrochloric acid imparts a greenish yellow colour to it. The aetic soda or potash precipitates it as a white water, persulpurate of iron precipitates it brownish red; it is soluble in the alkalies. No analysis has as yet been made of Hesperidin.

HEMOPHIC ACID, a product of the decomposition of narcotina by heat, which on being melted and exposed to a temperature of 428° is suddenly decomposed, with considerable insensibility, into ammoniac and a brown vesicular substance, which has the odour of the acid in question. This acid is a dark brown amorphous body, which melts on exposure to heat, and burns with a bright flame, diffusing an odor resembling that of narcotina. It is soluble in water, dilute acids, and in alcohol, giving with the latter a deep redcoloured solution. With this acid it forms saffron-yellow, brown, and ochre, or brown colours with base ingredients, in which it is obtained by a very complex and tedious process.

The properties of hemopinic acid are:—It crystallizes in small, white, lustrous, and it is often obtained in the state of a colorless or a yellow crystallized mass. When perfectly dry, it is inodorous; but when moist, especially if impure, it has a disagreeable stupefying smell, resembling that of tobacco. When anhydrous, hemopinic acid has no decolorizing reaction; but when mixed with water it has, on the contrary, a very decided decolorizing action. It is not volatile at common temperatures, and undergoes no change by exposure to the air; it melts at a low temperature, flowing F. C. S., No. 44.
brittle mass composed of crystalline grains, or else a fine and white powder, in which the salt adheres to the mother liquors.

It is insoluble in cold water, but very soluble in boiling water; the solution is fluid, and not gelatinous like that of starch. When it is very dilute, it does not become turbid on cooling; but alcohol, not being a solvent of inulin, precipitates it from this solution. It is precipitated by the addition of 10 parts of alcohol, and of 3 parts of water, 20 parts of alcohol, and 50 parts of water. The solution, when evaporated at a gentle heat, and as it goes off crystals of lactose are deposited, which are to be washed with pure water to separate the iodide of potassium.

The properties of the solution are:—It has the form of yellow, prismatic crystals, which have a slight disagreeable colour, somewhat resembling that of saffron; it is insoluble in water, but very soluble in alcohol, ether, and pyroxylin spirit. It sublimes at 212°, and decomposes at 248° into carbon, iodine, and hydroiodic acid. Its alkaline solution decomposes very readily.

IASTIC ACID. Iastin dissolves in potash with a deep purple colour, which becomes bright yellow by heat. The solution yields by evaporation a crystalline salt of potash, which is soluble in alcohol, and crystallizes in small, hard, colourless prisms. When a solution of this salt is mixed with one of acetic acid, a white precipitate is obtained, which, when diffused in water and decomposed by hydrosulphuric acid, yields a colourless acid liquid, and this by spontaneous evaporation yields a white and scarcely crystalline precipitate, which is hydastic acid.

The properties of iastic acid are:—It is perfectly insoluble in cold water, but when heated in water it is decomposed into iastin and water, the mixture being coloured with a reddish yellow colour; the solution iastate acts in the same manner with the mineral acids; when they are added to it cold, no decomposition is apparent; but as soon as heat is applied, the mixture becomes yellow, and deposits crystals of iastin.

Iastate of potash gives a white precipitate with baryte salts, solution, and with the *salt* of silver; it gives a white precipitate, which dissolves when heated in the mixture with a certain portion of the silver salt being reduced to the metallic state; the boiling solution of iastate of silver deposits crystals which are partly in laminae and partly granular. Its formula is *KINO*.

IASTIN, a substance obtained from indigo by the addition of two equivalents of oxygen. In order to prepare it, powdered indigo is to be mixed in water with equal parts of sulphuric acid and hot aqueous carbonate of potash, the last being dissolved in 50 or 50 parts of water. This mixture, and at first without the extraction of any gaseous matter, but towards the end with the disengagement of carbonic acid gas, and the formation of a deep yellowish brown liquid, from which the iastin separates, in crystalline form, is precipitated by the addition of a dilute alcohols, but not in cold water, and one in the last in alcohol.

The properties of iastin are:—It crystallizes in prisms, which are of a yellowish red or deep aurora-red colour, possessing much splendour when deposited from an alcoholic solution; they are slightly soluble in cold water; when heated, the crystals dissolve readily in boiling water and in alcohol: these solutions discolor the skin, and impart a disagreeable colour to it. The crystals are decomposed by heat, leaving a charcoal white precipitate, which, when heated, affords an alkaline carbonate, which converts into iastic acid. Its formula is *CINO*.

ITACONIC ACID. When citric or aconitic acid is distilled, two liquids are obtained in the receiver, the lighter of which mixes perfectly with water, whilst the heavier, which is almost colourless, is dissolved in a small quantity of alcohol. If it is slowly evaporated, a fine yellow line mass, to which a sufficient quantity of boiling water is to be added to dissolve the oleaginous liquid and the crystals formed, and the solution is to remain exposed to the air; after some days’ spontaneous evaporation, crystals of itaconic acid are formed, which, if for a longer time are be purified by repeated crystallizations from water.

The properties of the itaconic acid thus prepared are:—It crystallizes in rhombic tablets or rhombic octahedrons. It has no smell, but possesses a very strong acid taste. It dissolves readily in water, and 10 parts of it dissolve in 10 parts of alcohol, and of 3 parts of water. It is soluble in hot alcohol, and in ether; at 248° the crystals lose no weight. At 23° they melt, exhausting white vapours, and volatilizing without leaving a residue.

When subjected to distillation they decompose into a hydrosulphuric acid and water. The formula of this acid is *HO*-O-NOH.

Jervina, a vegetable alkaloid found with veratrin and saliculina is a very bitter root. It is white and crystallizes as white, yellow, or brownish crystals.

When a solution of it is dried, it becomes an amorphous, is dehydrated, and redissolves in water or alcohol. It decomposes at 148°.

KANTHAN. A new metal discovered by Moosander was what had been previously supposed to be entirely oxide of cerium; it is prepared by calcining the mixed nitrates of cerium and lanthanum; by this the oxide of cerium becomes disengaged, and the oxide of lanthanum, which is a powerful base, may be extracted by nitric acid diluted with 100 parts of water; when an alkaline carbonate is added to the nitrate of lanthanum, the carbonate of the metal is precipitated. Oxide of lanthanum is not reduced by the metal by potassium, but it separates a grey metallic power from the chloride of lanthanum, which oxidizes in water with the evolution of hydrogen gas, and is converted into a white hydrate.

LANTHANUM. Of a lanthanum, in the purest state in which it has hitherto been obtained, is nearly white or of a light yellowish colour without any admixture of brown, or brownish red; there is every reason to believe that the colour is owing to some impurity, from which it has not been hitherto possible to free it. It undergoes no alteration by calcination at a red heat in close vessels; it restores the blue colour of reddened lime-paper; when sprinkled with water, it is gradually carried into a hydrate, and becomes a bulky white powder; the alteration occurs very rapidly in boiling water; it dissolves very readily in acids, even when diluted; when boiled with a solution of hydrochlorate of ammonia, it expels ammonia and an ammonio-chloride of lanthanum is formed; the equivalent of lanthanum is thereby reduced in the hydrate of lanthanum, and is insoluble in carbonate of ammonia.

Lanthanum seems to combine with oxygen in a proportion only; it dissolves in hydrochloric acid without evaporating chlorine; it appears to be composed of 1 equivalent of oxygen, and 1 equivalent of oxygen plus 1 equivalent of oxygen plus 1 equivalent of oxygen.

Chloride of Lanthanum. When a solution of oxide of lanthanum in hydrochloric acid is evaporated over sulphuric acid, prismatic crystals of chloride of lanthanum of a white colour are obtained; it dissolves in water exposure to the air readily dissolves in alcohol, to the flavour of which it imparts no colour. This salt melts in water of crystallisation, gives off hydrochloric acid, and leaves a mixture of chloride and oxichloride of lanthanum. It appears to be composed of 1 equivalent of oxygen and 1 equivalent of oxygen plus 1 equivalent of oxygen plus 1 equivalent of oxygen plus 1 equivalent of oxygen.

Nitrates Lanthanum is obtained by dissolving the oxide in nitric acid. It crystallizes with difficulty, and forms variously-coloured saltnasses which is deliquescent; this saline is precipitated by the addition of alcohol to a general one, and it contains no water of crystallization. It consists of 1 equivalent of acid and base, or 84 + 56 = 140.

Carbarnate of Lanthanum. The neutral compound is obtained by precipitating the oxide in solution with carbonate of sodium. It is a white flocculent precipitate, which on drying becomes a white adherent powder.

It is composed of 2 equivalents of acid 22 and 1 equivalent of oxide 56. It has been demonstrated that a saturated alcoholic solution of it crystalises into a cube, which, when converted into a carbonate of cerium, contained only a trace of this metal, and consisted almost entirely of a compound of 1 equivalent of carbonate of cerium and 3 equivalents of oxide of lanthanum.
The salts of lanthanum give white precipitates with phosphoric and oxalic acids and ferrocyanide of potassium, but not with hydroxyluric acid nor tincture of gallads produces any change.

MARGARIDE. When ammonical soap, prepared either from animal fat or olive oil, is treated with boiling water, the soap diffuses through it without being dissolved; on cooling the greater part of the solid substance is deposited on the surface, which, if dissolved in boiling alcohol, deposits on cooling a substance which, if purified, has the following properties: it is white, crystalline, perfectly neutral, insoluble in water, very soluble in alcohol; it melts at about 140° Fahrenheit, and it burns with a sooty flame.

The solutions of potash and soda decompose it, when concentrated and boiled, ammonia being expelled and soap formed. Acids act upon it only when somewhat concentrated, and more readily when hot than cold. Its formula is C₃H₆O₇N₂.

It is equivalent to margeat of ammonia less 1 equivalent of water.

MEDULLIN. A name given by John to the pith of the acorn. It has been used in much the same manner as malt extract is used. It is insoluble in water, alcohol, ether, oils, or dilute alkaline solutions; concentrated sulphuric acid carbonizes it; nitric acid converts it into oxalic acid.

MEML. A compound substance discovered by Liebig. It consists of a mixture of three volatile products and a solid substance; the three first are ammonia, sulphuric hydroxy, and sulphur of carbon; the solid body is a mixture of melamine and the carbon dioxide, which is easily separated by washing with water.

The properties of melam are:—It is a non-crystalline powder of a greyish white colour, and is insoluble in water, alcohol, or oil, but it slowly dissolves in concentrated nitric and sulphuric acid and eventually decomposes it; boiling and concentrated nitric and sulphuric acid dissolve it, and the solutions, when treated with alcohol, produce a precipitate of ammoniia; when the acid solutions are boiled for some hours, the melam is converted into melamine and cyanuric acid.

By the action of heat melam is converted into ammonia and melamin: hydrochloric and dilute nitric acid convert it into melamine and melaminine: and when fused with hydrate of potassium, it is converted into cyanuric acid, and can be decomposed into melamine and cyanuric acid. Its formula is C₃H₆N₄O₂, or 72 carbon, 9 hydrogen, and 204 mol. wt. = 235.

MELAMINE. One of the simplest processes for preparing melamine is to boil melam until it dissolves in a moderately strong solution of alkali, to evaporate the solution until it forms a syrupy mass, to evaporate and cool, and melamine separates in crystals, and by recrystallization it is obtained in a pure state.

Its properties are:—It crystallizes in rhombic octahedrons, which are transparent and colourless, or only slightly yellow. It is very slightly soluble in cold water, but more so in boiling water. It is insoluble in alcohol or in ether, and is unstable in the air; the aqueous solution has a bitter taste, and has no action on vegetable colours. When dry melamine is burnt, it forms carbon dioxide and water without decomposing; but a small portion is converted into melim and ammonia.

Concentrated sulphuric acid and nitric acid decompose it, when heated, into ammonia and anhydrous cyanuric. When fused with hydrate of potash, there are produced ammonia and cyanate of potash.

It combines with dilute acids to form salts, all of which have an acid reaction except the double basic salts. The nitrate, chloride, and sulphate are less soluble than the mono-

nium itself; but the acetate and formate are very soluble. Melamine precipitates a part of magnesia from solution, and forms a double salt with that which remains dissolved.

It is a very body known by its formula is C₃H₆N₄O₂.

MELEIC ACID. [MELITRE, P. C.]

MELONIC ACID. When a saturated solution of allomelaine of barytes or strontia is heated to ebullition, a precipitate is obtained which consists of a mixture of melamine, allomelaine, and carbonate of the base employed. On evaporating the barytic solution crystalline crusts are formed composed of urea and melonate of barytes. When these are digested in alcohol the urea is dissolved, and the melonate of barytes is unacted upon. If a solution of allomelaine is gradually added to a boiling one of acetate of lead, a heavy granular precipitate of melonate of lead is formed; and the remains in the acid liquor merely the excess of acetate of lead and pure urea. The melonic acid is obtained by treating the melonate of lead or barytes with dilute sulphuric acid.

The properties thus obtained are, that it is very acid, reddens vegetable colours, crystallizes, and produces, when saturated with ammonia, as allomelaine does, white precipitates in the salts of lead, lime, barytes, and strontia. These precipitates are soluble in acids and in a large quantity of water. This melonic acid may be boiled and evaporated without decomposing.

The distinguishing character of this acid is the mode in which it acts on the salts of silver. When a salt of silver is added to melonate of ammonia, a yellow precipitate is formed, which becomes black, and is reduced with sulfurous acid when the mixture is gently heated.

The formula of this acid is C₃H₆O₇.

METACETONE. When a mixture of 1 part of sugar and 8 parts of lime is submitted to distillation, the temperature, after reaching 234° Fahrenheit, rapidly rises, and a very small quantity of combustible gas is liberated, accompanied with a liquor which is a mixture of acetone and metacetoine. When water is added to the metacetoine, a mixture is produced, which is, in this case, the metacetoine.

Metacetoine is a colourless liquid of an agreeable odour. It boils at about 158° Fahrenheit; does not mix with water, but combines with alcohol and ether. It may be regarded as acetone minus one of its molecules of water.

Metlyine, the hypothetical radical of pyroxyllic spirit, 

Pyroxyllic Spirit, P. C.; is composed of 2 equivalents of carbon 12 + 3 equivalents of hydrogen. Its composition was formerly supposed to be 1 equivalent of carbon and 2 equivalents of hydroxyl, the formula of a hydroxyl is C₃H₆O₂.

Oxide of Methyl, Methylic Ether, is a compound of this base (or at any rate of the proportions of carbon and hydroxyl assigned to it) and 1 equivalent of oxygen. Its formula is C₃H₆O₂, by first submitting to distillation 3 volumes of concentrated sulphuric acid and pyroxyllic spirit. The gasses which are evolved are passed first through cream of lime, and afterwards into several bottles containing pure water, which absorbs the oxide of methyl. When the aqueous solution is moderately heated, it parts with the oxide of methyl, which is collected over mercury. The gas is deprived of humidity and of hydrated oxide of methyl, by leaving it in contact with potash.

The properties of the oxide of methyl are:—It is a colourless gas, with a very agreeable ethereal odour. It burns with a blue flame; does not liquefy at 5° Fahrenheit; dissolves in water, giving it a sharp taste and an ethereal smell; 1 volume of water dissolves 37 volumes of the gas. It dissolves in alcohol, forming a solution which, by mixing with the oxides of methyl, is collected over mercury. When oxides of methyl is introduced into a cooled receiver with the vapour of anhydrous sulphuric acid, these two substances combine and form neutral sulphate of oxide of methyl; and in compon with the oxides it forms either neutral or acid salts. It contains the same elements combined in the same relative proportions as alcohol. The density of this gas is 1.090.

When oxide of methyl is combined with an equivalent of water it forms hydrated oxide of methyl, or pyroxyllic spirit.

Chlorine, iodine, sulphur, and cyanogen, all form compounds with oxide of methyl.

MUCIC ACID, Sulphoacetic Acid. This acid is formed by the action of dilute nitric acid upon gum arabic, or sugar of milk, and some other bodies. One equivalent of crystallized sugar of milk is converted into 2 equivalents of crystallized mucic acid, and 2 equivalents of oxygen and losing 2 equivalents of water.

Mucic acid is a white crystalline powder, which is gritty between the teeth: its taste is weakly sour. It dissolves in a small quantity of boiling water, and the mother liquor forms a thick skim of small crystals. It is insoluble in alcohol, and dissolves very sparingly in dilute acids; it dissolves in concentrated sulphuric acid, imparting a crimson colour to it. When the mixture is heated, charcoal is developed. When submitted to dry distillation it blackens, and pyrocumic acid and other products are obtained.

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Sulphate of Lanthanum. Dilute sulphuric acid very readily dissolves the oxide; by evaporation, acicular radiating anthoythine-coloured crystals are obtained. This salt gives off water, but does not melt at a low red heat; when anhydrous, it contains nearly 1 equivalent of sulphuric acid 40 + 1 equivalent of oxide 56 = 96.

The salts of lanthanum give white precipitates with phosphoric and oxalic acids and ferrocyanide of potassium, but not with hydroxyluric acid nor tincture of gallads produces any change.
It is composed of 6 equivalents carbon, 5 equivalents hydrogen, 8 equivalents oxygen = 106. Its formula is C\textsubscript{6}H\textsubscript{5}O\textsubscript{5}.

The alkaline mucates are soluble in water, whereas those which contain an alkaline earth, or a metallic oxide, are insoluble. These salts are all decomposed by the mineral acids, they combine with the basis and set the music acid free. They are also decomposed by the alkalines, and the property given by a particular principle obtained from the bark of the root of the Colotropis Mudderii, and to which he attributes its emetic effects. It is procured in the state of a brown, transparent, extractiform mass, by evaporating the alcoholic tincture of the bark. It is very slightly soluble in water and in alcohol, but insoluble in either oil of turpentine, and fixed oils. Its aqueous solution gelatinizes at 80\textdegree Fahrenheit, coagulates at a higher temperature, and separates into a porous substance, which, when once cooled, cannot be dissolved for some time. Murexine, Purpuric Acid of Dr. Prout. To prepare this substance, murexide is to be dissolved in potash with the assistance of heat, which is to be continued until the blue colour has disappeared, and then an excess of dilute sulphuric acid is to be added.

Its properties are:—It crystallizes in very brilliant silvery scales of a yellowish colour, which are insoluble in water and dilute acids. It dissolves cold in solution of ammonia, and the solution is not neutralized by it. The ammonical solution becomes purple by exposure to the air, and deposits brilliant crystals of murexide.

It is composed of 6 equivalents carbon, 2 equivalents azote, 4 equivalents hydrogen, and 5 equivalents oxygen = 108. Its formula is C\textsubscript{6}N\textsubscript{2}O\textsubscript{5}.

Muksine, Purpurate of Ammonia of Dr. Prout. This substance may be obtained by several processes. The least operose is probably that of dissolving uric acid in dilute nitric acid, evaporating the solution till it assumes a reddish colour; after the liquor has cooled to 150\textdegree Fahrenheit, add excess of ammonia; then dilute it with half its volume of boiling water, and allow it to cool. Care must be taken not to employ too much or too little nitric acid. Whilst ammonia continues to give a red precipitate, when added to small parts of the acid, the nitric acid is insufficient. If, on the contrary, ammonia produces a glairy yellow precipitate, murexide cannot be obtained without passing a current of hydro sulphuric acid into the liquor.

The properties of murexide are:—It crystallizes in short four-sided prisms, which exhibit a green metallic reflection. They are garnet-red by transmitted light. Murexide is very little soluble in cold water, and gives it a magnificent purplish red coloration. When heated readily it is reduced to a mass, and crystallizes from the solution unaltered. It is insoluble in alcohol and in ether. It is insoluble also in solution of carbonate of ammonia, but dissolves in a solution of potash, producing a substance red in color, which dissolves in hot water, and evolves ammonia. It contains 12 equivalents carbon, 6 equivalents hydrogen, 5 equivalents azote, 8 equivalents oxygen = 312. Its formula is C\textsubscript{6}H\textsubscript{5}N\textsubscript{2}O\textsubscript{5}.

Naphtha. [Hydrogen—Carbonate, P. C.]

Nitrum, a metal lately discovered in the desert of Bavia by H. Roes. When perchloride of niobium is submitted to the action of dry ammonia it becomes yellow, with considerable evolution of heat, and when this is heated it becomes black, with the disengagement of hydrochlorate of ammonia. On washing it with water, to free entirely from this salt, the water passes clear as long as it contains any of it; but when the metal is nearly pure the water becomes turbid. When niobium is heated in the air it burns with the evolution of light, and white niobium oxide, or more properly niobium peroxide, forms a crust. It is insoluble in water, but soluble in nitric acid and aqua regia, even when boiling, do not act upon niobium; but it is acted upon by a mixture of nitric and hydrochloric acids, and a red vapour is formed during the action.

A very strong action in water and in alcohol, but insoluble in ether. Opiammon, a substance produced by the decomposition of opianate of ammonia. This salt is to be evaporated to dryness with a gentle heat, by which a substance separates after washing with water, which is opiammon, and is rendered pers by boiling in water.

Its properties are:—It is a powdery substance of a pale yellow colour which is probably derived from some fleshy substance: viewed under the microscope it appears to consist of a collection of small transparent crystals. It fuses readily, and at a high temperature it emits a yellow smoke which has the same smell. It forms no colloid, and boiling water dissolves but little of it, and this is owing to a change which it undergoes. The solution is of a pale yellow colour, and has an acid reaction. It dissolves slowly in boiling alcohol, which on cooling deposits crystals of opiammon and opianate of sulphuric acid dissolves it, and is rendered of an orange colour. Water renders the solution milky; but when it is heated its transparency is restored, and afterwards it deposits, on cooling, crystals of opianate of sulphuric acid and deposits opianate of some salt. Opianmon dissolves in ammonia, and produces opianate of ammonia.

It appears to be composed of C\textsubscript{6}H\textsubscript{5}N\textsubscript{2}O\textsubscript{5} or in 100 parts, of carbon, 67.106; hydrogen, 4.248; azote, 3.446; oxygen, 29.083. M. Wrede finds that opiammon possesses the properties of bodies described as amides.

Opianic Acid is obtained by the action of an excess of dilute sulphuric acid upon narcotina, with the addition of a small quantity of water, or by heating the mixture to ebullition. The liquor becomes a pale yellow colour, and yields a little carbonic acid. Excess of the oxide of manganese is to be added, and care is to be taken to have sulphuric acid also in excess.

On the action of this acid upon the red precipitate of murexide, small triculated yellow crystals are obtained, which are opianic acid.

To render them colourless they are to be twice washed with cold water, and then dissolved in a boiling solution of hydrochloric acid of soda, with the addition of hydrochloric acid in excess. The liquor, after filtration and cooling, deposit colourless crystals of opianic acid.

The crystals of this substance are colourless, very small, reticulated laminae, insipid, slightly bitter, reddens linsman by the form of a little colour. It is inferior, for the same reason, to the bichromate of zinc, but is more brilliant if it be treated with ammonia than it is alone. When heated in a retort they rise up the sides of it without being properly volatilized, and the properties of the acid are altered. When heated in atmospheric air, this acid volatilizes with an odour resembling that of vanilla, and it burns with a bright flame. It is very slightly soluble in cold water; but it dissolves in boiling water in so large quantity that the solution solidifies on cooling.

It combines with various bases to form salts, of which many are soluble like crystalline; such are those of ammonia, barium, lead, and silver.

It appears to consist very nearly of C\textsubscript{6}H\textsubscript{5}N\textsubscript{2}O\textsubscript{5} or = 206; w in 100 parts, of carbon, 67.106; hydrogen, 4.248; azote, 3.446; oxygen, 29.083.

Oxyron. With respect to the density of oxygen gas, it is to be observed that the experiments performed by M. Dumas and Boussingault gave 1:1066 as its specific gravity, agreeing as nearly as possible with the previous determination of Stansmer, and exceeding by 0.0025 only the nearly accurate results of Berkeley and Dupont. M. Wrede finds the results to be 1:1052.

M. Dumas adopts 8 as the equivalent of oxygen, that of hydrogen being 1; and he admits 9 as the number representing water, and 14 for azote; all of which are those previously proposed by Dr. Prout, and adopted in this work.

Mr. Balmain has proposed a new process for obtaining oxygen gas, which may be advantageously employed in many cases. This consists in the combustion of any volatile substance containing an oxygen, the more oxygen it contains the more suitable it is affording a ready means of procuring the gas. It consists in heating in a glass retort, by means of a spirit-lamp, a mixture of 4 parts of concentrated sulphuric acid and 8 parts of bleaching powder of potassium. The quantity of oxygen is large, and it is nearly or quite pure; the oxygen is of course derived from the reduction of the chromic acid to the state of oxide of chromium, which remains combined with the sulphuric acid and potash; and from this, with proper treatment, the supply of chromic potash of potash may be obtained for future operations.

Paranaphthalin, Anthracin, a substance contained among the products obtained by the distillation of coal. It is white as chalk, but less soft. It melts at 366°, distils at 392°, and sublimes at a lower temperature in crystalline leaves. It is insoluble in water, slightly soluble in boiling alcohol and in ether. It cubic.
lies in ficollu from solution in the latter. It is dissolved more readily by oil of turpentine, and is deposited from it in granular crystals. The density of its vapour is 0.7325. It dissolves in concentrated sulphuric acid, imparting a dirty green colour to it. Its composition may be represented by C₁₀ H₁₁ O₄.

Pyroluciferin, a substance obtained from the Paroliaria amara. In order to procure it the powder of the lichen is boiled with water, and the solution evaporated. The residue is a yellowish brown substance which, on cooling, forms a jelly—picroelin then crystallizes, and after being washed with a solution of carbonate of potash it is to be dissolved in and crystallized from alcohol.

Its properties are—It forms colourless inodorous crystals. It dissolves in alcohol, but not in water. It fuses below 212°, and concretes on cooling. It is insoluble in cold water, and slightly soluble in boiling water, and nothing is deposited from it on cooling. It is very soluble in alcohol, ether, sulphuret of carbon, and oils, both volatile and fixed. The alcoholic solution has an acid reaction, and, like the solution in acetic acid, and also in concentrated sulphuric acid, it is precipitated by water. It is not decomposed by the nitric, hydrochloric, or phosphoric acids.

It combines with ammonia, and forms yellowish crystals, which effloresce in dry air. They are insipid, and dissolve readily in alcohol and the caustic alkalis. Solution of potoza dissolves pyroluciferin with a wine-red colour, which gradually becomes reddish-brown. Acidic solution from it is a bitter reddish-brown substance. When decomposed by heat it yields no ammonia; and when heated in the air it burns with a bright sooty flame, which is violet-coloured on the edges. Its composition is not known: it is stated to possess antifibrin properties.

Populin, a peculiar product obtained from the bark and leaves of the poplar (Populus tremula). After extracting salsicia from them, this remains in the water: carbonat of potash being added to it, a white precipitate is obtained, which is to be dissolved in boiling water. On cooling it crystallizes in needleform crystals, which have an acid and also a sweet taste, resembling that of liquorice. It dissolves in 70 parts of boiling water and in 1000 cold water. Its solution has a yellow tint. The alkaline solution imparts a red colour. The crystals contain 5.43 per cent. of water of crystallization.

Quinone, a substance obtained by Mulder from alumen, cascin, horn, and animal and vegetable fibrin. When any one of these is dissolved in a solution of potash, and the filtered solution is mixed with a slight excess of acid, a copious greyish-white, flocculent precipitate is formed, and a slight smell of hydroxyluric acid is perceived. This white substance is obtained in the form of a granular brown mass, of the utmost importance in relation to the aluminous principles.

Its properties are—While moist the white flocculi are disintegrated, but by drying they become yellow, hard, and brittle, not soluble in water, less so in alcohol, and not at all in ether. They are slowly soluble in the air, and loses water at 212°. It is insoluble in water, alcohol, ether, and essential oils. By long continued boiling in water it undergoes some change of properties, and is rendered soluble.

Acetic and phosphoric acids, whatever may be their state of concentration, dissolve it; hydrochloric acid also dissolves protein, and acquires an indigo tint. When heated the solution blackens. With concentrated sulphuric acid it produces a jelly which contracts in water, and which, after being washed with water and alcohol, though it does not redissolve limen-paper, contains 8.34 per cent. of sulphuric acid. Mulder calls this compound Sulfophyriproteide. When protein is boiled in diluted sulphuric acid, it acquires a purple tint.

Protein dissolves its acid solutions by the ferro- and ferric-cyanide of potassium, by tannin, and by neutralization with an alkali. When strongly heated, protein is decomposed with the production of ammonia and a charcoal which burns with a soft blue flame in the absence of air.

Protein consists entirely of carbon, hydrogen, azote, and oxygen; and it will be observed, that whether obtained from alumen (1), cascin (2), horn (3), animal fibrin (4), or vegetable fibrin (5), the statements of its composition differ so slightly, that it must be the same from whichever source they arise. It is represented by the following formula, C₁₀ H₁₄ N₄ O₄.

These analyses may be represented by C₁₀ H₁₄ N₄ O₄. When protein, or the substances which yield it, are boiled in a concentrated solution of potash as long as ammonia is evolved, and the solution is afterwards neutralized by sulphuric acid, evaporated to dryness, and then redissolved with boiling alcohol, three products of the decomposition are dissolved, one of which, erythroseproteid, separates in oily drops as the solution cools; leucin is deposited in small crystals; and a sour liquid, which mother water contains proctide, and formate of ammonia in solution.

Biocnese and tritoxido of protein are produced by the long continued action of boiling water upon fibrin in contact with air. They are the chief ingredients of the fluffy coat of the animal, the peculiar white of the albinos, being produced at the expense of the fibrin.

Pyren, a crystalline substance procured from gas-tar. It is insoluble in water, but crystallizes in small rhombic laminae in alcohol. It is insipid and inodorous, slightly soluble in alcohol and in ether. It melts at about 350° Fahrenheit, and concretes on cooling into a crystalline mass. A stronger heat volatilizes it without alteration. Sulphuric acid carbonizes it. It has not, we believe, been analyzed.

Quassia, a neutral substance contained in the Quassia amara and Quassia excelsa. Its properties are—It crystallizes in small white prisms, which have little lustre; they are very bitter, and do not alter by exposure to the air.

One hundred weight contains 0.45 part of quassin; the solution is precipitated white by tannin; but neither iodine, chlorine, bichloride of mercury, nor the salts of iron or of lead, occasion any precipitation in it. Quassia dissolves readily in alcohol and in ether. Concentrated sulphuric acid and nitric acid of 1:26 to 1:60 give an inodorous, white, acrid, and sour liquid containing acetic acid; but the solution decomposes when heated in the nitric acid, oxalic acid is produced. When quassin is heated, it fuses like resin and loses 176 per cent. of its hygroscopic moisture; when cooled it forms a transparent yellow, water-soluble mass; at higher temperatures it becomes more liquid, brown, carbonizes, and yields acid products, but no ammonia.

It yielded by analysis carbon 65.77, oxygen 30.32, hydrogen 6.91, forming C₁₀ ᵄ ᵆ O₄.

Quassiac, a neutral crystalline substance procured from the bark of the oak. Its properties are—It forms small colourless crystals, which are inodorous, and have a very bitter taste; they are very soluble in water, 100 parts at 60° taking up 7:3 parts; at an elevated temperature a greater quantity is dissolved; the solution has no action either on litmus or tumeric paper. Querecin is soluble in weak alcohol, but not in absolute alcohol, aether, or oil of turpentine. Concentrated sulphuric acid has no influence upon it. The solution turns yellowish, then orange yellow, and not bright red as is the case with sainfol; when heated in sulphuric acid the yellow colour becomes brown, and if water is added to it a brownish yellow powder separates, which is soluble in alcohol, but not at all in ether or in protinent. It dissolves in various acids, but does not appear to combine with them; a dilute solution of potash, and lime-water also, dissolve it, but they are not saturated by it. The action of pure caustic is not effected by carbonate of potash, acetate of lead, nitrate of silver, protominate of mercury, or solution of gelatin.

Querecin, the name given by Chevreal to the colouring principle of the bark of the querecerin. It crystallizes in colourless acicular crystals, which have at first a slightly sweet taste, and subsequently a bitter one. They are very soluble in water, in alcohol, and in ether. When quercerin is exposed to the air in solution in water, it gradually becomes of a yellowish white colour, and by degrees the solution deposits yellowish white flakes of a crystalline appearance.

The mineral acids dissolve quercerin, giving it a yellow colour; athers in contact with the air turn it of a dark brown yellow. Ammonia produces the same effect, and lime-water carbonate is immediately rendered turbid, and a yellowish white precipitate of lead forms a white precipitate, which may be dried in a tube containing anatase gas, without becoming perceptibly coloured; but by a few hours' exposure to the atmosphere it acquires a yellow color.

On boiling a solution of querecin, it becomes turbid, and deposits a quantity of small acicular crystals of querelein, less soluble in water, and which forms with hydrate of lead a beautiful yellow lake of lead. It appears from analysis that quercerin is constituted of the principles of tannin, alcohol, and a small quantity of akad. The formula representing quercerin is C₁₀ ᵄ ᵆ O₄, and quercerin is represented by C₁₀ ᵆ ᵆ O₄.
Quinquina, the name given by Serturmier to a third alkali, contained in yellow red and bark. Its properties are, that it is a brownish, resinos, diaphanous, lancelated mass, having the appearance of colophony. It is inodorous, and is bitter or nauseous, and is not volatile; it burns in the air without leaving any residue; it is nearly insoluble in cold water, and fusces in hot: the solution possesses nearly the same chemical reactions as that of quina; it is very soluble in cold water, and renders the phlegmatic solution turbid, and precipitates brown flocculi from it.

It neutralizes acids perfectly, and yields with them brown, viscid, bitter, uncrystallizable compounds, which are very soluble in alcohol; its capacity of saturation appears to be greater than that of concheonia or quina.

Quinquina, a neutral substance, obtained when kineic acid is decomposed by heat, or better by gently heating in a retort one part of crystallized kineic acid, four parts of binoxide of manganese, and one part each of sulphuric acid and water. The mixture swells considerably, and the thick vapours arising condense in the receiver in the form of yellow needles, and an acid liquor is produced, containing formic acid; the crystals are to be purified between folds of blotting-paper, and again sublimed.

The properties of quinoline are—It is of a golden yellow colour; possesses great lustre, and is heavier than water; it volatilizes without decomposition, and melts at 212°. Its vapours are offensive, and cause eyes to water; it is slightly soluble in cold water, but alcohol and aether dissolve it readily.

The ceustic alkali after it, and give a brown-coloured solution with it, which leaves, by evaporation, a black mass, which dissolves in water, and gives brown compounds with water and metallic salts. Concentrated sulphuric acid carbonizes quinolin, and when diluted converts it into brown insoluble flocculi. Nitric acid and hydrochloric acid dissolve it with a yellow tint. Its aqueous solution is not precipitated by the salts of silver or copper; the diaceate of lead forms with it when hot a bright yellow gelatinous mass; gaseous chlorine yields with it a crystalline compound, which is soluble, and of a pale yellow colour. When quinolin is treated with ammonical alkaline, it produces a crystalline compound, which is soluble in water, and an emerald green precipitate.

Quinolin, an alkali obtained by heating quina, or, which is better, concheonia, with potash; by this the quina loses the elements of carbonic acid, which combine with a portion of the potash; by distillation, colourous or slightly yellow oleaginous drops mixed with water are obtained; they are heavier than water, and dissolve in it to some extent; but they are more soluble in alcohol and in ether. The taste of quinolin is very acid and bitter: its colour is strong, reddish brown; it is very volatile. It has a strong alkaline reaction, neutralizing acids very perfectly, and precipitating certain metallic solutions. The salts of quinolin are crystallizable and soluble in water; the sulphate crystallizes in subnumeral, yellow, silky crystals. Its composition is represented by CH_2N_2.

Roccella, obtained from the Roccella tinctoria. This acid crystallizes in fine colourless needles of a silky lustre. It is insoluble in water, whether cold or hot; alcohol dissolves it readily, 100 parts of 98½ density, at the boiling-point, taking up 55 parts. Ether also dissolves it easily: it melts at 369°, and solidifies at 251°.

The alkaline roccellates dissolve in water, and yield solutions which froth like soaps; but when concentrated, the solutions cannot be drawn out in threads like those of other soaps. Roccellate of potash crystallizes in small laminae; the salt of lime is a white precipitate, insoluble in water, and contains 15.5 per cent, of basis. Its probable formula is C_6H_3ClO_3.

Sabadillina, an alkali contained in the different kinds of hellocare. It is obtained in the form of reddish stellated hexagonal prisms; but when quite pure it is colourless; its taste is not bitter; it melts at 208°; it fuses into a resinous mass, and loses 9.5 per cent, of water; at a high temperature it is decomposed. It is soluble in boiling water, but dissolves very sparingly in cold water; it is insoluble in ether. It possesses a strong alkaline reaction, and forms with pure acids salts which are fusible in water; and when fused, and with nitric acid it is decomposed; 100 parts of sabadilla saturate 10 parts of sulphuric acid. It has not yet been analyzed.

Sacharic acid, Oxalidric Acid, is formed by the action of acid on concheonia or grospire. When the solution is much evaporated it detaches crystals after long standing.

The properties of this acid are:—It forms white flocculent precipitates in lime and barytes water, soluble in excess of acid. It does not precipitate the salts of lime or baryta; nitrate of silver is not precipitated by it, but when ammonia is added for a long time a white precipitate is formed, which is reduced to the metallic state by exposure to the slightest heat. Nitric acid when hot converts saccharic acid into oxalic and carbonic acids; the alkali dissolved in water with some brown precipitate; it forms in excess of acids and dissolves in all proportions in alcohol, and but slightly in ether; it dissolves zinc and iron with the evolution of hydrogen gas. Formula C_6H_5O_3+4-6 HO.

Saccharic Acid and Saccharistics. When conchea's is boiled for a long time in sulphuric acid dissolved with thirty parts of water, or with very dilute nitric or hydrochloric acid, saccharin is deposited in brown, brilliant, crystalline scales, contaminated with saccharic acid; the latter is really dissolved by ammonia, in which the former is insoluble.

The properties of saccharic acid are:—It is dissolved by ammonia and the alkali, and is precipitated from them by acids in brown flocculi; these when dry become a light brown powder, insoluble in alcohol and in ether; by long chillation in water it is converted into saccharin, and loses solubility in ammonia, but without undergoing any change in its composition. Its ultimate analysis leads to the formula C_6H_5O_3 as, as its composition; but its saturating power is describe.

Salicin. The composition of this substance is probably more correctly represented by C_6H_5O_4+6 HO, than as we have formerly stated it. [Salicin, P. C.]

Sacchariferous Acid. When a mixture of one part of salicin, one part of procain, and one part of b-picric acid, is treated with twenty parts of water, and with twenty parts of water are made to act on each other in a retort, the result is the formation of saccharic acid. The salicin is to be dissolved in one part of the water, and the sulphuric acid with the remainder. The other parts are produced, and when these cease distillation commences; the acid comes over with the vapour of water, and after some time they separate: the acid is to be purified by washing with water and rectifying from chlorides of calcium.

The properties of saliculmic acid are—It is an oleaginous liquid, colourless or slightly yellow; inflammable, and burns with a sooty flame; specific gravity 1.731, boils at about 354°F., becomes solid at 6° below zero; its taste is hot, and its smell aromatic and agreeable. Water dissolves it readily, and the solution, at first green, reddens tinture of litmus, and eventually destroys the colour.

Concentrated sulphuric acid decomposes saliculmic acid; chlorine and bromine take an equivalent of hydrogen from it, and are reduced. It has a strong alkaline reaction, and is dissolved; the chlorine or bromine, replacing the hydrogens, form chlorosalicillic or bromosalicillic acid.

Saccharic acid is also obtained when the flowers of the Spiraea ulmaria, or mayweed, are distilled with water, to distillation with water, it is represented by the formula C_6H_5O_4.

This acid combines with bases to form salts, in which case it loses an equivalent of oxygen and hydrogen in the form of water, which is replaced by the combining base.

Saccharic Acid is obtained by heating sacchariferous acid with potash; the mixture is of a faint brown colour, and the heat must be continued till it becomes colourless. During this process hydrogen is evolved; the residue is to be dissolved in water and treated with excess of hydrochloric acid; this precipitates the saccharic acid, which is to be purified by repeated solutions and crystallizations.

The properties of this acid are:—It crystallizes from solution in hot water in small tufts, and by sublimation it is obtained in long needles: it is but slightly soluble in cold water, but very readily dissolved by hot water and by alcohol. It reddens litmus-paper, and decomposes the alkali carbonates. It is decomposed by hot sulphuric acid, with the development of carbonic acid and a solution of sulphurous acid gas. Its formula is C_6H_5O_4+4 HO.

The salts which it forms have been but little examined. Saliculmic Acid. When ammonia is added drop by drop to saccharic acid dissolved in alcohol, the liquid becomes a pure colourless solution, and then, on being poured into a cold dilute nitric acid, the crystals redissolve, and on standing the solution deposits brilliant transparent prisms of a golden-yellow colour, which when dry are hard and reducible to powder, and are insoluble in water.

When submitted to dry distillation saliculmic acid is decomposed, leaving a coarsly residue; acids and alkalis convert it
into salicylic acid and ammonia. It appears that at first
salicylate of ammonia is formed, which is very soluble in
water, and that this by the subsequent excess of ammonia
becomes gradually converted into salicylaldehyde.

Sulphacetin. When a solution of salicyl alcohol or hydrochloric acid is boiled, it soon becomes turbid and
deposits a yellowish white substance on the sides of the
vessel, which possesses the constancy and properties of a
resin.

Its properties are:

1. It is insoluble in water or in ammonia, but very soluble in alcohol, ether, and in concentrated

acetic acid. Water precipitates it from its solutions. It is soluble in glycerine and alcohol, and is precipitated from them by

acetic acid. Concentrated sulphuric acid gives it a blood-red
colour. With nitric acid it yields carbonic acid.

By analysis it yielded carbon 72.96, hydrogen 5.83, oxygen
21.21, in 100 parts.

Scurilis, the bitter principle of aquilla (Scilla maritima).

This is obtained by first insinuating the juice of the

root, then treating it with alcohol, and after having evaporated

the solution, dissolving the residue in water; to the

solution acetate of lead is to be added, which gives a precipi-
tate that is to be separated; afterwards sulphuric hydro-

gen is to be passed into the solution, and it is finally to be evap-

orated.

By this scirill is obtained, which has the fol-

lowing properties: it is colourless, frangible, of a bitter taste at first, and is not attacked by alkali or water, but absorbs

moisture from the air. It is soluble in alcohol, and in ether;

its solution is not precipitated by acetate of lead. It is

emetic and purgative, and when it is very pure may occasion death.

The oxide of lead is precipitated by a high principle found in saraspilla (Smilax Sarsaparilla).

It exists in the form of colourless needles, is inodorous, very soluble in water and in alcohol, when boiling, but less so when cold. It

dissolves in ether and volatile oils; the fixed oils dissolve it sparingly.

Sulphacilin dissolves in weak acids and alkaline solutions, and

separates from them unaltered when they are neutralized.

Nitric acid partly decomposes it. Sulphurous acid colours it

first deep red, then violet, and finally green; water precipi-

tates it. Its formula is C8H12O8.

Solynia, an alkanil existing in the nightshade (Solanum dulcamara) and several other species of solanum; it has been

found also in the potato which has been allowed to germinate in the dark.

A boiling saturated alcoholic solution of solanum deposits on cooling a pearly white powder composed of flattened

quadrangular prisms. It changes by exposure to the air; it is

inodorous, and has a nauseous, acrid, and sourish, somewhat bittersweet taste.

Its taste is acrid; it does not alter the
colour of turmeric, but restores that of reddened litmus.

It is very slightly soluble in water, and the solution is not ren-
termed turbid by tincture of galls. It cannot be melted without decomposition at 150° C. and is decomposed in 1 hour.

The greater number of the salts which it forms with them do not crystallize. The sulphate effloresces, by the spontaneous

evaporation of the solution into masses resembling cauliflower

in form, or in crystalline crusts.

The salts of solanum have a disagreeable permanently

acid taste, and are poisonous. They are very soluble in

water and in alcohol. The aqueous solution is precipitated by tincture of galls, and gives a yellow precipitate with chlorsilic acid; it does not coagulate wine; it does not alter the

colour of turmeric, but restores that of reddened litmus. It

is decomposed by heat, when boiled, and in a cold state. It is decomposed by chlorides of mercury or plati-

num, or by acetate of lead.

It is obtained from the bark of a species named Stramonium or

tramon, a substance produced by the decomposition of

alcalain by means of sulphurised hydrogen, or it may be

obtained by distilling chloroform with sulphuret of barium.

It is an ethereal liquid possessing a very disagreeable odour,

and is heavier than water, and insoluble in it.

Sulphtolatoeum, Bisulphurate of Cyanogen. This sub-

stance is prepared by saturating a concentrated solution of a metallic sulphydy.oxine with chlorine or by heating it with

nitric acid; it falls in the form of a deep yellow amorphous

powder, which retains its colour when dry; it is light, porous, and very soluble in water, alcohol, and esters; it is decom-

posed by strong sulphuric acid, and precipitated from it by water. It is decomposed by nitric acid, and by potassium with the aid of heat; giving rise to the formation of the sulphuret, cyanide, and

sulphocyanide of potassium. By the action of heat it is de-

composed, and with carbolic acid and water it is decom-

posed, and the residue is meillon, which at a high temperature is decomposed into azote and cyanogen gases.

Its formula is Cy Sn.

Sulphocyanogen combines with one equivalent of hydrogen to form a hydrosulphocyanogen.

Terbium, a peculiar metal recently discovered by Mosan-
der in the state of oxide in gadolinite, orbite, &c., associated

with yttria, and with oxide of erbia, another new metal.

The oxide of terbium has not yet been reduced to the state of metal; it is distinguished from that of erbia in not be-

coming of a dark orange-yellow colour when heated in the air.

The oxide of terbium is insoluble in water and in the caustic

alkalis; it is soluble even after heating to redness in a

boiling solution of carbonate of soda, but after a few days it

separates from solution in the state of a double salt; the

carbonate of terbium is soluble in solution of carbonate of am-

nium, and after saturation forms with it in a few hours a double

salt, which separates in such quantity that a very little of the

carbonate remains in solution, and the solution of carbonate of terbium and water, and have a sweeter taste. The sulphate is more soluble in cold water than in hot; the nitrate yields by evaporation a

crystalline mass which deliquesces in a moist atmosphere.

The oxide of terbium is a white powder, almost insoluble in small quantity only, and its properties are but little known.

Then, a neutral vegetable principle obtained from common

tea, and supposed to be identical in its nature with casein

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It is an ethereal liquid possessing a very disagreeable odour,

and is heavier than water, and insoluble in it.
nation. Hence arose his 'Examen Concilii Tridentini' ('4 vols. Leipzig, 1565, 8vo.'). The best edition is that of Frankfurt, 1707, folio), a work full of historical information, and of solid refutation of the Roman Catholic doctrines, which he asserted had originated with the Roman Catholics, and is still serviceable, in the opinion of Protestants, beyond other works of the kind, to prove the futility of the Papal system. The sound judgment, the critical acumen, the most serious and grave spirit, and the great modern manifested in his work, caused even the Roman Catholics to admire him: they used to say to the Protestants, 'Vos habitat duos Martinos; si pro Dominus vestistis, prior non stastatis.' With equal approbation his 'Examen Concilii etOrales Conclavls' was 'agined the Calhins in his 'Repeticio same Doctrinae do vera

The petals are very generally wanting, the flowers are solitary on short stalks. The stamens are numerous, forming a dense mass close to the ground. The leaves are very numerous, linear-subulate, and finely ciliated. It is found on the summits of any subsequent writer against the Roman Catholics, and is still serviceable, in the opinion of Protestants, beyond other works of the kind, to prove the futility of the Papal system. The sound judgment, the critical acumen, the most serious and grave spirit, and the great modern manifested in his work, caused even the Roman Catholics to admire him: they used to say to the Protestants, 'Vos habitat duos Martinos; si pro Dominus vestistis, prior non stastatis.' With equal approbation his 'Examen Concilii etOrales Conclavls' was 'agined the Calhins in his 'Repeticio same Doctrinae do vera

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silver, into the country than it took out of it, by our sales of Eastern commodities to other European nations. It was upon this ground, simply, that parliament had recently (by the 15 Car. II. c. 7, s. 12) so far permitted the trade to be legally carried on in the only way in which it could be carried on at all, as to allow the exportation duty-free of foreign coin and bullion.

Taking his stand upon what has been called the mercantile system, the principle of which is, that the value of a foreign country is increased by the bullion or coin which is carried away by the commerce with it, he wrote, in the first place, that it was not in money, Child admitted the paramount importance of gold and silver, but contended that the effect of the India trade, taken in its whole extent, as including the trade with other nations, was to promote, not to arrest, the accumulation in our hands of the precious metals. The destruction however of the fancy that there was anything necessarily desirable in that result, as far at least as it could be destroyed by reasoning, and the demonstration of the truth that nations do not differ in any respect, in their commercial character, from other commodities, were accomplished a few years after this date by Sir Dudley North, in his 'Discourses upon Trade, principally directed to the cases of Interest, Coinage, Shipping, and Increase of Money,' 4to., Lond. 1691.

Sir Josiah Child was of good family. In the chapter of his 'New Discourse of Trade' which relates to the support of the poor, he mentions his father, stating that he had much money, and disposing of it by his will to the amount of $10,000 to be used in the support of a poor man in London. He was a merchant of London. He is stated to have been descended from John Child, the son of William Child, by Catherine, daughter of Sir Thomas Coventry, one of the Judges of the Common Pleas. He was Lord of the Manor of the first ward of London, and of the last ward of the parish of St. Peter's, Keeper of the Great Seal, and the ancestor of the earls of Coventry. As Judge Coventry died in 1606, Richard Child, who is stated to have died in 1638, could not well have been a more remote descendant than his grandson, and was probably the son of his daughter, without the assistance of the family of Child, Le Child, or L'Entant, originally of Shropshire, but which had been seated at Northwich in Worcestershire since the middle of the fourteenth century. Sir Josiah was his mother's younger son. He was born in or near the town of Beverley, or at Beverley Minster, to which he was admitted as a chorister. He seems to have been brought up in an inferior station of life, he had, besides two sons who died in infancy, a daughter Elizabeth, who married John Howland, Esq., of Streatham, in Surrey, and whose daughter Elizabeth married John Wilson, esq., of Dunham Massey, in Cheshire, and the descent continued in a line. Sir Josiah was educated at Shrewsbury, and entered at the age of 15 at Balliol College, Oxford, where he was a liberal benefactor. He was married successively to five different women, but he seems to have always been a bachelor, and to have been in the utmost poverty for many years. He was a great advocate for the abolition of the slave trade, and was a member of the Radical Club. He was elected a member of the Corporation of London in 1680, and was one of the first members of the Royal Society. He was a great opponent of the East India Company, and was one of the most prominent of the opponents of the company, that the East India trade was ruinous, or prejudicial, by reason of its draining the country of gold and silver: it was answered by Child, who was an opponent of the company. He was one of the first to publish a discourse on the subject of the East India trade, and was one of the first to publish a dissertation on the subject of the East India trade, and was one of the first to publish a dissertation on the subject of the East India trade.
Earl Tylden in 1732, both in the Irish peerage, having previously married Dorothy, daughter and heir of John Glynne, Esq., of Henley Park, Surrey, by Dorothy, daughter of Francis Tylden of Rotherwick, in Hants. Lady Tylden eventually inherited the Rotherwick estates; upon which, in 1734, the surname of Tylden was assumed under the authority of an act of parliament by her son John, who became Earl Tylden on the death of his father, the first Earl, in 1750. Upon the above issue, and with the title becoming extinct; and the estates devolved upon Sir James Tylden Long, the son of his sister Lady Emma, who had, in 1735, married Sir Robert Long, Bart., of Dryeoute House, Wilts. In 1812, Catherine, Sir James's eldest daughter and co-heir, married the Hon. William Pole, who thereafter assumed the additional names of Tylden Long, and is now Lord Maryborough; his father, an elder brother of the Duke of Wellington, having assumed the surname of Pole in 1778, on the marriage of the Hon. William Pole, of Baliffe, Esq.; and the previous family name of Wellesley having been assumed, in 1728, instead of that of Colley, by the first Lord Mornington on succeeding to the estates of his cousin, Garret Wellesley, of Dangan, Esq. Of the estates of Sir James Long which came to Mr. Wellesley Pole in right of his wife, a principal portion consisted of the manor of Wanstead in Essex, which had been purchased by Sir Josiah Child of the heirs of Sir Robert Brooks, and upon which his son, the first Earl Tylden, erected one of the most magnificent houses in England. This house, the building of which is said to have cost 360,000/., its new possessor, whose wife died in 1825, sold in 1828 by auction for 10,000/., one of the conditions of the sale being that the purchasers should clear everything away to the foundation before Lady-day, 1825.

(The History and Antiquities of Essex, by the Rev. Philip Morant, 2 vols. 1768; Kimber's New Peerage, 1776; Collins's Peerage, by Brydges; The Irish Compendium of Honour, various editions; Brayley and Nightingale's Middlesex; Annual Register, various volumes; Anderson's Chronological Deduction of Commerce; Macpherson's Annals of Commerce; MacCallum's Principles of Political Economy, and Literature of Political Economy.)

CHILD-KILLING. [INFanticide, P. C.]

CHILD-STEALING. [ABDUCTION, P. C.]

CHIMNEY (derived immediately from the French cheminé, which conveys the idea of a narrow passage, a diminutive or feminine form of chemin, but primarily from the Latin caminum), an enclosed passage, funnel, or tunnel (see remarks on the etymology of TUNNEL, P. C., p. 368), for the escape of smoke from a fire-place or furnace. The office of a chimney is not merely the removal of smoke, but also the production of draught to excite the combustion of the fire, by the heating and consequent rarefaction of the column of air inclosed in the funnel, the rising of which causes a partial vacuum, which should be filled with air admitted either through or over the burning fuel. [SMOKE, P. C., p. 154; FURNACE, P. C., p. 21; WARMING AND VENTILATION, P. C., p. 71.]

The construction of house-chimneys is briefly treated of under HOUSES, P. C., pp. 327, 328; but the explanatory diagram of a stack of chimney-flues, referred to under BACKWORK, P. C., p. 410, was omitted there. Before introducing it we shall enumerare, on the authority of Nicholson's ' Architectural Dictionary,' article 'Chimney,' the technical names given to the various parts of a chimney and fire-place. That which builds term the fire-place is the square recess or opening, facing the room, in which the stove is fixed or set. The hearth is the flat piece of stone, or marble, or metallic plate, immediately under the fire-place, while the largest piece of stone on the same level, but before the fire-place, though very commonly called the hearth, is technically called the slab. The vertical sides of the opening of the fire-place, and the projections from the face of the wall at each extremity of the slab, are called the sides and the back or partition of the fire-place, the ends of which rest upon the jambs, is styled the mantel. Coings are the oblique facing of stone, marble, or metal, sometimes applied to the inside of the jambs to reduce the space at the back of the fire-place. Casing is a general name applied to the cavity or passage of the chimney, from the fire-place to the top of the wall, the lower part of which, where the sides are sloped so as to contract the passage from the dimensions of the top of the fire-place to those of the flue, is called the gathering of the wings, or simply the gathering. The flue is the long narrow passage which extends from the gathering to the top of the wall, and which, whatever may be its course, should be of equal dimensions throughout its whole length; and the throat is the lower end of the flue at the junction with the gathering. The breast is that part of the wall which faces the apartment, and forms that side of the funnel which lies parallel to it; and the back is the opposite wall of the flue, parallel with the breast, but at the side furthest from the apartment. Withs are the narrow partition-walls which separate one flue from another rising beside it and which form the sides of the flue, the breast and back being considered the front and back. A stack, or chimney-stack, is a wall containing a number of chimneys or flues arranged side by side. The chimney-stack is the turret rising above the roof, to conduct a chimney or stack of chimneys to a sufficient height; and the chimney-top is the horizontal termination of the chimney-stack, which is commonly surmounted by chimney-pots, to contract the upper end of the funnels or flues.

In most English houses, there is an opening in the chimney-flues within the substance of the party-wall, an arrangement which, while it involves rather more brickwork than the older plan of forming them in the projecting jambs, has the advantage of leaving the width and projection of the jambs entirely dependent upon the taste of the architect. Where this plan is adopted in the case of two adjoining houses, the fire-places of which are back to back, the flues of the two houses may be brought into one plane, as illustrated in the annexed diagrams, Figs. 1 and 2. Fig. 1 represents the arrangement of the flues in a four-story house, having two fire-places on each of the three lower floors, and three on the

Fig. 1.
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CHIMNEY-PIECE. The assemblage of architectural dressings around the open recess constituting the fire-place in a room, and within which the fuel is burnt, either immediately opens on the hearth above, or is placed near by. Accordingly, the fire-place being the spot around which persons naturally group themselves in an apartment, or near which they take their station—literally the focus of the domestic circle—the chimney-piece is a principal feature and one chief point for decoration, so much as to have come to be considered almost essential to the character of a sitting-room; for though an equal degree of warmth and a more equable temperature may be obtained by means of fire for a room in a state of coolness, and even for a room in a state of warmth, yet the want of a fire-place is felt, the chimney-piece is missed as an architectural feature, there being about the same want of expression as there is in a house which shows no chimneys. It is, therefore, that chimney-shafts and chimney-pieces were therefore properly made significant and ornamental features in our ancient domestic architecture. For a long time indeed, fire-places were used only for one or two principal rooms in a building, and were of very rude and primitive design, the funnel of the chimney projecting into the room, and sometimes sloping forward, downwards, and the opening for the fire-place being a simple arch, with scarcely any attempt at ornament. The first attempts in this direction are those of mere fire-places, and not chimney-pieces. In domestic architecture much was exceedingly uncoy and inconvenient, at the time when the Gothic style had attained in ecclesiastical edifices what has been considered by many its highest perfection. But as soon as some degree of architectural refinement began to be introduced into the habitations of nobles, external dressings constituting a chimney-piece were added to the fire-place. The annexed example of one from Tattershall castle, Lincolnshire, may serve as a type for such internal feature where the Gothic style is employed, both on account of its marked fitness and propriety of character, and the happy union of simplicity with richness. It exhibits the style characteristic as employed for that particular purpose and no other, by those who were familiar with it, and who therefore did not, like modern Gothic designers, including Horace Walpole and his friend Bentley, look to tombs and gateways for ideas for chimney-pieces: here there is nothing borrowed from antiquity of the kind, nor from door or window. Some other examples—one from the same building, and two from Windsor Castle—are given in Pugin's "Gothic Specimens," all of them very similar in their general character itself, and in a raised which so and in regard to compactness and simplicity of composition they accord much more nearly with modern taste, and have a less "Gothic" air than the cumbrous and extravagantly ornamented chimneys of the French and our own Elizabethan. In these the design was carried quite up to the ceiling so as to form a sort of architectural frontispiece, composed of two or more stages piled upon one another, adorned with columns, pilasters, Caryatides, termini, niches, &c., in work, whenever it is desired, of carving and sculpturing. But though such compositions were generally exceedingly capricious, and equally fantastic and coarse in detail, some were real works of art—truly admirable for artistic beauty of design and masterly execution. In the place of chimney-baffles were many sumptuous structures—for so they may be called—of the kind, and among those still remaining is the one
in the ball-room, originally decorated with two bronze caryatids, larger than life, but for which columns are now substituted. Various magnificent examples, of the same period, occur in the Low Countries: two noted ones in the Hôtel de Ville at Courtrai, and one other in the Comédie Royale, in the Hôtel du Franc at Bruges. In our own country, chimney-pieces of the time of Elizabeth and James I. are by no means uncommon: many are remaining not only in mansions of that period which are still kept in condition, but others which have been almost completely modernized in all other respects. A great number and also a very great variety of them may be found in Nash's 'Old English Mansions,' and Richardson's different publications illustrative of English architecture. Hitherto, they are exceedingly handsome in their mass, 'over-informed' with ornament of all sorts, in the style of the ponderous cabinets of the time, and allowing in fact sometimes immense pieces of furniture of the kind, owing to their rather contrasting than according with the enrichment bestowed on other parts of the room. Some however are of comparatively sober design, and even those which are most extravagant as compositions, and over-loaded with ill-assorted details, are of interest as exhibiting numerous samples of ornament.

As the more regular Italian style gained ground, the fashion of chimney-pieces greatly changed; the decorated superstructure reaching from the chimney-piece itself to the ceiling was either discarded altogether, or greatly reduced so as to become part of a wall, and thus to be a cause for decoration. The chimney-piece and fire-place were reduced to nearly their modern proportions and dimensions, whereas the opening or fire-place had previously been of such size that a person might enter it, as it was intended to be used as a large kitchen fire-place; which, putting aside other objections, caused a room to appear low by comparison. At present the height of the opening is made nearly the same in all cases, viz. from three to three and a half, the width alone being increased accordingly as a larger fire-place than usual is required, and the dressings around it extended so as to proportion the chimney-piece in some degree to the size of the room as a piece of architectural furniture in it: thus like other decorations, those of the chimney-piece, if used for mere device, to such as they dictate excessed, the chimney-piece itself would look gigantic, and the mantel-piece would be out of reach. When therefore a single fire-place of the usual size is insufficient, as for very spacious rooms or galleries, there are two or even more according to circumstances, and they must of course be placed with strict regard to architectural symmetry; thus, if two, there is generally one at each end of the room, though both are sometimes placed on one side opposite to the chimney, viz. at the wide end, and another at the north end. Fire-places are sometimes made on the window side of the room, which although by no means to be recommended for general practice, or for more than one or two rooms at the most, and also in large houses, has its advantages. It is a convenient disposition for them in libraries, because a person can sit and read by the fireside and a window at the same time; it is also very agreeable to have a chimney-piece so placed when the windows command a fine prospect; thirdly, it is very useful in the case of sitting-rooms or other rooms in the house, which are quite isolated from other parts of the house. In such case there must of course be a central hearth for the fire-place, and that pier must be of such width as to allow the chimney-piece to be placed against it without seeming to be squeezed in between the windows. It is objected that when the chimney-piece is so placed, not only is the window side of the room not to look crowded, but the opposite one to look blank; but that depends entirely upon circumstances: the opposite wall would be sufficiently filled with bookcases; or in any other room a sufficient balance may be kept up between the opposite sides by hanging some very large picture, or mirror, immediately facing the chimney-piece, or by a cabinet or some other large piece of furniture; or it may chance to be a very great convenience to have that side of the room free from a chimney-piece, as it allows the opportunity of obtaining specious and folding-doors in the centre of it into another or other saloons, the height of which would sufficiently fill up that side of the room. Instead of being placed between windows, chimney-pieces are sometimes put beneath them, the mantel-piece forming the in- ferior division of an architrave. This last disposition is almost completely abandoned in the style of the adjacent piers. Again, where fanciful effect is aimed at, a chimney-piece is set in an architectural compartment entirely filled with looking-glass, in which case the jamb and architrave are most often contrived. It may be truly said, the doubled by reflection, the chimney-piece has the appearance of being a solid and insulated mass of marble.

Marble is now the usual material for chimney-pieces even in ordinary houses, and such very general employment of it for the purpose has caused economy to be consulted by exclusive plainness of design and wantonness of workmanship, sculpture being out of the question; the mouldings very few and plain, the mantel-piece a mere shelf. Chimney-pieces of this class are manufactured by wholesale, and are kept likewise by other articles of furniture ready-made, requiring only to be fixed up when purchased. Convenient and economical as it may be, such a system is not calculated to advance taste, since a chimney-piece ought to be designed expressly for the particular house in which it is to be placed, and not transplanted from houses of a superior kind, and yet in some recent instances there is so far from being that accordance between the style of the chimney-pieces and the other architectural decorations of the room, that the chimney-places appear to be but than a lesser degree of embellishment, inasmuch as they are more closely observed, they have frequently very much less, consequently appear to be in a style of affected and half severity in comparison with all the rest. Worse than this, both style and keeping are sometimes so contrived by paint, that chimney-pieces of 'crinkum-crankum' design, à la Louis Quatorze, are stuck in rooms whose other architectural dressings are marked by the opposite extreme of soberness or even plainness. A chimney-piece ought to be: very dark or black marble is by no means the most suitable for such purpose, because instead of relieving the fire-place, the chimney-piece and fire-place together form a dull and sombre mass. This disagreeable effect is very greatly increased when—as is actually the case in the morning room of the new Conservative Club-house—black marble chimney-pieces are introduced among scagliola columns and plates of pale or bright hues: all consistency of composition is shut out immediately, and the whole thing is at once of less than a lesser degree of embellishment, inasmuch as they are more closely observed, they have frequently very much less, consequently appear to be in a style of affected and half severity in comparison with all the rest. Worse than this, both style and keeping are sometimes so contrived by paint, that chimney-pieces of 'crinkum-crankum' design, à la Louis Quatorze, are stuck in rooms whose other architectural dressings are marked by the opposite extreme of soberness or even plainness. A chimney-piece ought to be: very dark or black marble is by no means the most suitable for such purpose, because instead of relieving the fire-place, the chimney-piece and fire-place together form a dull and sombre mass. This disagreeable effect is very greatly increased when—as is actually the case in the morning room of the new Conservative Club-house—black marble chimney-pieces are introduced among scagliola columns and plates of pale or bright hues: all consistency of composition is shut out immediately, and the whole thing is at once of less than

CHINA. The first attempt of the English to keep up a trade with China was in 1696, when three ships, bearing letters from Queen Elizabeth, were freighted for that purpose, but they were lost on the voyage out; and no further attempt appears to have been made till 1637, when four merchant-ships from England arrived at Macao Roads. In a few days they sailed up to the Boca Tigris, which is considered by some as the mouth of China, and by others the Portugal, already established at Macao and trading with the Chinese, had misrepresented the purposes of the English, who, having communicated with the mandarins, were directed to proceed up the river. The ships were away, and the journeys up the river was compared to that of a journey up the Nile. A few days afterwards they were, without warning, fired upon from the fort. Incensed by this act of treachery, they sailed up the river as far as Canton, stormed the castle, and carried off the guns. A further communication then took place, by which the idea of the English was that of opening the country to the Portuguese. Cargoes were supplied by the Chinese, and the guns were restored, and the English ships sailed quietly away. Little or no commercial intercourse took place for some years afterwards. The East India Company established small commercial agencies at Amyot, at Ningpo, and on the islands of Chusan and Formosa; but the trade, owing to the exclusive purposes of the mandarins, proved so troublesome and unprofitable, that the Company decided to exploit the Chinese trade by their own agents from those places, and managed to establish a trade at Canton, which continued to advance, but slow and
On Meantime The consequence that he was out, and the frigate in which he had sailed returned to England in 1767. Lord Macartney was appointed ambassador to China; he died however on his passage out, and the British ships at Peking were placed under the command of Dr. Staunton, afterwards Sir George Staunton, as secretary of legation, chiefly in order to obtain leave to trade at Ningpo, Tyussing, Chusan, and other places besides Canton. The embassy was unsuccessful, and the emperor, in his communication to the king of England, stated that British commerce was to be limited to the port of Canton.

After the mission of Lord Macartney the general condition of the East India Company seemed to improve considerably. The conduct of the mandarins became less impertious; the exactions fewer and less annoying; and though some of the heaviest burdens on the trade still continued, the commercial progress of the English was tolerably quiet and rarely interrupted.

An interruption however of some importance occurred in 1808, in consequence of Admiral Drury, by direction of the East India Company, landing troops on Macao, for the protection of that island against the supposed designs of the French. The Chinese, regarding Macao as a portion of their empire, and the Portuguese as mere tenants at will, ordered the British troops to be withdrawn; the order was not complied with; the Company's trade at Canton was stopped in consequence of his Majesty's displeasure; and Admiral Drury, in vain endeavoured to obtain an audience with the viceroy at Canton, threatened to force the line of ships which the Chinese had placed across the river, but did not carry his threat into execution. After fruitless discussions which lasted three months, the Chinese gained their point; the British troops were withdrawn from Macao, trade was resumed, and Admiral Drury sailed away to Bengal.

Another dispute between the British and Chinese occurred in 1814, in consequence of the British frigate Doris having captured the American ship Hunter, and brought her prize into the Canton river. The Chinese authorities directed the Committee of Merchants to send the Doris away, to which the Committee of Merchants replied that they had not withdrawn her. The Chinese authorities thereupon began a series of agressive measures, not against the frigate, but against the mercantile community.

The Committee of Merchants, feeling the aggravations to be intolerable, determined on the bold measure of stopping the trade. The Chinese, finding the weapon which they had more than once used against the British now turned against themselves, became more conciliatory. Sir George Staunton, son of Sir George Staunton who had been in Lord Macartney's embassy, was appointed to manage the negotiation, and he ultimately gained the principal points for which the British contended, which were then incorporated in an official document signed and published by the viceroy.

Although a new arrangement as to Canton was such that the commercial transactions of Great Britain were at all times exposed to the risk of interruption from the caprice and extortion of the officials at Canton, who knew the system perfectly, and esteemed their own corrupt participation in the profits of the illegal traffic and of their oppressive conduct towards the merchants.

A principal object of Lord Amherst's embassy in 1816 was to complain of the treatment to which British commerce was subjected, and to demand a regular treaty on equal terms, with the means of appeal to the emperor himself in case of need. Lord Amherst left England on the 10th of February, 1816, and the ships arrived in Macao Roads on the 26th of July. Having been in possession of Sir George Staunton and others, the embassy reached the gulf of Peckeleo on the 25th of July, but the ambassador did not land till the 9th of August. The objects of the mission were not attained, and the ambassador, after reaching Peking, returned through the interior of China. Meantime the Alceste, the Lyra, and the Hewett Indianman had returned to Canton, and the local authorities displayed their ill feeling to Mr. Hewett from taking in a cargo, and refusing to allow the Alceste and Lyra to anchor at Wampoo and take in provisions.

The Alceste was fired at by the war-junks and the fort at the Bocca Tigris. A single shot silenced the junks, and a single round was sent to the fort, after which the ships on the side of which the fort is built. The effect of this decisive retaliation was, that provisions in abundance were sent to the Alceste at Wampoo, and Hewett was permitted to take in a cargo of rice, and a statement was published which described the firing as a salute.

Though Lord Amherst's mission was unsuccessful, it was followed by a longer interval of freedom from Chinese annoyance than had ever before been experienced. From 1816 to 1822, not a single British merchant ship was stopped, and a short interruption in 1822, arising out of an unprovoked attack by the Chinese on some of the crew of the Topaze frigate, who were taking in water at the island of Linant. In this case the Chinese local government at Canton made the first advances towards a resumption of the intercourse which had been suspended in consequence of the provocation on the part of the Chinese. The illegal trade in opium had been driven in 1822, owing to the concerted efforts of the Portuguese, from Macao to Linant, a small island between Macao and the mouth of the Canton river. The local government of Canton, by its long course of secret participation in the profits arising from the sale of the prohibited article, continued to object to the exclusion of it, had placed themselves in such a position with respect to the emperor as well as Europeans, that they dared not interfere to protect their own subjects at Linant, where armed European smugglers had in defiance of their authority.

The exclusive trade of the East India Company with China terminated on the 22nd of April, 1834, and several private ships soon afterwards quitted Canton with cargoes of tea for the British Islands. The now act declared that it should be condition of the navy, by commission under his sign manual, to appoint not exceeding three superintendents of the trade of his Majesty's subjects with China, and to give such superintendents certain powers and authorities. Lord Napier was appointed chief superintendent, John Francis Davis, Esq. second superintendent, and Sir George B. Robinson third superintendent. The instructions, under the royal sign manual, dated Dec. 31, 1833, say, 'In execution of the said commission, you will take up your residence at the port of Canton,' &c., and the instructions from this, by the Prince of Hissar, signed by Lord Palmerston, Jan. 25, 1834, say, 'Your Lordship will announce your arrival at Canton by letter to the viceroy.' The British government seems neither to have proscribed the trade, nor to have interfered with the part of the Chinese authorities, or any difficulty arising from their insolent assumption of authority and bigoted adherence to matters of ceremony connected with that assumption. Till 1834 the East India Company stood in the way of any interference on the part of the British government.

With the whole trade under their control, they adopted the general policy of entire submission to the Chinese, their great object being to carry on their trade peaceably and without interruption, at whatever cost to the personal feelings of the supercargoes.

Lord Napier arrived at Macao from Great Britain on the 15th of July, 1834, on the 25th sailed up to Canton, and on the 26th addressed a letter to the viceroy, announcing his arrival. Napier was appointed to conduct the negotiations, and the letter was rejected on the ground that it was not superscribed with the character 'pin,' or 'petition.' This character had been used by the supercargoes of the East India Company, but Lord Napier, acting as a brigadier representing the British government, was expressly directed not to use it. On the 18th of August, Lord Napier was ordered to withdraw to Macao. The order was not complied with. On the 21st of August a shipment of cargo which had been announced to the Hong merchants was stopped at the entrance of September the British trade was entirely suspended by the viceroy. On the 4th of September the residence of Lord Napier was surrounded by a large number of soldiers, his house was surrounded, his garden in which five servants were staying was fired, and the communication of September the British trade was entirely suspended by the viceroy.
at Whampoa. The guard was sent up on the 6th of September, and the two ships sailed through the Bocca Tigris on the 7th, alienating as they passed the batteries which were opened on them. Negotiations ensued, and on the 15th of September Lord Napier took languishment to the British consul there, having in vain used every effort to establish a commission at Canton, he did not at present feel authorized, by continuing to maintain his claims, to cause any further interruption to the trade of the British ships then there. The 21st Lord Napier was embarked under a strong guard of Chinese officers and soldiers to proceed by the Inner Passage to Macao, where he arrived on the 26th, suffering from fever brought on by the noise, the heat of the weather, and the apprehension he had been subjected. On the 11th of October, 1834, he died.

Mr. Davis, who, previously to his becoming second superintendent, had been the chief supercargo of the East India Company, succeeded Lord Napier as first superintendent. Mr. Davis, on the 7th of August, 1834, had written to Lord Palmerston in the following terms:— Lord Napier seems to be clear as to his instructions allowing him to decline any but a direct communication with the officers of government, and in the policy of his course I have no hesitation whatever in concurring; for to be governed by the Hong merchants, a system which has always been highly detrimental to our true interests, would now be infinitely worse than under the reign of the Chinese. The amounting to some millions per annum, did of course give them great influence over these merchants. This species of influence is out of the question with us, who, unless we have direct access to the government officers, can do nothing whatever. Lord Napier's letter on the subject was rejected on the most frivolous and inadmissible pretences.

Mr. Davis, in January, 1835, embarked for England, and was succeeded by Sir George Robinson as chief superintendent. Captain Elliot, who had previously been secretary, then became second superintendent.

On the 21st of January, 1835, some of the crew of the Argyle, which had anchored on the coast of China in consequence of sea damage, were seized and detained by the local authorities. Captain Elliot, proceeding to Canton, demanded the restoration of the crew, but was assaulted by the authorities there, and forcibly removed. The crew of the Argyle however were restored on the 18th of February. On the 23rd of February several chests of opium, which had been seized from smugglers, were publicly burnt at Canton.

The reciprocal interests of China and Great Britain kept affairs tolerably quiet, and trade continued to prosper under the new administration of Sir George Robinson. The British and Chinese authorities carefully abstaining from any communication with each other.

Sir George Robinson was recalled by the British government and the post of chief superintendent was filled by Sir Frederick Napier. This order was received at Canton December 4, 1836.

The opening of the British trade in 1834, had given additional stimulus to smuggling of all kinds, and the illicit trade in opium continued to increase, though the edicts against it became more severe, and were more rigidly enforced. The smugglers were entirely driven from Linzin, in consequence of which the traffic extended not only to the east coast, but was carried on within the Canton river as far as Whampoa by Europeans in their own boats, in the most audacious manner.

Captain Elliot used every effort in aid of the Chinese authorities, to check the importation, at the same time adopting a system of conciliation which had the effect of making them more tractable. Their communications were always addressed to the Hong merchants; "they are not addressed to me at all," says Captain Elliot in one of his despatches; "they speak of me, not to me;" and he was directed to submit his communications to the Hong merchants, in order that they might judge whether they had the right to send them to him.

In March, 1837, an edict was received from the emperor allowing Captain Elliot to reside at Canton, and he continued to communicate by the medium of the Hong merchants, and to use a "character or pin, or petition," though both were repeatedly ordered by the British merchants, who threatened Elliot with the Chinese authorities, without themselves taking any steps to get rid of the offensive formalities.

The aspect of affairs at Canton became more gloomy about these times. The difference between the officers of the two nations remained unadjusted, and a debt of more than three millions of dollars was due by the British factory from two insolvent Hong merchants, with little prospect of liquidation. Admiral Sir Frederic Maitland arrived at Macao, July 12, 1838, in the Wellesley ship of war, accompanied by the armed frig Algerine. Captain Elliot joined him, and an edict of the viceroy of the Chinese government was ordered to be drawn up and sent to the Hong merchants, which was returned unopened, with a notice that such a mode of communication was prohibited by the British government. Captain Elliot then proceeded to Canton, where he was received by the Chinese admiral, who expressed the satisfaction he felt at the British eagerness to relieve the Chinese community. No mark of attention, however, was shown to the British consuls. The admiral informed this result, which was a written declaration of an intention to insult, with which the admiral was satisfied, returned to his former anchorage, and soon afterwards sailed away.

Fresh disturbances broke out in consequence of the smuggling of opium. Preparations were made on the 15th of December, 1838, to strengthen a Chinese opium-smuggler in the square immediately in front of the factories at Canton, which the Europeans resisted, and the man was executed elsewhere. The British and Chinese authorities afterwards agreed, the Hong merchants being required to deliver the opium then amounting to many thousands, attempted to force, but they were at length dispersed by a body of Chinese soldiers. Captain Elliot, on the 18th of December, published a notice, requiring all British-owned vessels trading in opium to have the river flag of Great Britain put on board, for three days. The vessels were not conciliated; on the 26th of February, 1839, a Chinese opium-smuggler was strangled in front of the factories, as a mark of the opposition of the Europeans; in consequence of which insulting and offensive proceedings all the enemy flags were struck, and remonstrances sent to the viceroy, to which no answer was returned.

On the 10th of March, 1839, Lin Tseh Suey arrived at Canton as high commissioner from the imperial court, and re-established the authority of the Chinese government, for the intercourse between China and Great Britain unavoidable. In consequence of Captain Elliot's order (which in fact he had no authority to make nor any power to enforce) the opium-veils had left the river, but this was not enough for Commissioner Lin. Having first sent round the Hong merchants to ascertain by inquiry what arms the foreigners possessed for their immediate defence, he then, on the 18th of March, issued an order commanding all opium in British ships, whether on the river or on land, to be delivered up. Having assured himself that the commander of the ships undertook to deliver them to the officers of Commissioner Lin. On the 20th of April half the quantity was delivered, and the remainder on the 21st of May. The burning and destruction commenced on the 3rd of June, and continued for about two weeks.

Meanwhile Captain Elliot had written to Lord Auckland, then governor-general of India, detailing the system of violence and spoliation which had been adopted by the Chinese, and asked for measures to be taken to protect British shipping. Captain Elliot had joined his countrymen in the factories, and demanded passports, which were refused. The surrender of all the opium on board the ships was demanded of him, and under these circumstances of intimidation he issued a notice ouining all British subjects to surrender to him all the opium under their control, for the service of her Majesty's government, pledging himself as responsible, on the part of the government, to each of the opium, for all the value of the opium not delivered up. Having assured himself that the commissioners, on behalf of the British merchants, who had taken measures with the Chinese authorities, without themselves taking any steps to get rid of the offensive formalities, could be spared from the Indian station. This message had been sent by the Lorn sloop-of-war, and there did not then remain a single British armed vessel in the Chinese waters for the protection of British life and property.

After the delivery of the opium all foreigners were allowed to leave Canton, except sixteen, who were afterwards however allowed to depart under an edict from the viceroy, which

On the 29th of July, 1839, Captain Elliot warned the British community, all of whom were now living in the different
merchantships, that he ' had moved her Majesty's and the Indian governments to forbid the admission of tea and other produce of China into Great Britain and India.' This stoppage of trade irritated Commissioner Lin excessively. He tried by means of placation to quiet the British to discover Captain Elliot's notice, and having gone down to Macao, made it a matter of complaint to the Portuguese against Captain Elliot that ' he had prevented the merchant-ships of his country from entering the port of Canton.' Commissioner Lin then sent Keshen to Guangzhou to prevent the use of opium by the Chinese; but it was more eagerly sought for than ever, and the very strictness of the prohibition and severity of the measures seemed to create a sort of mania for it which now became more alarming.

In an affair between the Chinese and some British and American seamen, a Chinaman was killed. In consequence of this homicide, an order was issued on the 15th of August, interdicting the supply of any kind of food to the British in China, and on the 31st of August a proclamation was issued calling upon the Chinese to arm and attack the British, whose situation was becoming daily more critical and dangerous, when, on the 11th of September, the Volage, British frigate, arrived, and Captain Smith, the commander, immediately published a notice of blockade of the port of Canton, on the ground that the regular supplies of food had been prohibited to her Majesty's subjects; that the Chinese people had been ordered to fire upon and seize whenever they saw British ships, as all the objects had been actually cut off. The proclamation against the British was immediately withdrawn, provisions were no longer prohibited, and Captain Smith then withdrew the notice of blockade.

The British frigate Hyacinth joined the Volage on the 29th of October, and on the 3rd of November the two frigates were attacked by twenty-nine war-junks under Admiral Kwan. The Chinese were beaten off with great loss; one junk was blown up, and several were sunk. On the 5th of January, 1840, an imperial edict was issued, directing all trade with Great Britain to cease for ever.

The Chinese now made active preparations for the protection of the port of Canton. The guards were increased, and redoubts were formed; guns collected, fire-ships got ready, and troops exercised. On the 22nd of May the British merchant-ship Hellas was attacked by eight junks and three large boats, when all the crew of the Hellas were wounded. On the 9th of June, another unsuccessful attempt was made to burn the British ships by means of fire-rafts. The British naval force was rapidly augmenting. Sir Gordon Bremer hoisted his broad pendant on board the Wellesley, 74, and on the 22nd of June, 1840, entered the Tae-eok-tow, the old Canton fort, in its entrances, by order of the British government. British armed vessels continued to arrive, and within a day or two after the notice of blockade the chief command was assumed by Rear-Admiral the Hon. George Elliot, who had just arrived.

A small force having been left in the Canton river to maintain the blockade, on the 30th of June, 1840, the fleet sailed northward along the coast of China, Rear-Admiral Elliot and Captain Chuenpee having been appointed joint-plenipotentiaries for settling with the emperor the matters in dispute between the two nations.

On the 2nd of July, a boat sent into Amoy from the Blonde, 44 guns, and bearing a flag of truce, was fired upon. The British imagined that the attack was made with the effect on the batteries and war-junks, sailed away and rejoined the fleet. Tinghai, the capital of the island of Chusan, was taken on the 5th of July, after a slight resistance; and on the 10th of August, a British vessel, the Village, of 18 guns, ten of 44 guns each, three barks, two sloops, a gun-boat, and two armed vessels, the Chinese gunboat Leng, with 18 guns, 10 of 44 guns each, four armed steamers, and twenty-seven transports, having on board three regiments of soldiers, a body of Bengal volunteers, and a corps of Mahratta sepoys and miners.

On the 11th of August, 1840, the Madagascar steamer, with Captain Elliot on board, entered the Peiho, which flows past Peking on the south and falls into the gulf of Pechelbo, where the rest of the fleet arrived a few days afterwards. Lord Palmerston's communication was now received, and forwarded to the emperor at Peking, and a conference took place near the village of Lin on the 26th between Captain Elliot and Keshen, the governor of the province. While the emperor's answer was expected, the greater part of the ships sailed northward up the Gulf of Pechelbo, as far as the great wall of China. On their return, the result of the emperor's answer and the negotiations between the two plenipotentiaries was, that China was to return with the squadron to Canton, whither Keshen was to be sent as imperial commissioner, to supersede Lin, whom the emperor described as ' no better than a wooden image.' The squadron then returned northward, and as it was now evident that the negotiations had failed, another fleet was despatched from Canton to undock the British ships; and, on the 29th, Rear-Admiral Elliot was compelled to resign his situation of joint-plenipotentiary, owing to sudden and severe illness.

On the 6th of January, 1841, in the midst of the negotiations with Keshen, an imperial edict was issued, requiring all British ships and men to be destroyed, wherever met with and in any manner. Meanwhile the Nemesis, a large iron war-steamers of extremely shallow draught of water, and built expressly for service in the Chinese rivers, had arrived, and was of the most important use in the subsequent warfare. In consequence of the violation of the truce, which appears to have been by the emperor's express order, the forts of Chuenpee and Tae-ek-tow were stormed and carried, and 175 enemies taken or rescued, with a few more killed. A battery was carried to one of the fortresses of Tientsing, and a large squadron was sent up the Yang-tse-keang, under Admiral Kwan, which was destroyed, and eighty guns taken.

On the following day the Bocca-Tigris, a large vessel which defended the Bocca Tigris, were on the point of being attacked, when a boat bearing a flag of truce was sent off to the flag-ship by Admiral Kwan, with a communication to Captain Elliot. Negotiations again commenced, the fleet retired to Chuenpee, and on the 20th of January the lowest Elliot announced that a treaty of peace had been concluded with Keshen, by which the island of Hong-kong was to be ceded to the British, six millions of dollars were to be paid in indemnity, and trade was to be resumed at Canton within ten days.

The forts at Chuenpee were then given up, and the British took possession of Hong-kong on the 28th of January. On February 2nd, at the end of the ten days, the British were surprised that no proclamation was made for opening the trade at Canton, and there were also rumours of warlike preparations going on up the river. Captain Elliot waited till the 10th of February: he then went up to Canton, and on the 11th fresh negotiations commenced between the British and Keshen. Captain Elliot consented to a further delay of ten days for the preparation of a definitive treaty for signature; but before the ten days were expired it was discovered that the most extensive preparations were going on for a renewal of the conflict. By the 20th of March, the Chinese had finished an edict which he had received from the emperor respecting the treaty which Keshen had concluded with the British.

The British made immediate preparations for resuming hostilities, which were commenced on the 22nd of February by the capture of a masked battery and eighty guns, and the following day was fixed for the grand combined attack on all the Bogue forts, which had now been made very strong. The attack was made, and the forts taken, most of their defenders killed or dispersed. Including the eighty guns captured on the previous day, the whole number amounted to 460 pieces, several of which were from 18 to 42 pounds. The Chinese were surprised and wounded, with 500 killed and 1200 wounded, and 3000 taken, who were soon afterwards set at liberty. Sir Gordon Bremer announced that of the British ' five men were slightly wounded.'

The fleet proceeded up the river on the 27th of February, and found other Chinese prepared a little below the island of Whampoa, consisting of mud forts, war-junks, and a great raft across the river, very solid and strongly constructed. All these defences were destroyed, and nothing remained but to attack Canton.

The approaches to Canton were imperfectly known, and while an examination was making the Chinese contrived to obtain another short truce. Sir Hugh Gough arrived from Madras, and on the 2nd of March assumed the chief command of all the land forces. On the 18th Keshen left Canton for Peking in disgrace, where he afterwards condemned
as a traitor, because he had not defeated the British; his property was confiscated, and he himself was banished to Tartary.

On the 18th a bold exploit was undertaken and successfully executed by the Dutch in the straits of Amoy, being the forerunners of a Battle of Passage, or Inner Passage, a branch of the Canton river which leads almost in a straight line from Macao to Canton, and had never before been navigated by European ships or boats. This feat occupied the 18th, 19th, and part of the 20th; the Nenzimes, consisting of three armed boats, in many parts literally ploughed her way through the mud, and rejoined the squadron close to Canton. Opposition was made to the passage of the boats, by forts and batteries on the banks of the river; but the boats, and by iron-masted junk-jun boats, with only three of the British were wounded in the series of conflicts. Altogether 115 guns were rendered useless, nine war-junks were destroyed, and six batteries, several armed mandarin boats, and three military stations, with barracks and magistrates, were put to the torch.

On the 18th of March the forts and all the other defences of Canton were taken, the war-junks and armed boats all dispersed or destroyed, and the city lay at the mercy of the British. Nothing further was done on the 19th, and on the 20th a suspension of hostilities was agreed upon between Captain Elliot and the new imperial commissioner Yang-Fang, who on the following day issued a proclamation, in which he stated that as Elliot had represented that all he wanted was peace to trade, and as all former expeditions had been performed from the generous Goodness of the Celestial Court, therefore it was right now to permit the English to trade as well as other people, in order to show a compassionate regard.

The other two imperial commissioners associated with Yang-Fang did not arrive at Canton till the 14th of April. Meanwhile trade went on with activity but much caution; and rumours soon became prevalent of hostile preparations in active progress somewhere above Canton. The authorities displayed great dexterity in using words to conceal their thoughts, but Captain Elliot was at length convinced that a treacherous plot was about to be executed, and he gave orders for the British in the factories to be prepared to leave Canton at a moment's notice. The plot exploded on the night of the 20th of May, the European inhabitants having previously been withdrawn from Canton. The sentries discovered several dark-looking masses dropping down the river; these proved to be fire-rafts consisting of boats chained together in twos and threes so as to hang across the bows of a ship while the combusibles were burning. They were set on fire by those who had the charge of the Nenzimes and began immediately to chain among them, and towed them out of the way of the ships. Many of them drifted on shore, and set fire to the suburbs of the town, while masses of fire were seen floating down the river on all sides.

On the 21st of May the heights which command the city of Canton were carried by the British troops, but the breaching of the walls was deferred till the following day, when a flag of truce was displayed, and on the 27th the Chinese authorities paid the English two millions of dollars for the ransom of the city. Hostilities were consequently suspended, and on the 31st of May five millions of dollars were paid, and security given for the other million. The British forces then withdrew from Canton; early in June all the ships of war and transports were again at Hong Kong, and on the 16th of July the Canton trade was re-opened.

On the 10th of August, 1841, Sir Henry Pottinger arrived in Macao Roads, as sole plenipotentiary and chief superintendant of his mission, in company with two Chinese, a man of eminence and determination, experience as a diplomatic agent in India, and a thorough knowledge of the Asiatic character, to counteract the manoeuvres of the Chinese, and bring the war to a speedy termination. He was accompanied by Vice-Admiral Thos. B. Freeman, RN, on whom all the subsequent naval operations were conducted.

On the 12th of August, 1841, Sir Henry Pottinger issued a proclamation, announcing his appointment, and stating the objects of his mission, and on the 21st of August the fleet, consisting of thirty-six sail, including transports, with two line-of-battle ships, seven other ships of war, and four steamers, set sail northward along the coast of China.

On the 20th of August a notice was sent from the fleet to the Commissioner of Amoy, stating that it had resolved to enforce the demands made in 1840 by Captain Elliot at Tientsin, and that if the town was delivered up to the British no damage would be done. If this requisition was complied with, a white flag was to be displayed from the fortifications; but if this was not done, hostile operations were commenced forthwith, and by 28th the whole of the town and the island of Kowloon were in the possession of the British. The town was taken on the following day: 296 guns were rendered useless; a garrison was placed in the island of Kowloon, which commands the entrance of Amoy; and on the 8th of September the whole island of Amoy was in British hands.

On the 1st of October the town of Tientsin, with all its new and extensive defences, was recaptured; and on the 10th of October the town of Chincan, at the mouth of the river Hwang-ho, was occupied. The town was burnt by a body of several hundreds killed and wounded, and 157 guns, of which 67 were of brass, taken or rendered useless. The British loss was three killed and 16 wounded.

The important commercial city of Ningpo, 12 miles up the river, was taken without resistance on the 15th of October. The authorities had abandoned it. The troops were moved into winter-quarters at Ningpo. The weather set in intensely cold about the middle of December, when reports were brought in of the assembling of large bodies of troops higher up the river. A military expedition was therefore raised upon, and a body of Chinese troops collected at the town of Yu-yau were dispersed, and pursued some miles over the snow. The troops were re-embarked on the 30th of December, and on the 16th of January, 1842, lay opposite the town of Taekei, which is about four miles from the banks. On the following morning the troops entered the town, which the authorities had abandoned. The town of Yung-chow was entirely taken on the 18th of January, 1842, the soldiers and public officers having all fled. In this case, as in the others, the stores in the public granaries were distributed among the Chinese poor, and no damage was done except to the fortifications and government buildings.

A night-attack on Ningpo by the Chinese, on the 9th of March, was repulsed with some difficulty, but ultimately with great loss to the Chinese. On the following night a similar attack was attempted by the Chinese fleet, with a similar result. On the 15th of March 1000 men were embarked on board the steamers to attack a large body of troops who were encamped on the Segon hills, near the town of Taekei. A large part of them were Tartars, who fought with the greatest bravery, and when they found their efforts useless, nearly all of them refused to surrender, and many deliberately cut their own throats. The town of Taekei was entered, and treated in the usual way, and the expedition then returned.

Ships of war, steamers, and transports continued to arrive in succession during April. About the same time vast numbers of fire-rafs were discovered concealed among the Chusan islands, and were destroyed by the Nenzimes. On the 7th of May Kowloon was evacuated by the British, and on the 27th the force proceeded towards Chappy, about 50 miles distant. Chappy was captured on the 18th of May, after a desperate resistance by the Tartar troops.

On the 16th of May the British set sail, and on the 5th of June reached the entrance of the Yung-tse-kiang, on the right bank of which is situated the small town of Woosung, at the mouth of the Woosung river, very strongly fortified. On the 16th of June the batteries were attacked and captured, though they were manned by Tartar troops, who served them well and fought desperately. Altogether 150 guns were taken, of which 42 were of brass. On the 19th of June the wealthy city of Shanghae, second only to Canton in commercial importance, was occupied by British troops, and the British were enabled by a breeze to get up the river to the inland town of Hing-foo. Additional reinforcements had now arrived from England, and it was resolved to proceed up the Yung-tse-kiang to Nanking, formerly the capital of China. Sir Henry Pottinger having issued a proclamation explanatory of the complained demands of Great Britain, on the 5th of July the fleet sailed from Woosung for Nanking. The navigation of the river was found to be difficult, on account of the numerous sand-banks, but the steamers overcame all obstacles. On the 16th of July the batteries at Nanking were taken, and on the 21st the town was captured. There were about 2400 Tartar soldiers within the town, and about 3000 in encampments without, who fought with reckless courage and desperation. The town was their stronghold, which they defended with as much dexterity as the British contained the town, and the country under the Tartars was devastated. It was generally reported they were resolved to stay, and they were assailed with the revenges of horror which ensued, arising from the cutting of the throats and strangulation of the
wives, their children, and themselves, are indescribable. The number of British killed was 34, including 3 officers, and 107 wounded, including 14 officers.

The Grand Canal enters the Yang-tse-kiang beneath the walls of Chang-hai. The communications of the canal were now cut off and the immense traffic upon it entirely stopped, by which a heavier blow was inflicted than even the capture of Nanking would have been.

On the 16th of August the ships were in a position to bomb- bard the city of Nanking, which communications took place between Sir Henry Pottinger and Elephoo and Keying, the two imperial commissioners, who, by offering a ransom for the city and various presents, endeavoured to obtain a cessation of hostilities, but the emperor could overcome the determination of the British plenipotentiary, and at daylight on the 14th of August the attack was ordered to be made, which the commissioners were informed nothing could suspend except the production of a document bearing the emperor's signature and authorizing them to treat definitively of peace. After-nightfall, and just three hours before the attack was to have commenced, the required document was produced, a cessation of hostilities ensued, and on the 17th of August Sir Henry Pottinger announced that the state of the negotiations was now such as to authorize him to require that hostilities should be suspended.

A report was sent to the emperor by the commissioners, in which the emperor ordered the deaths of officers was for the time distinctly pointed out to him. Meanwhile, a friendly can-

The treaty, signed on the 29th of August, was received in Great Britain on the 13th of December, and the convention was at last completed.

Thus ended the Chinese war, which may be said to have commenced with the blockade of Canton, June 22, 1840, and which was terminated by the peace of Nanking, August 29, 1842, during the whole of which, though the conflicts were so numerous, they were slight in number, and, with the exception of the total loss of British life in actual warfare was probably less than 100 men.

The most important provisions of the treaty of 1842 are as follows:

British subjects are allowed to reside at the ports of Canton, Amoy, Foochow, Ningpo, and Shanghai, and a consul is to be appointed to reside at each of the five ports.

The island of Hong-kong is ceded in perpetuity to Great Britain.

The emperor of China agrees to pay 21,000,000 dollars, namely six millions for the opium destroyed by Lin, three millions as the amount of the debts of the Hong merchants, and twelve millions as indemnity for the loss of the war; six millions to be paid immediately, six millions in 1843, five millions in 1844, and four millions in 1845.

The company of Hong merchants are dissolved, and British merchants are permitted to carry on their mercantile transac-
tions with any persons whatever.

All British subjects, whether natives of Europe or India, who are in confinement in any part of China, to be un-
ceremoniously released.

The port of Amoy is re-established at each of the five ports.

Correspondence between the officers of both governments to be on terms of equality.

The military post at Chinhae and the islands of Koolangko and Jalu, to be held by the British till the money pay-

A Supplementary Treaty was signed at Hooman-Clave, October 8, 1843, to which is attached the tariff of export and import duties which are to be paid at the five ports.

The following are the most important articles.

Article 4. 'After the five ports of Canton, Foochow, Amoy, Ningpo, and Shanghai, shall be thrown open, English merchants shall be allowed to trade only at those five ports. Neither shall they repair to any other ports or places, nor sell the Chinese merchants any goods or articles, or trade with them, except for the sake of commerce. If English officers and subjects shall, in contravention of this agreement, and of a proclamation to the same purport, be issued by the British plenipotentiary, repair to any other ports or places, the Chinese go-

Article 7 provides for the setting apart of ground and houses at the five ports for the residence of British subjects and their families, to be purchased at a fair valuation. This article concludes with observing that the emperor has 'certain privileges or immunities to any of the subjects or citizens of such foreign countries, the same privileges and immunities will be extended to, and enjoyed by British subjects.

Article 12: ‘The Emperor of China having been gradually enabled to grant to the merchants of Great Britain privileges and immunities which have hitherto traded at Canton, the privilege of resorting for the purposes of trade to the other four ports of Foochow, Amoy, Ningpo, and Shanghai, on the same terms as the English, it is further agreed, that should the emperor hereafter, from any cause which he shall think fit, be pleased to grant privileges or immunities to any of the subjects or citizens of such foreign countries, the same privileges and immunities will be extended to, and enjoyed by British subjects.'
vast empire to the influence of foreign commerce, is for the
common good of each other, and of all Christendom.
A Statement of the Foreign Trade with China, and an
Account of the Transit of the Chusan Company, in the
Empire,' dated Government House, Victoria, Hong-Kong,
February 16, 1844, and received in London, June 8, 1844,
gives the following summaries of the amount of the annual
foreign trade of China:—

<table>
<thead>
<tr>
<th>Exports</th>
<th>Dollars</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ship's disbursements and tonnage dues</td>
<td>500,000</td>
</tr>
<tr>
<td>Tea</td>
<td>9,450,000</td>
</tr>
<tr>
<td>Raw silk, silk thread, and silk piece-goods</td>
<td>2,747,000</td>
</tr>
<tr>
<td>Sugar and sugar-candy</td>
<td>370,000</td>
</tr>
<tr>
<td>Canada</td>
<td>240,000</td>
</tr>
<tr>
<td>All other kinds of goods</td>
<td>532,720</td>
</tr>
<tr>
<td>Treasure, duty free</td>
<td>11,190,200</td>
</tr>
</tbody>
</table>

25,000,000

<table>
<thead>
<tr>
<th>Imports</th>
<th>Dollars</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opium, rice, treasure, and pearls, which are</td>
<td>15,954,650</td>
</tr>
<tr>
<td>never smuggled, or landed</td>
<td></td>
</tr>
<tr>
<td>Ginseng, both kinds, much of which is smuggled</td>
<td>65,000</td>
</tr>
<tr>
<td>Raw cotton</td>
<td>5,000,000</td>
</tr>
<tr>
<td>Cotton manufactures of all kinds and cotton yarn</td>
<td>2,090,000</td>
</tr>
<tr>
<td>Wooden manufactures of all kinds</td>
<td>1,047,000</td>
</tr>
<tr>
<td>Metals of all kinds</td>
<td>261,590</td>
</tr>
<tr>
<td>All kinds of goods</td>
<td>947,120</td>
</tr>
</tbody>
</table>

25,000,000

By a return of the quantities and value of merchandise ex-
ported from the port of Canton in eighty-nine British vessels,
of 49,012 tonsburthen, during the half-year ending June 30,
1844, the total exports are stated to be 1,888,281 Ibs., of which
the principal articles are—Cassia lignum, 22,204 cts.; China
wax, 92111; quickeater, 81286; silk, fine, 190,585; silk,
course, 42,5353; silk manufactures, 29,587; sugar, raw (to
Bombay), 1,604,670; sugar-candy (to Bombay), 1,062,120;
10,279; tea (to Great Britain, British India, Australia, Ma-
nilla, Singapore, and Lima), 1,004,570l.; vermilion, 871111.

Chinese Weights, Measures, and Money.
1 peck = 100 catties; 1 cattie = 10 lbs.; 1 ton = 10 catties.
1 peck = 138 lbs. avoidupol; 1 ton = 16 pecks 80 catties; 1 cwt. = 84 catties; 1 lb. avoidupol = 12
taels, or 4ths of a catty; 1 tael = 679-49 grains Troy; 1 chang
= 10 Chinese feet or catties, and is fixed by agreement at 141
inches; a cord therefore = 14-1 inch; 1 foot = 8 taus, or
Chinese inches. A dollar is usually estimated at 2 mace 2 cands-
arens, but in paying large sums 717 taels are equal to 1000 dol-
ars. In paying duties 11 to 15 per cent. must be added for the
loss in melting the dollars. A tael = 1.99 dollar, but a mace
in the amount is calculated at 141 taels. Cents are the only
coin made by the Chinese government, of which 1150 to
1140 are exchanged for a Spanish dollar, which is in
general circulation for commercial purposes, and may be
valued at 4s. 4d. as an average value. Cash is called the
Chinese name, but a name which it has acquired among
foreigners. It has a square hole in the centre, through which
it is run a string, and they are thus threaded together in conve-
nient numbers for paying away. The great circulation of
the people is carried on by this medium, which, being of a low
denomination, is extremely suitable to the price of the neces-
saries of life in China. For larger exchanges silver is indis-
penable; and, as great traffic is carried on among them,
the amount of it in circulation must be very large.

Sir Henry Pottinger, at a dinner lately given to him at
Glasgow (April, 1845), among other observations relating to
the trade with China, said, 'Next to Canton is the port of
Shanghai, which may yet be superior, because it is more open
to the north to trade, and because it is more the resort
of Chinese trading vessels than Canton. I have heard,
since I came here, by a letter from China, that junks of
the largest size come from the Yellow Sea, and go along-
side the largest British ships, and take their cargo
bodily, and sail away. If the Chinese can only find
the means of paying us, I may say the demand for our goods will
be unlimited.'

(David's Chinese, vol. 1801; Narrative of the Voyages and
Exploits of the Nevsium from 1840 to 1843, with the
Notes of Commander W. H. Hall, R.N., with Observations
by W. D. Bernard, A.M., Oxon; Parliamentary Papers, &c.)

CHLOROCA, a genus of plants belonging to the natural order
Gentianaceae. It has 8 sepals, a rotate corolla with 6-8 seg-
ments withering round the capsule, the stigma bi-lamellate,
the anthers not altering, the capsule 1-celled with spiny placenta,
the seeds angular.

C. perfoliata, yellow-wort, has the lowermost leaves dis-
lioned, the others sessile. A species of the Perennial
Family, and not a true C. It is remarkable, however,
peculiar: the corollas are of a bright yellow colour, and
the stigmas are scarlet. The whole plant is glaucous, and is
very subject to attacks of mildew. It is a native of dally
hills and banks in most countries of Europe. It is found
in England and Ireland, but not in Scotland. Like
many other plants of this order, it is seldom found
outside of Europe, in the United States. It is
Chlorella.

Out of the vast number of articles which were
early known to be used for the purposes of
physiognomy, there is seldom found, however
powerful as in many other species of the
order.

(Lindley, Flora Medica; Balnking, Manual of Bot.)

CHLORODIC ACID. [CHEMISTRY, P. C. S.]
CHOANITES, a group of Spenggoid fossils from the chalk
of England and France, thus named by Mantell. Analogs
living forms occur on the coast of New Holland.

CHOCOLATE. [Cacao, P. C., p. 96; Thomson, P. C., 318.]

CHÔDÔWIECKI, DANIEL, a distinguished miniature
painter and etcher of the eighteenth century, was born at
Danzig in 1726. His father was a tradesman of Danzig, and
Daniel was brought up to his father's trade. He, however,
remained until the death of the latter in 1740. In 1743
he removed to Berlin, and entered into the service of his
mother's brother as his bookkeeper. His uncle seems to have
kept a general store, and one class of articles in stock, which
were all executed by Daniel in his leisure hours; many of them were on enamel,
which art his uncle had had taught him for the purpose.
The designs were all copied from prints, and were, according to Chodowiecki's own word, of no
artistic value, but serve to indicate those things which
he whole knowledge of drawing and painting he had learnt from an
aunt in Danzig. Chodowiecki continued some time
employed in this humble way, until through his enamel-master,
Haid, he made the acquaintance of some of the artists of
Berlin, who, seeing his works and conversation excited his ambition,
and induced him in the year 1754 to devote himself entirely
and exclusively to art. He commenced as a miniature
painter, and met with considerable success, but he soon
forsook this tedious art for etching. He etched chiefly
from his own designs, and as an etcher he ultimately obtained a
reputation equal to or perhaps superior to that of any artist
of his age in Europe. His etchings are very numerous, amount-
ing to at least two thousand, but they are mostly of
mechanical or heraldic character. Very scarce are the
etchings in Heineken's Dictionary, arranged according to the subject,
consisting in heads, portraits, historical pieces, sacred
and profane, figures and original compositions; landscapes,
illustrations for pocket-books and almanacs, from maps,
and frontispieces, vignettes, and tail-pieces, for various works.
The works engraved after Chodowiecki's designs or drawings by other
enamellers are less numerous than his own etchings,
but amount nevertheless to some hundreds; including several
engravings for Lavater's work on 'Physiognomy,' engraved by
J. H. Lips and others.

Chodowiecki was director of the Royal Academy of the
Arts of Berlin, where he died in 1801. Many of his designs are
satirical, and he has been called the Hogarth of
Berlin. All his works, though on a small scale, are remarkable
for their expression, and the character is seldom exaggerated:
his subjects are chiefly illustrative of common life or contem-
porary and recent history. Many novels and other light
works were also illustrated, owed their success chiefly and
in some cases entirely to his portraits; and the Almanac of
the Berlin Academy, which he illustrated from the year 1770, had
from the same cause, a circulation of about four thousand.
The great success of these works led many of Chodowiecki's prints to be
borrowed by other artists, and at the close of the eighteenth
century Germany was inundated with illustrated almanacs, pocket-
books, and the like publications, to such a degree that Fartile
status was lost, and young people generally spent the greater
part of the year in reading almanacs.

(Meusel, Miscellanea Artisticae Inhelt.; Heineken,
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lege, travelled together in Turkey, and were remarkable for their friendship. Sir John Finch was ambassador in Turkey, and died there in 1682; his body was brought to England, and interred in Christ's College Chapel, and Sir Thomas Baines, who did not long survive him, was buried in the same vault.

Sixteen bishops have received their education at Christ's College, among the most eminent of whom are Latimer, bishop of London; Sternberg, bishop of Winchester; and Sir Philip Sidney; Milton, the poet; Quarles, the poet; Sanderson, the mathematician; and Archdeacon Paley, were educated at Christ's College.

(Dyer's History of the University of Cambridge; Lynas' Cambridgehire; Wilson's Memorabilia Cantabrigia; Cambridge University Calendar, 1845.)

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till a situation is found where the waves or fringes on the latter exhibit two dark lines crossing each other; at that place the tints of the wedge and that of the glass plate are equal to one another, and, the former being given, the latter is consequently obtained. In this manner any tint produced on the plate may be compared together and referred to the scale of colours.

CHRYSOCOLLA. [Sap. P. C.]

CHRYSOCOMA, a genus of plants belonging to the natural order Saxifragaceae. It has a half-cylindrical capsule, 5-8 mm. in length, a velvety surface, 2 seeds, a yellow capsule with two beaks opening in the form of a cup. There are two species of this genus found in Great Britain, and known under the name of Golden Saxifrage. One is C. alternifolia, and the other found by the base, erect stem 4 or 5 inches high, with umbelate, nearly sessile, deep yellow flowers. It is a native of boggy places. C. oppositifolia has opposite leaves. The stem is decumbent and straggling, about 6 inches long. The flowers are paler and more scattered than in the last species. The leaves are usually glabrous, but sometimes they are slightly hairy. It is a native of damp, shady places.

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CHURCH-RATES are rates raised, by resolutions of a majority of the parishioners in vestry assembled, from the parishioners and occupiers of land within a parish, for the purpose of repairing, maintaining, and restoring the body of the church and the belfry, the churchyard fence, the bells, seats, and ornaments, and of defraying the expenses attending the service of the church. The spire or tower is considered part of the body of the church. In rebuilding or repairing the chancel lies on the rector or vicar, or both together, in proportion to their benefits, where there are both in the same church. But by custom it may be left to the parishioners to make good any damage to the chancel, and in London there is a general custom to that effect.

The burden of repairing the church was antiently charged upon tithes, which were divided into three portions, one for the repair of the church, one for the poor, and one for the rich members of the church. Pope Gregory had enjoined on St. Augustine such a distribution of the voluntary offerings made to his missionary church in England; and when Christianity came to be established through the land, and parish churches generally erected, and when the payment of tithes was exacted, the tithes were ordered to be distributed on Pope Gregory's plan. Thus, one of Archbishop Eiophice's canons, made in the year 970, is as follows:—"The holy fathers have also appointed that men should give their tithes to the church of God, and if the clergy neglect the collection of them, one for the repair of the church, and the second for the poor, but the third for the ministers of God, who bear the care of that church." (Wilkins, Concilia, l. 253.) The same distribution of tithes was enacted by King Ethelred and his councillors in witenagemont assembled, in the year 1014. A portion of the fines paid to churches in the Anglo-Saxon times for offences committed within their jurisdictions, was also devoted to church repairs. The bishops were likewise required to make an assessment from the clergy and the franks to the payment of their own churches. A decree of King Edmund and his councillors, in 940, headed 'Of the repairing of churches,' says that 'Each bishop shall repair God's house out of what before he had, and shall also admonish the king to see that all God's churches be well provided, as is necessary for us all.' (Schmid, Gesetz der Angel-Sachsen, i. 94.) One of King Canute's laws says, 'All people shall rightly assist in repairing the church;' but in what way it is not said. There is no pretence however for interpreting this law of Canute's as referring to anything like church-rate. A payment to the church for the maintenance of the clergy, was all that the law of Edward the Confessor, called the "Fiscal," required in the case, and it has been erroneously identified with church-rate by some writers. This was a payment of the first-fruits of corn-seed every St. Martin's day (November 11), so much for every hide of land, to the church; and the laws of King Edgar and King Canute confirm the practice. It is probable the account was written otherwise called cyric-amber, amber being the measure of payment.

Churches continued to be repaired with a third of the tithes after the middle of the eleventh century, and up to as late as the middle of the thirteenth century. How the burden came to be shifted from the tithes to the parishioners is involved in much obscurity. The following conjectural sketch of the rise of church-rates is from a pamphlet by Lord Campbell:—'Probably the burden was very gradually shifted to the parishioners, and their contributions to the expense were purely voluntary. The custom growing, it was treated as an obligation, and enforced by ecclesiastical censures. The courts of common law seem to have interposed for the protection of refractory parishioners till the statute of Circumspecte Ag ris, 13 Ed. I., which is in the form of a letter to the king from his common law judges, desiring them to use themselves circumspectly in all matters concerning the contributions of the people to the repair of their churches, is mentioned in the act of Parliament.' In the printed rolls of Parliament, 24 Ed. III. No. 62, it is called an ordinance; but in the statute 2 and 3 Ed. VI. c. 13, § 51, it is expressly styled a statute, and it must now clearly be taken to be the act of the whole legislature. From the year 1265 therefore the bishops were authorized to compel the parishioners by ecclesiastical censures to repair and to provide ornaments for the church.' (Sir John (now Lord) Campbell's Letter to Lord Stanley on the Law of Church-Rates, 1857.)

The existence of the custom of making the parishioners contribute to the repairs of the church, and after the statute Circumspecte Agatis, the original obligation on the clergyman to repair out of the tithes was remembered. Lord Campbell quotes in the same pamphlet a passage from a MS. treatise in the Harleian Collection, written in the reign of Henry VII. by Edward Dudley, a privy councillor of that king, which thus lays down the law for appropriation of the incomes of the clergy:—'One must not be too pertinacious in exacting the tithes of money; the clergy are not in the power of the king; the second in deeds of charity and alms to the poor folk, and specially within their dioceses and curves, where they have their living; and the third part thereof for the repairing and building of their churches and mansions. Lyndwood, who wrote in the sixteenth century, says: "by the law the burden of repairing the church is on the rector, and not on the laity. But certainly," he adds, 'by custom even the lay parishioners are compelled to this sort of repair; so that the present people is compelled to observe this laudable custom.' (Cont. Legati. 118.)

Church-rates are imposed by the parishioners themselves, at a meeting summoned by the churchwardens for that purpose. Upon the churchwardens, conjointly with the minister, devolves the duty of collecting the rates, and the superintendence and administration of its offices. With a view to provide a fund for such expenses, it is the duty of the churchwardens to summon parish meetings for the purpose of levying rates; and if they neglect the duty, they are called to account by the ecclesiastical courts. They may also be punished by the ecclesiastical courts for neglecting to make repairs for which money has been provided by the parish; but if they have no means to raise the money, in such case, if they have not failed to call the parishioners together, they cannot be punished; but, as before stated, is also granted to compel the churchwardens to call a meeting. If the parish fail to meet, the churchwardens then constitute the meeting, and may alone impose a rate; but if the matter is so urgent that it cannot be left to the parishioners to determine the amount of the rate, or to negative the imposition of a rate altogether.

The repair of the parish church and the provision of the necessary services involved in the work are thus entirely at the option of the majority of the parishioners assembled. Before the erection or formation the parishioners could be punished in the ecclesiastical
church or failing to repair the parish church; and the punishment was to place the parish under an interdict, or sentence of excommunication, by which the church was shut up, the vestry being informed of the parson to whom it was addressed, and by whom the offense was committed. Thus, if a parishioner who died was buried without bell, book, or candle, but there was no means of compelling the parishioners to provide church rates. There is no remedy by mandamus: the Queen's Bench will grant a mandamus, as has been already said, directing churchwardens to perform their duties, but not to compel parishioners to make a rate. The ecclesiastical courts cannot make a rate, nor appoint commissioners to make one. An obiter dictum of Chief Justice Tindal in delivering the judgment of the Court of Exchequer Chamber (in the error in the Braintree case, has lately suggested the possibility of proceeding criminally against parishioners for voting against a rate, or abstaining themselves from a meeting called to consider a rate, where repairs are needed. In Braintree parish, after the decision that the majority of the ratepayers of a parish, the churchwardens had levied a rate of their own authority, and proceeded against a parishioner for refusing to pay his portion. The Court of Exchequer Chamber, to which the churchwardens appealed against a prohibition issued by the Court of Queen's Bench, confirmed the prohibition, and declared the churchwardens' rate to be illegal. But in delivering the judgment of the court, Chief Justice Tindal made the following declaration, viz. that, in cases of that kind, in this case is no more than to declare the opinion of the court, that the churchwardens have in this instance pursued a course not authorized by law, and consequently all the power with which the spiritual court is invested by law to compel the ratepayers to pay the tax themselves, and if the county court is empowered (as is stated by Lynwood, page 53, sect. 1 Subsec.; and other ecclesiastical writers) to compel the churchwardens to repair the church by spiritual censure; to call upon them to compile the parishioners together, by due notice, to make a sufficient rate; to punish such of the parishioners as refuse to perform their duty in joining in the rate by excommunication, that is, since the statute of 53 Geo. III. c. 127, by imprisonment, and under the same penalty to compel each parishioner to pay his proportion of the church-rates to the same power will still remain with them, notwithstanding the decision of this case.' In December, 1842, some parishioners of St. George's, Colegate, Norwich, were indicted in the Court of Arches for having wilfully and contumaciously obstructed, or at least refused to make, or join in and concur in making, a sufficient rate for the repair of the church of the parish. The articles were admitted by Sir Herbert Jenner Fast, the judge of the Court of Arches; but on application to the Court of Queen's Bench the proceedings were stayed by prohibition. Church-rates depend therefore entirely on the will of the majority of the parishioners assembled: and this is obviously a state of things which, where dissenters from the established religion of the country abound, may lead to parish churches being left to go to ruin.

The existing poor-rate of the parish is generally taken as the criterion for the imposition of the church-rate; but decisions as to poor-rates are not binding in cases of church-rates, and the proper test for the church is a valuation by competent judges, grounded on the rent the tenant would be willing to pay for the premises. All property in the parish is liable except the glebe-land of that parish, and the possessions of the crown when in the actual occupation of the crown, and places of public worship. Stock in trade is not generally rated for church repairs, but a custom may exist rendering it rateable in a particular parish. The ecclesiastical courts have the exclusive authority of deciding on the validity of a rate, and the Baron's 1000 parishes in England is probably to be attended to in the original proceeding in those courts raise objections to a rate for the purpose of quasing it altogether. If he wishes to dispute it, he ought to attend at the vestry, and there state his objections. The objection abounds, may lead to parish churches being left to go to ruin.

In the latter case, if proceeded against in the ecclesiastical court, he may in his defence show either that the rate is generally invalid, or that he is unfairly assessed. The acquisition of the sacraments, baptism, and any part to the ecclesiastical judge, who will see that right is done.

A retrospective church-rate, or rate for expenses previously incurred, is bad. This has been often decided in the courts of equity. There is no statute in England for the recovery of such a debt. The reason is stated by Lord Ellenborough in the judgment of the court in Rex v. Haworth (12 East, 556):—The regular way is for the churchwardens to raise the money beforehand by a rate made in the regular form for the repair of the church, in order that the money may be paid by the existing inhabitants at the time, on whom the burden ought to fall. It has been recently determined that the proper mode, in the case Creston v. Hutchins, reversing the decision of the Court of Arches, and confirming the previous decision of the Consistory Court, that a rate not retroactive on the face of it, but admitted to be partly retroactive, was good.

Previously to 63 Geo. III. c. 127, the only mode of recovering church-rates from parties refusing to pay was by suit in the ecclesiastical court for subtraction of rate. By that statute it was provided that the sum to be recovered is under 10l. and there is no question as to the validity of the rate, or the liability of the party assessed, any justice of the county where the church is situated may, on complaint of the churchwardens, inquire into the merits of the case, and order the payment. Against such an order no appeal lies to the superior courts. Several counties have opposed such a decision that the county court is an appeal to the county court, as it is contrary to the decision of the Common Law in many cases of the subject of church-rates. There is a case against the decision of the King's Bench by certain and less obnoxious provision for the repair of churches and the due celebration of divine service. Lord Althorp, as chancellor of the exchequer in Lord Grey's government, brought in a bill for the abolition of church-rates in 1844, which proposed to charge the Consolidated Fund with 250,000l. a year, to be devoted to the repair of parish churches and chapels (including the chancel), and to be disbursed by commissioners after certificate from the quarter-sessions of the county in which the church is situated, and certain county surveyor, to place on the rector or lay impropriator, relieved of the duty of repairing the chancel, the burden of providing necessaries for the performance of divine service; to leave the preservation of pews to the owners or occupiers, and to leave the provision and repair of bells, organs, and ornaments to voluntary contributions. This bill fell to the ground, principally owing to the opposition of dissenters, who viewed the substitution for church-rates of a charge on the public taxes as more objectionable, and the burden upon themselves, and objected altogether to being called upon to contribute to a church to which they did not belong. In 1837 Lord Melbourne's government made a second attempt to get church-rates abolished, but in vain in Mr. Spring Rice, chancellor of the exchequer, to abolish church-rates, and provide for the objects of them by a surplus created by a better management of the church lands held by the archbishops, bishops, and dean and chapters; these lands to be managed by the commissioners, and 250,000l. a year to be the first charge on the surplus. The opposition of the church and of church lessees frustrated this measure, and no measure has since been brought forward by any government.
alleged to be in the return of 1839. In 1831-2 the total amount which the churchwardens received was 668,814l., derived from the following sources: — Church rates, 446,247l.; estates, 61,692l.; mortgages or burial fees, 18,516l.; poor-rates, 41,489l.; pew and sitting, 39,322l.; other sources not stated, 66,559l. The payments by the churchwardens in the same year amounted to 645,856l., and included 46,6µl. for books, wine, &c.; salaries to clerks, sextons, &c., 126,185l.; £500 per annum to the bell, &c., 41,110l.; and repairs of churches, 248,124l.

CHURH. [Butten, P. C., p. 68.]

CHUSAN, or, as Lord Macartney writes it, the Chusan Islands on the eastern coast of China, and forming an appendage to the Province of Chekiang. Their number is very great, and they are dispersed over that part of the sea which 30° N. lat. cuts 119° E. long. Stanning states, that between the Queenen Islands and Chusan Harbour there is a strait of about sixty miles in length and thirty in width, the number of islands exceeds three hundred; but others, apparently not less numerous, lie north of Chusan Island. These numerous islands contain almost as many harbours or places of perfect security for ships of any burden. Most of these islands consist of hills rising with a regular slope, and rounded at the top. Though mostly close to each other, they are divided by channels of great depth. Some of them have a very inviting aspect, and one of them in particular, Cape Fanny, is densely inhabited, and belongs to a sect of religious men, and contains four hundred temples.

The principal island, which gives its name to the group, is about thirty miles long, and varies in breadth from six to ten miles. The surface is diversified by pleasant heights and well cultivated valleys. The principal harbour is on the southern coast towards the Chinese continent, and only a few miles distant from Keo-to Point, the most eastern cape of China. It is formed by three small islands, which lie about a mile from Chusan, and has four entrances; but these entrances are so completely shut in by the remoter points, that the harbour looks like a lake surrounded by hills, and it has exceeded for vessels the entrance of a mile furlong. This harbour is the capital of the island, Ting-ho. The inter-vening space is a plain, intersected with rivulets and canals, and cultivated like a garden. The road which traverses it, though good, is very narrow, in order that as little land as possible may be lost to cultivation. The town is enclosed by walls thirty feet high, which overtop the houses, which they surround like those of a large prison. Along the walls, at the distance of every hundred yards, are square stone turrets, which resemble the towers of the town of Ypres on a smaller scale. It is, in some degree, surrounded by walls intersected by canals, and the bridges thrown over them are steep and ascended by steps like the Rialto. The streets, which are no more than alleys or narrow passages, are paved with gravel taken from the houses of the town, and form one story. The numerous shops contain chiefly articles of clothing, food, and furniture, which are arranged in good taste.

These islands are of great importance to China in a commercial View, especially for its intercourse with Japan. This commerce is chiefly carried on by the three commercial towns of Ning-po, Hang-shou, and Shang-hae, which are situated on the continent opposite to the islands. The junk, by which this commerce is carried on, assemble at the Chusan Islands, and depart thence for Nangaski. The islands are of importance, as protecting the commerce from the Strait of Formosa on the south, to the peninsula of Shang-tong on the north. If a foreign nation or a piratical chief should get possession of them, the whole coast above mentioned would be at their mercy, and the maritime intercourse would be interrupted. The Chinese are well aware of this circumstance, and in the last quarell and negotiations with England showed that they were aware of it.

In 1842, when the disputes between the British and Chinese governments respecting some commercial transactions at Canton had reached such a height that England thought it expedient to appeal to arms, a British force was sent to the Chusan Islands, which captured them after a slight resistance. This occupation of the islands by the Chinese government became more disposed to yield, and, after some negociations, a truce was agreed upon near Tientsing, between the Chinese imperial commissioner and the British plenipotentiary. The British troops were compelled to abandon the Chusan islands on account of their unhealthiness. The disease, which soon became alarming, appear especially to have arisen from the Chinese inhabitants having been ordered by the government not only to supply the British army with fresh provisions; they were therefore obliged to live on salt meat and dry grain. A new appeal to arms was made, and though the Chinese were beaten near Canton, and only saved the town by paying a million pound sterling, they refused to fulfill the conditions of the treaty of Tientsing till all the Chusan Islands were again captured in 1842, after a much more vigorous defence, and a British army had been sent to the continent, which took the town of Hang-

CHUSAN.

[China, P. S. C.]

CHUVASHES. [Russia, P. C.]

CHYLE. [Dignition, P. C.]

CICENDIA, a genus of plants belonging to the natural order Gentianaceae. It has a 4-parted funnel-shaped corol, without glands or any sort of tissue annually twisted over the capsule; the calyx 4-lobed, tubular; the stamens four; de anthers erect, not twisted; the stigma capitata, undripped; the capsule single, or imperfectly 3-celled. The species of this genus were formerly referred to Gentiana and Eucalces. C. Hypocarifolium, which is entirely without spines, is 30 centimetres in height, with angles slightly winged; the flowers 8 or 10 together in saillé whorls, each furnished with a linear spatulate bract; the calyx 5-let, permanent, and closely embracing the base of the mature capsule. This species grows in many parts of the East Indies, and, like the whole of the order to which it belongs, the plant possesses a bitter principle, though not so intense as some of its allies. It is employed by the natives of India as a stomachic, and is administered in the form of decoction or powder. In the tonic action, it is said to act as a laxative.

C. filiformis (Eucalces filiformis of Smith and others) the calyx 4-lobed, half-tubular, adnerved to the stamen-tube of the corolla; lobes ovate to ovate-oblong, forked; flowers solitary on long stalks. It has yellow flowers, and is a native of Europe. It is found in damp sandy places in England and Ireland. In their cultivation the species of Cicendia require the same treatment as Gentians.

(Blavishing, Manual; Lindley, F1ora Medicina.)

CICHORACEAE, one of the primary subdivisions in the system of Jussieu, of the natural order Compositae. It is characterised by the absence of allumun in the seed; the soft, downy, or hairy leaves; the calyx of salver-shaped tube; the flowers in heads or heads-like groups, and possessing binocular, or compound heads. The species include under this division by Jussieu belong to De Candolle's Liquidifolium. The Cichoraceae in their anatomical structure closely resemble the Compositaceae; they also resemble that order in their physical properties. Both orders produce a milky juice, possessing in common species powerful medical properties. This juice in the Cichoraceae has a bitter and astringent taste, and possesses narcotic properties. It is found in the Cichorium intybus, the common Seney [Succory, P. C.], and in the cultivated and wild Lettuce [Lactuca, P. C. S.]. From the latter plants the juice has been obtained under the name of Lactucarium [Lactuca, P. C.], and used as a narcotic, instead of opium. Many of the species of Cichoraceae secrete starch in large quantities, and are used as articles of diet, as the Endive, Scrofuro, Tragopogon, or Salafny, &c. The root of the Dandelion [Taraxacum Denus Lactis] is used as a tonic and purgative, and has lately been recommended in diseases of the stomach [Lescoofere, P. C.]. The British genera belonging to this division of Compositae are as follows:

Section I.

Lapaceae.

Lapage.

Section II.

Hyposcidea.

Hyposcidea.

Hyposcidea.

Hypocharideae.

Hypocharideae.

Hypocharideae.

Acrobichora.

Sceplidaceae.

Sceplidaceae.

Trincica.

Leontodon.

Ophiurn.

Tragopogon.

Pieria.

Helumbia.
CIGOLI, GIAMBATTI
to the microscope is when their movement begins to slacken. Their figure is generally that of slender conical or sometimes flattened filaments, which are broad at the base or root, and gradually taper to the point. Their size differs greatly on different parts of the same animal. The largest I have measured,' says Dr. Sharpey, 'are those on the point or angle of the brachial lamina in the Buccinum undatum and Patella vulgata. I have attempted to determine the exact size of the smallest, but Purkinje and Valentini state it at 0-000075 of an inch, while they make the largest they have met with only 0-000096 in., which is considerably less than I have found them; but they had no opportunity of examining many of these generally speaking the largest cilia are met with.

In the sea-mussel the darker coloured cilia are about 0-001 of an inch long, the others considerably less.' The substance of the cilia is of the most possible transparency and their colour a slight colouring may be observed. They assume also various forms, and Ehrenberg has described compound cilia in the Infusoria. In the Clillographus Meduse the cilia consist of rows of broad flattened organs, each of which is made up of several simple filaments joined together by a connecting em"brase throughout their whole length. In most cases the cilia are arranged in regular order. On the gills of the mussel they are placed in straight rows; in many of the Infusoria they are arranged in circles or spiral lines. In some instances they are erect, but in others they are placed at right angles to the surface on which they are seated.

The movement of the cilia is not very rapid, and may be easily observed with a lens of 4 inch focus. Their most obvious movement is of a fainting gliding kind, the cilia being bent in one direction and returning to it again. In addition to this movement, Mr. John Queckett has lately detected another in the cilia of the gill-rays of the common mussel. A new element of motion has been discovered in the cilia of every organ of this animal. Each cilia turns on its own axis through the space of a quarter of a circle, with a movement like that of the feathering of an oar in rowing. This observation of Mr. Queckett's is of importance, as it explains how it is that the cilia are capable of propelling the organs over their points which could not be effected by the first observed up and down movement. When the surface of an organ is examined on which are seated a large number of cilia, a wave-like motion in the whole is observed, which arises from the regularity with which each cillum is affected with the movement.

The cilia were first observed as present on the external surface of the bodies of intussusculous animals. Leeuwenhoek seems to be one of the earliest observers who described the presence of the cilia in the Infusoria. In his famous work 'Arcanum Nature' he describes in many places the nature of the cilia in the common polygastric animals as well as in the wheel-animals. He also pointed out the probable use of these organs by means of which these animals move from place to place, and carry their food into their stomas. In the work of Leeuwenhoek, we have been observed in almost every species of Infusoria, and seem to be the active organs by means of which these animals move from place to place, and carry their food into their stomas. In the wheel-animals, these animals are found in great numbers covering the surface of the tentacula by which these animals obtain their food. Although they have not been observed on the full-grown sponges, they have been described by Dr. Grant as existing upon the ova of these animals before they became fixed. Though not abundant in
the Aculeph, they have been seen by Grant and others in the Bence plieus and other Medus. Dr. Sharpay has observed the cilia in the echinodermata, and also in the Annelids. In the Mollusca they are very abundant, and one of the best means of examining these organs is afforded by the common mussel. Till within a recent period, it was supposed that cilia were confined to the external surface of these animals, or at least to the observation of their existence to any extent in the Vertebrata was very limited. One of the earliest observations of their presence in vertebrate animals was by Steinback a German anatomist, who found cilia upon gills of the same kind living within the last few years Parkinje and Valentin have devoted much attention to the subject, and have found that cilia exist very generally on the moist surfaces of the membranes of all the higher animals. The systems of organs on the surface of which cilia have been detected are:

1. The Surface of the Body. In this situation cilia have been detected in the Infusoria, Poly, Meduse, Actinia, Echinodermata, and in the larvae of the Batrachian Reptiles.

2. The Respiratory System. Cilia have been detected in the lining membrane of the air-passage of reptiles, birds, and mammals, in the gills of the larvae of the Batrachia, and on those of the Mollusca and Annelida. Those on the external surface of the Infusoria, Poly, and Mollusca are also regarded as belonging to the respiratory system.

3. Alimentary System. They are found in the mouth, throat, and gullet of reptiles, in the entire alimentary canal of Mollusca, and in the vessels of the Annelida.

4. Reproductive System. Ciliary movements have been observed in the mucous membrane of the Fallopian tubes, in the uterus and vagina of mammals, and in the ovicell of birds and reptiles. A peculiar ciliary movement has been observed in the embryo of many animals. Where respiration is carried on by means of the external surface, as in the Infusoria and Poly, the cilia assist this process by removing the used water, and bringing fresh currents to the surface of the organ which is so facilitated. They probably undoubtly perform the same office when seated on internal respiratory membranes. On the surface of the reproductive organs of the higher animals they may also assist in bringing the sperm to the organism in contact with the fertilizing cells of the male fluid. The movement in the embryo has probably the same object in view as that on the respiratory membranes, bringing the surface in contact with currents of oxygenated water.

In coming to the conclusion that the motions of fluids on the surface of membranes are produced by cilia where these organs exist, Dr. Sharpay observes, "The currents cease when the motion of the cilia stops, they are strong and rapid when it is rapid, and when it languishes they are weak and sluggish. The organs of respiration of molluscs have been observed to move its motion from the surface over which it flowed, and independently of any visible contractions of the animal tissue, there was always considerable room to doubt, whether, even in these cases, these were manifest. The effect of these organs was wholly mechanical, and whether the motion of the water was not rather due to some peculiar impulsive power in the tissue, differing from mechanical action. But more extended observation has almost wholly removed these exceptions, while it has added others. The number of confinements and limitations, insomuch that there seems at present no necessity for having recourse to any other explanation of the motion of the fluids than that it is produced by the action of the cilia, and that their action is the result of muscular contractility, known property of animal tissues. There are some remarkable exceptional cases. Currents are observed in the sponge, in the stem and branches of the Sertularian, but no cilia. There are also a number of remarkable cases of the movements of fluids in cells in the organic kingdom, which are produced by the motion of cilia, as those seen in the cells of Chara, Valineria, the hairs of Tradescantia, &c.

For further information consult the article Cilia, by Dr. Sharpay, in the Cyclopedia of Anatomy and Physiology. What has been said in this paragraph is derived from the above, and the encyclopaedia of Robertson, and in the Dublin Journal of Med. and Chem. Science, July, 1855, and in Edinburgh New Phil. Society Journal, vol. xvi.

CIMICIFUGA (cinem, a bug, and fugio, to drive away), a genus of plants belonging to the natural order Ranunculaceae. The calyx is composed of four deciduous sepals; corolla of four petals; styles one to fifteen; the carpels dry, dehiscing, many-seeded. The species are perennial herbs, with divided leaves, and racemes of whitish flowers; the roots act as drastic purgatives and are poisonous.

C. Blacksnake-Bug-wort, has four almost sessile and very villose leaves; the racemes panicled; the leaves ternate or bilaterate; the leaflets ovate-oblong, deeply toothed. It is a native of the Carpathian mountains, Dauria, Eastern Siberia, and the north-west coast of America. It is a very useful drug in the treatment of dysentery. The powdered dried grass, just as tangy and wormwood are used in this country.

C. serrata, Black Snake-root or Bug-wort, has compound, very long racemes; the leaves tripartite, with serrated or rather ciliate outlines. It is a native of North America and Canada to Florida. This has white flowers, and resembles the species of Actea, to which genus it was formerly referred under the name of Actea racemosa. Like many other plants possessing active properties, it has a reputation in America for healing the bites of snakes and preventing their poisonous effects on the system. There is one species, C. japonica, a native of Japan; the rest are American plants. They are easily cultivated, preferring a moist shady situation, and may be propagated by dividing the roots or by seeds.

Don, Gardener's Dictionary.

CINCIUS. L. CINCIUS ALIMENTUS, and his contemporary Fabius Pictor, are mentioned by Dionysius of Halicarnassus (Roman Antiq. 1. c. 6, ed. Hudson), as the oldest of the Roman annalists. Alimentus is also frequently mentioned by Livy (xxi. 38, xxix. 28, &c.).

The time of the birth and death of Cincius is not known, but he was actively engaged during the occupation of Italy by Hannibal. Alimentus was of a plebeian family. He was sent to Syria, and came home in the year 219, B.C. He was in the service of the legate of the governor of Syria, Ptolemy, in the room of his former colleague, Cato, who had been sent to Egypt in the same year. He published his work, (which was divided into three books) under the name of Livy, c. 212 B.C. After Marcellus had taken Syracuse, and left Sicily, Cincius held that province for two years as proconsul (Livy xxvi. 28, xxvii. 7), in the years 210 and 209 B.C. To this period he added the office of praefectus annonae in Asia. In the year 208 B.C. he was consul, and in the next year he had the command of a naval force, with which he crossed over from Sicily to Leon, and which he made an unsuccessful attack, and was obliged to retreat. He was afterwards one of three commissioners, who were sent by the Senate to give their advice to T. Quinctius Crispinus, the consul, who was lying wounded at Capua. It is not known whether it was at this time or later that he fell into Hannibal's hands, a circumstance which gave him the means of obtaining the one respect of which he was really ambitious of that period. He learned some facts from the mouth of Hannibal himself (Livy, xxi. 38). Cincius wrote a history of Rome from the foundation of the city to his own time, of which Dionysius says that he treated minutely of the events with which he was acquainted, and described them in a summary way of the events which followed the foundation of the city. Neither the title of his work nor the number of books is known. The work of Cincius is stated by Dionysius to have been written in four books. There is no evidence to oppose to this. Livy frequently mentions Alimentus, and in one passage (vii. 3) he calls him an exact authority.

Other works were attributed to Cincius—On Genius of Leonти, on the Fasti, the Consilia, on the authority of the Conclave, on government, On Magna Graecia, On confinements, on Anticnt Words, and De Festis Mystagogio. But it is not certain that the Cincius who was the author of these works was the same as the historian, though it is likely enough that so
historian might write on military tactics. Gellius (xvi. 4) gives several extracts from the work on military matters, but he simply calls the author Cincius. The chronological difficulties which Krause raises against the author of the treatise on military matters being also the historian is not very great. His arguments against the probability of Cincius having written a grammatical work such as that on ancient words are mere verbal quibbles. There is no sufficient evidence that the other works that have been mentioned as written by Cincius, were written by the historian.

The epoch which Cincius assigned to the foundation of Rome is about the fourth year of the twelfth Olympiad, or B.C. 753. The discrepancy from other reckonings is accounted for by supposing that Cincius either followed other evidence than the annals of the Roman pontiffs; or that he made his calculation by changing the lunar years of the early Roman kings to solar years, which is produced as a mere guess, according to the reckoning of the period when he wrote. Now if we admit, as Junius Gracceanus states, that the old calendar was in use to the time of the first Tarquin, which will give a period of 132 years from the foundation of the city, we may adopt the following solution of Niebuhr:—

1. Cincius took these to be cyclical years, he got exactly a seque (110 years) for the first four kings; and if he subtracted the difference, twenty-two years, from the era of Polybius, the result is 68 B.C., the date assigned by Niebuhr, Ol. 19, 4th (Niebuhr, Roman History, Transl. i. 280).

The fragments of Cincius are printed in Krause’s Vitae et Fragmenta Veterum Historiorum Romanorum, Berlin, 1833. CINERIA, a genus of plants belonging to the natural order, Composite. It contains many species with a stalk, a umbel, palmates, the subtribe Senecioneae, and the division Eupatorieae. It closely resembles Senecio (Senecio, P. C.), and differs from that genus in its involucre being composed of 1 row of equal scales only. Two species are found in Great Britain.

1. C. pulchris, a shaggy plant with a much branched stem which is coriaceous above, leaves broadly lanceolate, half-clasping, the lower leaves sessile-dentate. It has a stem 3 feet high, thick, hollow, and the flowers are of a bright yellow colour. It inhabits ditches in fenny districts, and was at one time a more abundant plant in England than it is at present.

2. C. composita, a shaggy plant, with a simple stem, the root-leaves oblong, nearly entire, narrowed below; the stem-leaves lanceolate, heads coriaceous, involucry wolly below, nearly glabrous in the upper half; the fruit hispid. It has a stem 5 or 6 inches high with yellow flowers. It is found near the sea in very wet seasons; it is then twice or three times as large as usual, and the lower leaves are dentate.

(Babington, Manual of Brit. Bot.; Lindley, Natural System.)

CINQUE-CENTO STYLE. [Renaissance, P. C. S.]

CIO’NE, ANDREA DI. [Orcagna, P. C. S.]

CIRCULAR POLARIZATION, in the undulatory theory of light, is the same given to a supposed circular rotation of the particles of ether in certain media, when a pencil of plane polarized light (or one in which the vibrations are supposed to be rectilinear, in parallel directions, and in a plane perpendicular to the direction of the wave or pencil) is allowed to pass through the substance.

When a pencil of light polarized as usual, either by refraction or reflection [Polarization of Light, P. C. S.], is transmitted through a plate of quartz in a direction parallel to the axis of the crystal (the surfaces of incidence and emergence being of opposite sign), the triangles of the wave, instead of passing through a prism of any doubly-refracting material; it is found to be divided into two coloured pencils, whose tints are complementary to each other (or such as when mixed together would produce a neutral tint). Also, when the prism is turned round upon the direction of the polarized ray, as an axis, the colours of the emergent pencils change successively; those in one of them from red to orange, from orange to green, &c., to violet; again to red, after performing half a revolution, and so on, while those in the other pencil take always the complementary tints. These phenomena were first observed by M. Arago, and an account of them is given in the ‘ Mémoires de l’Institut’ for 1811; but the subject was fully developed afterwards by M. Biot and Fresnel.

Let the doubly-refracting substance be placed between the axes of the polarized rays, or of the quartz plate, till one of the two pencils appears to be of a deep violet colour, in which case

the yellow, or complementary light, may be conceived to be polarized in the plane passing through the original polarized pencil and the principal section of the prism; and let the angle which the principal plane of polarization makes with the latter plane be observed.

Next, let the plane of quartz be removed, and a thicker one cut from the same crystal be substituted for it; then the image before examined through the doubly-refracting prism will not appear of a violet colour but of a yellowish tint, so that its principal section may make a certain angle, which will be greater than the former, with the primitive plane of polarization, the violet colour will be reproduced. The like will be found to hold good for all the homogeneous colours of the pencil; and, for each colour, the angle through which the prism is turned will be proportional to the thickness of the plane of quartz. The angle of the rotation by which the same effect is obtained with the different colours, is of different kinds of light; and it was found by Biot that the greater, according as the pencils of homogeneous light are more refrangible. The effect thus produced on a polarized pencil of light, in traversing a plate of quartz, may be represented by supposing the plane of polarization to be the same or different from the pencils, to revolve in contrary or same directions.

With different specimens of quartz, the angle through which the refracting prism must be turned to obtain the same colour in either of the images seen through it, when the thickness of the plate of quartz is increased, is variable; and it is quite ascertained, both by Biot and some other experiments, in order to produce the same tint, the refracting prism must be turned from right to left, while with others it must be turned from left to right: as if the plane of polarization were caused, by contrary properties in different kinds of quartz, to revolve in contrary directions. This remarkable action upon light is founded to have a dependence upon the form of the crystal; for those varieties of quartz in which the solid angles between the regular faces of the natural prism are cut off by planes unsymmetrical with some others, in order to produce the same tint, the refracting prism must be turned from right to left, while the contrary, according to the cutting planes, on the face nearest to the spectator, incline towards the axis of the prism on his right or left hand.

The like rotatory polarization has been discovered to exist in several liquids, and even in vapours, and the circumstances were first observed, about the same time, by M. Biot and Dr. Seebeck. Oil of turpentine, oil of laural, and some other liquids exhibit a polarization moving towards the right hand, while oil of lemons and concentrated syrup of sugar exhibit a rotation towards the left hand: the angles described by the planes of polarization when the same tint is produced in an image are, however, much less in all liquids and vapours than in quartz.

In order to account for the observed phenomena M. Fresnel assumed, as an hypothesis, a uniform circular motion of the particles of ether, within the substance of the quartz or of the fluids which possess the property above mentioned; and it is readily seen that such motion may result from the combination of rectilinear vibrations performed at the same time, by any number of particles, in parallel lines, with as many lines also parallel to one another but at right angles to the former lines; all the vibrations being in a plane perpendicular to the wave or pencil of light, and those which take place in one set of parallel lines differing in phase (positions of the particles in the lines of vibration) by one-quarter of an entire vibration. For the amplitudes of the vibrations being equal to one another, let each be represented by $a$, and let $\alpha$ and $\beta$ be the coordinates of two particles, at the same instant in their respective lines of vibration; then, the equation of vibration being, for one particle,

$$y = \sin (\alpha t + 2\pi z t),$$

the equation for the other will be

$$z = a \sin (\alpha t - \frac{2\pi z t}{c}).$$

and from these equations we have

$$y^2 + z^2 = a^2,$$

which proves that two particles while performing vibrations at right angles to one another are always in the circumference of a circle. If, however, one considers the cause of this distribution, being unsymmetrical distributed, been unequal, the resulting equation would have

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been that of an ellipse; in which case the polarization is said to be elliptical.

Now M. Fresnel, by a delicate experiment with wedges of quartz exhibiting apparent movements of the plane of polarization in opposite directions, ascertained that the original polarized pencil passing along the common axis of the wedges in a direction oblique to their common surfaces was, after transmission, really divided into two pencils, which being afterwards made to suffer two reflexions at the interior surfaces of a parallelopiped of glass were found to be polarized, one in a plane making an angle of 45° on the right hand of the original plane of polarization, and the other in a plane making an angle of 45° on the left hand; and the fact of this division of the pencil is a proof of the velocities of their waves within the quartz are unequal.

It is evident therefore that when the original polarized pencil is made to fall perpendicularly on the surface of a plate of quartz A the direction of the axis of the latter, in passing through the crystal, it becomes two pencils, such that the light of one is polarized at right angles to the light of the other while their waves move in the same direction with different velocities. Now, let each of these component pencils, after emergence, be conceived to be made up of two others, each of these last having an intensity of light equal to half the intensity of the pencil of which it is a component, and the particles in one of them differing in phase from those in such pencil by one-half of a vibration; in advance, while the particles in the other differ in phase from those in the pencil by one-eighth, in retardation, so that one component pencil differs from the other in phase by a quarter of a vibration: then, of the four pencils, there are two, one on each side of the original pencil of polarization, in which the retarded vibrations are at right angles to one another, and differ in phase by a quarter of a vibration, and which consequently produce a circular rotation from right to left: the other two being such as will produce a circular rotation in a contrary direction.

In order to explain how light compounded of two pencils whose particles revolve in the manner just stated, and with unequal velocities, may produce the apparent angular movement that the plane of polarization which has been observed when polarized light passes along the axis of quartz: let

![Diagram]

a particle in one pencil set out from A, and a particle in the other pencil set out at the same time from B the opposite extremity of a diameter of the circle described by each: the velocities being unequal, and that of the particle which sets out from B the greatest, let M and N unequally distant from A and B be the positions of the particles at the time of emergence. Join M, N, and C the centre draw CE bisecting MN at right angles in D; then, if the equal lines CM, CN represent the equal attractions exercised on a particle at C, these forces may be resolved into MD, DC, and ND, DC of which MD and ND being equal and acting in contrary directions destroy one another, and the resulting attraction is such as will create a vibratory motion in CE: in this case a plane passing through the diameter HK perpendicular to CE and to the circle will be the plane of polarization at the given time. But, in proportion as the plane of quartz is thicker, M' and N' being the points of emergence, the ratio of AM' to AN' at the time of emergence will be greater than that of AM to BN; and the plane of polarization passing through HK parallel to M'N' will make with AB an angle greater than BCK; thus the plane of polarization will seem to revolve about a line passing through C perpendicularly to the plane of the circle.

The velocities of the particles in air being by supposition constant, equally, two points as m and n in a line parallel to AB would be points of emergence; and the plane of polarization would equally pass through.

Sir David Brewster has observed that the amethyst exhibits phenomena which indicate, in it, the two species of quartz which give rise to circular rotations in opposite directions are crystallized together in very thin layers succeeding each other alternately; by which, when a plane polarized ray is made to pass through a plate of the mineral cut perpendicular to the axis of the latter, and transmitted through a prism of quartz, curiously coloured fringes, varying with the position of the plane of polarization, may be observed.

CIRCUMFERENTOR. This instrument is a species of surveying-compass, and its construction may be understood from a view of the diagram in the article SPIRIT LEVEL, P. C., since, if the reader will imagine the telescope of the instrument to be removed, and, for the supports, called in, in the form of the compass-box, that is, from the magnetic meridian, is observed.

Each station-line is measured by the chain, and the smaller ends of the road or boundary are determined by 'odds measured perpendicularly to that line. [Subventis, F. C., pp. 117, 118, and 146. SIR GILES PORTER, P. C.]

CIRRUS. [Tenell, P. C.]

CISTUS. [Vitace, P. C.]

CISTOPTERIS. [Cistopteris, P. C. B.]

CISTUS, a genus of plants belonging to the natural order Cistaceae. The calyx is composed of 5 nearly equal sepals; a double row; corolla of 5 equal petals, somewhat cuneated, caducous; the stamens numerous; style filiform; stigma capitate; the capsule superior, 5- or 10-celled, loculicidal; the seeds covered by a membrane which becomes membranous on drying, and at a certain age are shrubs or undershrubs with opposite leaves and one or more-flowered peduncles. The flowers are either red or white, large, resembling a rose.

C. Creticus, Cretan Rock-Rose, has spathulate ovate or oblong leaves, somewhat hairy, downy, dull green, somewhat wavy at the edge, and stalked; the petals fluffy, nearly distinct, the pedicels 1-flowered; sepals with a long upper point and villous; white flowers. It is a native of dry hills in the most southern parts of Europe. It has evergreen leaves which emit a balsamic odour when rubbed or after damp warm weather in the summer. It yields, with many other species of Cistus, a gum-resin called Ladanaum [Ladanaum, P. C.], formerly used in that repute as a stimulant in medicine, and still used by the Turks as a perfuming spirit.

C. Laurusfollis, the Laurel-leaved Gum Cistus, or Rock-Rose, has stalked ovate-lanceolate three-nerved leaves, with the upper surface glabrous and the under surface somewhat villous; the follicles dilated and ciliate at the base; the capsule 5-celled. It is a native of the south of France and Spain. It has white flowers with a yellow mark at the base of each petal.

C. ladanius, Gum Cistus, has almost seashol leaves, conic at the base, linear lanceolate, 8-ispersed, the upper surface glabrous, the under surface somewhat villous, 10-celled. It is a native of the hills of Spain and Portugal. Two varieties are described, one with white petals having a yellow spot at the base, the other with white petals and a blood-colored spot at the base.

C. Ledon, has conic leaves, oblong lanceolate, never upper surface smooth, shining, under surface silky villous; the flowers in corimbosum cymes; the pedicels and calyx clasped at the base; the capsule 5-celled. It is a native of the south of France and some species of Cistus have erroneous names as the Gum Ladanaum. Many species which were formerly described under Cistus are now referred to Helianthemum. [Heliatherium, P. C. B. This is the case with the whole of Old Buffon's genera of Cistus although these genera are very beautiful, and are remarkable for lasting only one day, opening with the rising of the sun in the morning and perishing with the setting sun of the evening. All the species of Cistus have the worth of cultivation in gardens; and although during mild seasons and against a south wall they will
in the open air. They may be propagated by seeds as layers or by ripened cuttings procured in July or August, which, if planted under a hand-glass, will root readily. (Don, Gardener's Dictionary; Lindley, Flora Medica.)

CITATION, a process in the commencement of a suit by which papers are commanded to appear before the Consistorial courts.

CITIZEN, from the French word citoyen, which remotely comes from the Latin civis. Aristotle commences the third book of his 'Politics' with an investigation of the question, What is a citizen? He defines him to be one who participates in the judicial and legislative power in a state; but he observes that his definition strictly applies only to a democratical form of government. The Roman word Civis, in its meaning by ancient writers, was the designation of the share in the sovereign power in the state. The word citizen, then, if we take it in its historical sense, cannot apply to those who are the subjects of a monarch, or, in other words, of one who has the complete sovereign power. It is consistent with ancient usage and modern usage, and it is also convenient to apply the term citizen only to the members of republican governments, which term, as here understood, comprehends (Respublica, P. C.) constitutional monarchies. The term constitutional monarchy appears to have been introduced with this idea; it is a form of republican government at the head of which is a king, or person with some equivalent title, whose power and dignity are hereditary. Constitutional monarchies approach next to absolute monarchies when the constitution gives very little power to the people, and represent the form of the Roman Republic, infeuditial by the contrivance of the prince and his advisers.

Constitutional monarchies are of an aristocratical character when much political power is vested in the hands of a minority who are already proprietors of property, and are not likely to approach to a democracy, and differ from it mainly in having an hereditary instead of an elective head. Citizenship therefore is here understood as only applying to those states in which the constitution, whether written or unwritten, gives to those who are members of such states, or to some considerable number of them, some share of the sovereign power.

The usual form in which citizenship is acquired is by birth; by being born of citizens. In the old Greek states, and generally in those states of antiquity where citizenship existed, this was the only mode in which a general rule it could be acquired. A person obtained no rights of citizenship by the mere circumstance of being born in a country or living there. Citizenship could only be conferred by a public act either on an individual or on all the members of other communities. Difference of religion was one of the causes of these communities excluding strangers from their political body. The Roman system was at first a close community, but the practice of admitting foreigners to the possession of certain rights and duties of Roman citizens was only introduced. They were very admitted by the old burgers (the patricians) in considerable numbers, but only by a vote of the collective body of patricians. The admission of aliens to the citizenship, either partial or complete, became a regular part of the Roman law when the public right of Roman citizenship was acquired by her name, her language, and her power. It is true that the process of admission went on slowly, and for a long time the Romans unwise, and with danger to their state, resisted the claims of their Italian allies, or subject people, who demanded the Roman citizenship; but this claim was finally settled in favour of the Italians by the Social or Marius War (a.c. 90), and by the concessions that followed that war. The consequences of this war were, that all the inhabitants of Italy, whether Roman citizens or not, were now entitled to the state recognised to be a legal marriage. If a Roman married a woman who belonged to a people with whom the Roman state recognised no intermarriage (connubium), the child was not a Roman by the laws of nature, nor was it the child of his father; and it was only as the child of a Roman father that he could claim Roman citizenship. This was the strict principle; but it appears that if a Roman woman had a child by a man with whom there was no connubium, the child was legally a Roman citizen.

The English law gives the citizenship to all persons who are born anywhere of a British citizen or of one whose father or father's father was a citizen of Great Britain. The English law also gives the citizenship to every person born in the British dominions; which rule originated in the king claiming this right as his, and which he afterwards was disposed to have given to others by act of Parliament, for instance as a membership of the House of Commons. But these are not permanent and personal disabilities; they are temporary incapacies arising from not having a certain degree and number of properties; and they may be acquired by every man who can acquire the requisite property qualification. It follows from what has been said that those who happen to be under this disability are not full citizens, but have a capacity to become such. Those who have not the suffrage are in the situation of subjects to that sovereign body, of which those who possess the suffrage form a part. Thus the word subject may apply to some persons who live in a republic, as it does apply to all who live under a sovereign power; but the word citizen is applicable to the citizens of the state, whether they are full citizens or not. Conscription, for instance, would extend the period of probation to twenty-one years. This would however be a very impolitic measure, for if foreigners will throng to a country such as the United States, with the view of settling there, the best thing is to make them citizens as soon as they wish to be; and there would be manifest danger to the United States if the large number of foreigners who settle there should be considered as aliens for a period which would extend to the whole term of the natural life of many of them. Indeed there seems to be no objection to giving to aliens in republican governments, as soon as they choose to ask for them, all the rights and consequent duties of citizens, if they are ever to have them. It may be prudent to exclude aliens by birth from some of the high offices in a state, which is done in England and in the United States of North America. In ancient Rome, aliens were not always admitted to the full rights of Roman citizens; and in the early history of the state, even the Roman citizen was without many of the privileges which the patricians enjoyed. A person might receive the Roman citizenship so far as to enjoy every advantage except a vote at the public elections and access to the honours of the state. The Roman citizenship was acquired by Aristotle, nor is it citizenship as understood by the free states of modern times. The acquisition of complete citizenship implies the acquisition of a share of the sovereign power: the acquisition of all the rights of a citizen, except the suffrage and subjects to that sovereignty, of which those who possess the suffrage form a part. Indeed there seems to be no objection to giving to aliens in republican governments, as soon as they choose to ask for them, all the rights and consequent duties of citizens, if they are ever to have them. The man changing his residence which now exist, and the increased motives to such change in a desire to better his condition by permanently settling in another country, lead to emigration from one country to another, and make it necessary that the advantage which any country receives from the emigration of those who possess capital or peculiar arts is so great that, under the present circumstances of the world, it is not easy to discover any good reason for republican governments to refuse an admission to any who comes to another country with the view of settling there. A difficulty will arise in case of war when a man owes a divided allegiance; for it is a principle of English law that a man cannot divest himself of his allegiance to the king and the crown, and become an American citizen and retain a divided allegiance; it is a situation in which an American citizen cannot divest himself of his allegiance to the United States, and become a citizen of another country. Yet the two countries which maintain this principle, allow the citizens of any other country to become citizens of their several communities. The Roman principle under the Republic was, that as soon as a Roman
CLA

was admitted a citizen of another state he ceased to be a Ro-
mman citizen, because a man could not belong to two states at
once; wherein we have one among many examples of the
precision of Roman political principles. The same principle
must have been adopted some time into the international law
of modern states.

The nations of Europe and the states of the two Americas
have all a common religion, which however contains a great
number of discordant species, and in point of expense, the
States of North America may become a citizen, and his
opinions are no obstacle to his enjoying any of the honours
of the country. But this is not so in England. No man for
instance, though an English citizen, can be a member of the
House of Commons unless he be of the same religious profes-
sion that he is a Christian. The declaration to be made by
members of the House of Commons, which contains 'upon the
true faith of a Christian,' excludes all who will not profess
Christianity. But we have not the same restrictions to
Jews; for all other persons call themselves Christians, wheth-
er they believe in the divine origin of Christianity or not.

A great number of foreigners, particularly from Great
Britain and Ireland, and from some of the German states,
annually settle in the United States of North America; and
it is now alleged that by their numbers they materially affect
the elections. It is also alleged that many of them are very
ignorant, and for want of previous education and proper
legal training incapable to exercise the political functions of an
American citizen. It is further alleged that a great many of them
are Roman Catholics, who are under a sort of obedience to a
foreign prince, the Pope of Rome, and hostile to the principles
of the American constitution. For these and other like reasons
it is said, that a law should be established which would
require all aliens before they are admitted to the
franchise; and a party which calls itself the American
Republican party would make the period of probation twenty-
one years, as above stated. It is admitted in the argument
of their party that if foreigners on settling in the United
States are not allowed to have the franchise during the
period of probation, they are during that period subjects to the
citizens of the United States and not American citizens;
which would be admitting, as Price (P. iii.) says, that the
period of probation is extended to twenty-one years, the
citizens of the United States will have among them a great
number of subjects—a great number of persons who will be as
much their subjects as the people of Prussia are the subjects
of the king of Prussia. The period of twenty-one years will,
as above observed, comprehend the whole life of the great
body of immigrants, and this body will be very numerous.

The immigrants will enjoy no more privileges than aliens can
eventually have in the government of Europe—nothing but
their eyes the daily spectacle of a large number of citizens
do enjoy rights which they do not. Whether all these circumstances
will render the government of so large a body of
aliens so troublesome a thing to deal with than the difficulties
that are alleged to grace the treatment of aliens who after
the citizenship is given, remains to be seen. The declared
hostility of the American Republican party to the Roman
Catholic religion, the religion of a great number of the immi-
grants, is calculated to embitter these immigrants still more if
they are deprived of the power of attaining the citizenship.
The United States already possess a great number of slaves
who are subjects, and a large body of free coloured people
who are looked upon as a different caste. To these a party now
proposes to add a large body of alien subjects, to add to the
discords of discord one element more; and that a more
powerful element than all the rest. Undoubtedly the great
amount of immigration into the United States is not a pure
advantage to that country, but the call for different terms of
naturalization seems to proceed more from party and religious
feeling than to be founded on sober reflection; such at least
is the conclusion to be derived from some of the manifestos
of those who call for a change in the naturalization laws.
If we are not to legislate like Prussians towards these
people, we are not to legislate like Prussians towards
them, and the temper with which they are urged, we must
agree with the party which urges them, that the American
nation has rapidly grown up 'without political experience
and without our own mists.'

CLA/DIUM (from alab., a branch or twig), a genus of
plants belonging to the natural order Cypereaceae. It
has 1-2-flowered spikelets, 5 or 6 glumes, the lower ones empty
and smaller, bristles absent, the nut with a thick fleshy coat,
tipped with the slender base of the style. There is but one
European species of this genus, the C. Maricicus, Common
Sedge. It has lateral and terminal repeatedly compound
panicles, the spikelets capitate, the stem roundish, leafy,
smooth; the leaves rough on the margins and keel. It is
not a common plant in Great Britain, except in Cambridge-
shire, where it is in the boggy and fen districts, and is
generally common, hundreds of acres being covered entirely
with it. It is used in many districts of Cambridgeshire for
the purpose of lighting fires. This plant is the Scirpus Muru-
ca. It is the common name for this plant in Britain.

Several species of Cladium are natives of New Holland.

(Babington, British Bot.; Burnett, Outline.)

CLA/DOCO/RA, a fossil genus of corals allied to Litho-
dendron, and occurring in the Palæozoic strata.

Cl/ADO/DUS, a genus of shells, from the mountain limestone of Armagh, Bristol, &c. (Agassiz.)

CLA/DON/A, a genus of plants belonging to the natural order Licienhe. It has a thalus somewhat shrubby, branched,
nearly simple, leafy, with scales, which are often reduced
to small branchlets cartilaginous, rigid, fistulose, all attenuated and sul-
late, divided, fertile, generally perforated in the axils. Shield
sensile, orbicular, convex, capituliform, not bordered, fixed
by the circumference, free beneath in the centre, the sides
reflexed, uniform within. The genus Cladium thus defined,
with Scyphophorus and Pycnotheca, are included by Acharia
and Delisle in the genus Cenomyce, Sir W. Hooker
observes of this genus, that 'the determination of the speci
is made of the outer form of the shell and the variable
character; and in the present state of my knowledge
I dare not venture upon introducing others than those
published in English Botany. Much attention has been given to
this genus by Delisle in the 'Botanicum Gallicum,' who, with
Achardius, had the same object in view in his recent
Cenomyce, and enumerates 53 species, besides many varied
varieties, as natives of France; all of which are most probably
natives also of Britain. We would render an acceptable
service to British Botany which should undertake to sub-
nominate the British Cladonias.' Hooker enumerates only five British
species.

C. rangiferina, Reindeer Moss, has erect, elongated,
roughish, cylindrical, greenish-white, very much branched,
radians, in the middle of which small bluish-white flowers
are borne, with branched, intricate divaricate, the alternate ones drooping, apothecial
subglouse, brown, on small erect branches. This is a
frequent plant in Great Britain, on moors, heaths, and
mountains. Its botanical characters are very variable, more
especially the colour and the length of the ramifications.
This may be accounted for by the wide range of latitude
in which it is found, extending from the arctic regions, where it is
most abundant, to the tropics. This plant is the principal
constituent of reindeer moss, a bogmoss very commonly
found on the higher ground in arctic regions, and
of which the name is common name. In Lapland there is no plant so abundant as
this, especially in the pine forests, where it covers the surface
of the soil for many miles together like snow. On the destruc-
tion of the forest by fire this plant collapses and then
reappears in its greatest luxuriance. In such districts the rein-deer
are principally pastured in the winter, and whatever
may be the depth of snow, these animals are enabled to
obtain their food by grubbing with their noses through the snow.
It would be quite impossible that the rein-deer should
exist in these climates during the winter, were it not for this
apparently insignificant plant. The Laplanders are also in
the habit of collecting this lichen with rakes in the rainy season
where it is most abundant, when the grass has grown up too
high, and then leav it up in heaps, to serve as fodder for their cows. Dr. Clarke and his companions, during
their travels in Lapland, were tempted to eat some of this
lichen.

'To our surprise,' he says, 'we found that we might eat of it
with as much ease as of the heart of a fine lettuce. It tasted
like wheat bran. But after swallowing it there remained in
the throat and upon the palate a genuine neat or sense of burning,
as if a small quantity of pepper had been mixed with the lichen.
We had no doubt that, if we could procure a large supply of this,
we might make of it a delicious and wholesome salad. Cooling and juicy
as it was to the palate, it nevertheless warmed the stomach
when swallowed, and cannot fail of proving a gratifying article
of food to man or beast during the dry winter of the frigid
regions where it is common.'
as it would from that time forth be only looked upon as a last resource. Dillenius however states, that when boiled in water it yields no jelly, its substance is very little diminished, and becomes drier than before; and the decoction evaporated yields a substance annexed to it to the original foundation. The alimentary secretion of this plant appears to be similar to that of other lichens. It is called Lichénin [Lichénis, P.C.], and contains the same elements as starch. No nitrogen has been detected. It is however probable that nitrogen will be found to appear in the solutions made with this substance, and that the rein-deer with food which must require a nitrogenous compound, in order to maintain its muscular power, unless we have recourse to the supposition that starch or Lichénin, by undergoing some chemical change, can be converted into fibrine or other proteinaceous compounds.

C. verniculair, Vernicellii Lichen, has its podetia spreading horizontally, pure white subulate, simple or slightly branched, branches tapering at each end. It has been found not unfrequent on the loftiest mountains of the North of England and Scotland. The shape of its branches give it the appearance of a bundle of small worms, or of vermiciellii. It is a native of South America, where it is used as a stomachic under the name of Camelreobra blanco.

C. songiaies has a leafy, very thick, imbricated thallus, scarlet, and frosted with white beneath; above, green and somewhat gelatinous: the lobes crenulately ascending, podetia nearly solid, crenovious, split into fingered lobes, either wholly or partly decurrent on the stipes. This pretty form is a native of the Bradlis, where it is rubbed down with sugar and water, and is found to be an excellent remedy for aphthae in children. The remaining descriptions brought by the same authors, pugnax, C. fasciculata (Lindley, Flora Medicin.; Burnett, Outlines of Botany; Hooker, British Flora, vol. ii.)

CLADYDON, a generic title for some fossil reptiles found in the red sandstones of the E. C.

CLAIRON, CLAIRE JOSEPH LEYRIS DE LA TUDÉ, a celebrated French actress, whose name frequently occurs in the literary memoirs and correspondences of her day, was born near Conde, in French Flanders, in 1723. She made her first appearance on the stage in 1736, at the Theatre de la Monnaie, in the city of Harfleur, and the neighboring provinces of France. In 1739 she was called to the Parisian Opera, and soon afterwards to the Comédie Française. Although her name is now seldom mentioned, and her fame is almost forgotten, no actress of any age or country appears to have been the object of a reputation so wide and an admiration so intense. No one can read the letters of Voltaire and his contemporaries, or the memoirs of Marmontel and others, without being struck by the frequent references to the captivating and marvellous lady. She was evidently a woman of vicious morals, yet she was proud and unsubmissive in public; and Voltaire, who had obvious motives for extolling her, from her successful representation of several of his characters, speaks of her in his Candide (vol. ii. p. 387) as a woman of extraordinary beauty, that the boast of having met her in society is put into the mouth of an obscure braggart addicted to telling extravagant fictions. The prevailing character of her acting was the natural, and in this she was imitated from her Carlotta, who was considered the representative of art. Madame Cléon quit the Comédie Française in 1765. She lived for many years as mistress of the Margrave of Anspach, and died in 1803. Some memoirs relating to her were printed in 1799 by her pupil Mlle. Rancourt; and there are many anecdotes of her in the memoirs of the Margrave of Anspach, and the Mémoires de Fleuray (the actor).

CLARE HALL, CAMBRIDGE, was established on the 8th of March, 1356. The first foundation was made in 1292 A.D. by Dr. Richard Badew, who was afterwards chancellor of the university. University Hall was destroyed by fire in 1424, and was rebuilt, chiefly through the liberality of the benefactors of Dr. Badew, by Elizabeth de Bergh, one of the sisters of the prior of the Hospital of Clares. The new college was called Clare Hall, and she endowed it in 1347 with lands for the maintenance of a master, ten fellows, and ten scholars, the liberal-minded lady stating in the deed of endowment as her principle reason for her wish, an extension of every branch of useful learning, that there might no longer remain an excuse for ignorance, and to create a firmer concord and closer union among mankind by the civilizing powers of literature.

Besides the fellowships on the old foundation, which are called the senior fellowships, three others were founded by the Earl of Exeter in 1619, two by John Freeman, Esq., in 1628, and four from the estates bequeathed to the college by Joseph Diggons, Esq., in 1658. These nine fellowships are called the junior fellowships, but have nearly the same privileges as those annexed to them to the original foundation. The nineteen fellowships are open to all persons who may be bachelors of arts, or of a degree higher. The electors are the master and senior and junior fellows, and when the numbers are equal on both sides the master has a casting vote. Fellows are elected within ten weeks after admission, and after a fellowship has become vacant. The master is elected by the fellows within ten days after a vacancy has occurred, and he must be a bachelor or doctor in divinity.

All the students of the college are of a certain quality of divinity, except two, who, with consent of the master and majority of the fellows, may profess law and physic. Six of the senior fellows must be in priest's orders. Seven of the junior fellows of a certain standing must take priests' orders, but two of the fellowships may be held by laymen.

There are, besides the nineteen senior and junior fellows, three bye-fellowships, of which one was founded by Mr. Bawage, in 1637, for persons of his own name and kindred, or, in default, a Norfolk man; and two by Mr. Philipot, in 1717, for natives of Kent. These three fellowships must take priest's orders within seven years after they become bachelors of arts. They have no voice in college business, can hold no college offices, and are incapable of being elected into any other fellowship.

There are four scholarships of 50L. a year each, and four of 20L. a year each, besides a weekly allowance in the butties of 3s. 3d. a week each during residence. There are also, besides the fellowships, one of 10L. a year, tenable till M.A.; two of a guinea a week during residence; one of 12s. a week during residence; one of 40L. a year; and upwards of thirty other scholarships and exhibitions, varying in value from 2s. to 5s. a week, with allowances in the butties during residence. These fellowships and scholarships are awarded to natives of all parts of the kingdom, except four, two of which are from Wakefield school, one from Hull school, and one open to natives of Hertfordshire only.

There is an annual prize of 50L. for the best dissertation on the character of King William III., established by Mr. Greaves, of Fulbourn. Two silver cups of the value of 6L. each are given annually, one for regularity of conduct, the other for general learning. There are also awarded annual prizes of books, besides prizes of books not exceeding 40L.

There are 16 benefices in the gift of Clare Hall, namely, 2 in Cambridge-shire, 1 in Essex, 1 in Hertfordshire, 3 in Huntingdonshire, 1 in Lincolnshire, 1 in Norfolk, 3 in Suffolk, 2 in Kent, 3 in Surrey, and 1 in Yorkshire.

Clare Hall is beautifully situated on the bank of the Cam, over which it has a stone bridge, leading to a vista between two rows of lime-trees. The buildings occupy a quadrangular court, 140 feet by 111 feet. Clare Hall was rebuilt in its present form in 1818, and interiorly, though an old building, looks remarkably fresh. The front looking towards the Cam is over-crowded with pilasters of the Ionic and Tuscan orders, and the forms and moldings of the windows are not handsome, but the general effect is pleasing. The hall is a fine room, 69 feet by 21 feet. The modern library is also a large and well-proportioned room, well filled with valuable books, and the old library contains a good collection of Italian and French books.

The old chapel of Clare Hall was built in 1585, previous to which the members attended divine service in the south aisle of St. Edward's church, which belonged to the college. The old chapel was never consecrated, and no one was ever buried therein. It was destroyed, and a new one begun in 1768, and consecrated in 1769. It is of the Corinthian order, the ornaments are appropriate, the stucco-work of the ceiling is highly finished, and the wainscoting neat. The cupola of the anti-chapel produces a fine effect. The design of this new chapel was by Dr. James Storer, of the Middle Temple, and the King's College.

Among the eminent men who have been members of Clare Hall may be mentioned Archbishop Tillotson, Dr. Cudworth, and Ruggle, one of the fellows, author of the Latin burlesque comedy of 'Ignorantius.' Others of some account are Dr. William Gilbert of London, and the barrister phylology of the lawyers, which was twice acted before James I., by members of the University, to his majesty's great amusement.

(Overy, History of the University of Cambridge; Lytton, Cambriog; Wilson, Memorials Cantabrigiæ; Cambridge University Calendar, 1845.)
CLASSIFICATION OF PLANTS. [Exodorus, P. C.; Exodorus, P. C.; Junius, P. C.]

**Clathria**, a genus of fossil plants found in the Wiedenst strata of Sussex by Dr. Mantell. The stem is reticulated on the surface, and has analogous to Xanthorhoea and the Cyadaceae. Clathria Lyelli and Cl. Mantelli (this latter the fruit) are described by Brongniart, ("Hist. des Végét. Foss.".)

**Clathropteris**, a remarkable genus of fossil ferns, the foliage of which is marked with quadrangular network of vessels—a rare circumstance in living ferns—such as Meniscium. Clathropteris meniscioides occurs in the mesozoic sandstone of How in Scania.

C. Rosil (Lindley), was the successor of Zeno of Cithium in the Stoic school, and was himself succeeded by his pupil Crysippus. As Zeno died in B.C. 263 or 259, the period of Cleanthes is approximately determined by that fact. [Zeno of Cithium, P. C.]

Cleanthes was a native of Assus in the Troad, and originally a boxer. He came to Athens with four drachmas (about 4s. in his pocket, and began to attend the lectures of Zeno. As he had to pay his teacher a small fee, and at the same time to gain his livelihood, he used to draw water for the gardens about Athens in the night and also grind corn. There is a story that he was brought before the Areopagus in order to show what his means of subsistence were, and he proved that he was an honest man by producing as witnesses to the gentleman who had been in the habit of employing him, who met the Areopagus him a portion of ten minae, which however Zeno would not allow him to receive.

Ten minae seems rather a large sum for the Areopagus to vote on such occasion; and it is not said whether they had a fund for such occasions, who were always so short of groundless charges. Cleanthes attended the lessons of Zeno for nineteen years. He was slow of comprehension, but very laborious, whence he got the name of the second Hercules. Though he did not learn quick, he kept what he got. He was a copious writer; a list of his numerous treatises is preserved by Diodorus Laertius. Nothing is known of his works, except that we may collect that he indulged in the subtleties of discussion; but it does not appear that he did much on the question or improvement of the Stoic doctrines; that was done by his pupil Crysippus: but the stern character of Cleanthes was well adapted to give stability to the doctrines of Zeno. The story of his death is characteristic. He had a swelling in his jaw, and at the advice of physicians he abstained from food, and the complaint began to abate. The physicians told him that he might now take his usual food, but he remarked that he had already gone a good part of the journey, and so he continued fasting till he died, at the age of fifty, or of ninety-nine, according to Lucian and Valerius Maximus.

Cleanthes is the author of a hymn to Jupiter in Greek hexameters, which was first published by Fulvius Ursinus, at the end of the "Fragmenta of Nine Illustrious Women and Men," Amsterdam, 1754. It is now in the Cudworth's "Intellectual System," with a Latin poetical version by Duport. The last edition is by Ch Cities, in his edition of the "Enchiridion of Epictetus," Paris, 1826, 8vo.

The hymn of Cleanthes has always been a favourite with Christian philosophers, but the true understanding of it, as Ritter remarks, can only be reached by looking at it from the Stoic point of view.

[Diogenes Laertius, Cl. Ristes; Fabricius, Biblioth. Grac. iii. 650; Ritter, Geschichte der Philosophie, iii. 521.]

CLEAVAGE, a term employed in geology to indicate a peculiar fissility in certain (especially argillaceous) rocks, which is independent of, and generally meets at a considerable angle, the surface of stratification or deposition. Clay slates furnish the best examples of this phenomenon, which is discord under the title Slate, P. C.

**Cleome**, a genus of plants belonging to the natural order Capparidaceae. It has a calyx of four almost equal spreading segments, and a corolla of four or five petals of unequal size, in rare cases over half hemispherical; six, rarely four, stamens; a siliqua dihiscant, stipitate, or sessile within the calyx.

C. gigantea is a shrubby plant, velvety-pubescent and sometimes clasping the stem, with leaves 40 mm. on each side of each leaf. It has whitish-green flowers, with pinkish filaments and yellow anthers. It is a native of South America. It is a beautiful plant, but has a disagreeable odor, and an acrid juice.

C. roseus is an herbaceous unarmed smooth plant, with quinate leaves, the lower and floral ones terete, the uppermost ones ovate sessile; the silique smooth, the length of the stipules. This plant has beautifully rose-coloured flowers. It is a native of Rio Janeiro.

There are about fifty species of the genus Cleome, described, many of them are not referred to the genus Peltandra [Peltandra, P. C. S.]. Most of them are worth cultivating on account of their beauty. The shrubby species do best in a rich light soil. They may be propagated by ripened cuttings or planted in a hotbed under a glass. The seeds of the annual species should be sown on a hot bed in spring, and when the young plants are of sufficient size may be planted out in the open border, but not before the middle of May. The biennial species must be kept in the house; they may be propagated by cuttings, as the shrubby species.

(See, Gardener's Dictionary.)

CLERC, SEBASTIEN LE, a very celebrated French designer and etcher, highly praised by his contemporaries, was born at Meix in 1657. His father, who was a jeweller, instructed him in the rudiments of drawing and engraving.

Sebastien Le Clerc commenced his career as a civil and military engineer; but, having met with some misfortune, he resigned a place which he held under the Marshal de la Ferté, and determined in 1666 to settle in Paris, where, by the advice of Le Brun, he devoted himself exclusively to the art of etching, an art for which he showed the highest ability. He had also a fertile invention, and great ability as a designer.

In 1668 Le Clerc published a "Géométrie Pratique" in eighty plates, which procured him the notice of Colbert, who engaged him as a designer and engraver of monasteries, manufactories, with apartments in the factory, and a salary of 3000 francs. Whilst in this situation he married the daughter of Vander Kerkhove, the dyer of the establishment, by whom he had sixteen children, and his family increased so rapidly that he was forced to give up his situation, and to try his fortune by working for the public at large. About 1684 he was elected a member of the Royal Academy of Painting, and appointed Professor of Perspective, as also to engrave the plates of the "Histoire des Arts et Mœurs," which in 1688 he was commissioned to engrave in Ordinary to the King (Louis XIV.); and he was created about the same time a Knight, by Pope Clement XI. He used to sign himself Chevalier Romain. He died at Paris in 1714.

Le Clerc's etchings and engravings are very numerous. They are said to exceed 3000; and his designs are twice as numerous. His works include nearly all subjects except shipping. His master-pieces are, the Academy of the Arts; the Entrance to the Tuileries; the Hunting of the hylo, and the Feeding of the Five Thousand, from his own compositions. A complete list of his works, preceded by a memoir, was published at Paris in 1774, by C. A. de Jembert, entitled "Catalogue Raisonné de l'Œuvre de Sébastien Le Clerc." In 1668 he was nominated Engraver in Ordinary to the King (Louis XIV.); and he was created about the same time a Knight, by Pope Clement XI. He used to sign himself Chevalier Romain. He died at Paris in 1714.

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Sebastien le Clerc, his son, was a good historical painter. He was elected a member of the Royal Academy in 1704, and died in 1767, aged eighty-three. Several of his works have been preserved.

CLERK OF ASSIZE is an officer attached to each circuit, who accompanies the judges at the assizes, and performs all the ministerial acts of the court. He issues summons, orders, writs, and other processes; draws indictments; takes discharge, and resapes recognisances; files informations, affidavits, and other instruments, enters every process, records all the proceedings of the court, and enters its judgments. He is associated with the judges in the commission to take assizes; and he is restrained by statute 28 Ill. 84, 95 Ill. 5, 116 Ill. 24, and 121 Ill. 126, to exercise his authority on his circuit. He is paid by fees which are charged upon the several official acts performed by him, some, by virtue of established wages, others, under various statutes, 66 Geo. III. c. 86; 12 Ill. c. 64; 16 Ill. c. 16; 18 Ill. 7; 19 Ill. c. 55. The fees payable on each circuit will be found in the "Part. Paper," No. 681 of 1848. (Part. Paper, 1848, No. 681; Wood's Institutions.)

CLERK OF BORDERS.

CLERK OF THE CROWN IN CHANCERY is the officer of the crown in attendance upon both Houses of Par
HANSEN, and upon the great seal. In the House of Lords he makes out and issues all writs of summons to peers, writs for the attendance of the judges, commissions to summon and procure Parliament, and to pass bills; and he attends at the table of the House to read the titles of bills whenever the royal assent is given to them, either by the queen in person or by commission. He receives and has the custody of the returns of the representative peers of Scotland, and certifies them to the House; and makes out and issues writs for the election of representative peers of Ireland. He has the custody of the records of the Lord High Steward's Court for state trials and for the trial of peers; and he is also registrar of the Coronation Court of Claims.

In connexion with the House of Commons, he makes out and issues all writs of summonses to persons in Great Britain (those for Ireland being issued by the clerk of the crown in Ireland); gives notice thereof to the secretary-at-war, under act 8 Geo. II. c. 50, for the removal of troops from the place of election; receives and retains the custody of all returns to Parliament for the United Kingdom; notified each return in the 'London Gazette,' registers it in the books of his office, and certifies it to the House. By act 6 & 7 Vict. c. 18, he has the custody of all poll-books taken at elections, and is also empowered to require an inspection of them to all parties applying, and to prove them before election committees. He attends all election committees with the returns of members; and when a return is to be amended in consequence of the determination of an election complaint or issue, records the report of such determination.

He is an officer of the lord high chancellor, not in his judicial capacity, but as holding the great seal; and in this department he makes out all patents, commissions, warrants, licences, and other instruments of the crown, except patents for inventions and other patents and charters which are passed in the Patent Office. He also administers the oaths of office to the lord chancellor, the judges, the sergeants-at-law, and all other law officers, and records the same in the books of his office. He also receives a salary of 1000l. a-year, under 7 & 8 Vict. c. 77.

(Part. Report, No. 455, of Session 1844.)

The office of the Clerk of the Crown is commonly called the Clerk of the Upper House, or the clerk of the House of Commons, and is also an office in the Court of Queen's Bench called the Crown side of the Court, of which there is a master and other officers.

CLERK OF THE HOUSE OF COMMONS, the chief officer of that House, is appointed by the crown for life, by letters patent. Upon entering office he is sworn before the lord chancellor 'to make true entries, remembrances, and journals of the things done and passed in the House of Commons; in which duties he is aided by the clerk-assistant and stenographers, or other officers, commonly known as clerks at the table.' The chief clerk signs all orders of the House, endorses the bills, and reads whatever is required to be read in the proceedings of the House. He is also responsible for the execution of all the official business of the House, and is authorized to issue commissions to the Judges of assize, which may not be exceeded by the Clerk of the Peace, under a penalty of 5l. If he take more than is authorized by such table of fees, he will also be liable to be proceeded against at common law for extortion, and be ordered to pay the amount of the fees which have been charged. A bill is now before the parliament, by which Clerks of the Peace are in future to be remunerated by salaries, payable out of the fees collected.

(Dickinson, Quarter-Sessions: Burn, Justice of the Peace.)

CLEVERLY, CLEVERLAND, or CLEAVELAND, JOHN, was born in Leicestershire in 1815, and studied at Cambridge, where he became a college-tutor and reader in rhetoric. On the breaking out of the Crimean war, he joined both as an active soldier, and as one of the most severe and biting writers of lampoons on the roundheads. He died in London, in 1858. Those few verses of his, chiefly love-poems, which rise above personalities and occasion, as is the case with occasionalists, have been admired; but they are deformed by the most perverse conceits anywhere to be found in the circle of that which has been called the metaphysical poetry of the seventeenth century. The most complete edition of Cleveland's works appeared in 4to in 1687.
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CLU HOUSE. As now constituted, the clubs of the metropolis are no longer the peculiar feature in the social life of the towns. 

Unlike the library and other clubs of the last century, consisting of a comparatively few individuals who held their meetings at stated times, and generally at some tavern, with no apartments of their own, the clubs of the present day—most of them established within the last thirty years—spare no expense in the footing of what used before to be called Subscription Houses (such as Brookes' and White's)—merely places of rendezvous always open to those who are members of them, and who are subject to no other form of membership than that of paying the being bailed for some time. That, in fact, is almost the only thing in their constitution which distinguishes them from public hotels and coffee-rooms, except that the accommodations are upon a much more extensive scale, and in a very superior style. We have come to the time at which both the number of members and the consequent general certain revenue derived from the annual subscriptions alone, and to there being no profit to be made out of what is expended and consumed. To the original character of coffee-room and news-room the modern clubs add that of library and reading-room, and are furnished not only with card, billiard, and smoking rooms, but with baths also. The cuisine and domestic department are equally complete; in short, luxurious refinement is observable throughout the whole; the scale upon which the different classes of members are accommodated is that which may be called princely, and would be deemed quite extravagant for a private establishment, except that of a few of our wealthiest noblemen. But the seeming extravagance is only in appearance, because of what it costs each member singly to furnish an ordinary sitting-room, when clubbed together by a thousand or fifteen hundred persons, sufficient to erect a sumptuous palace. Accordingly, the club-houses—the later-erected ones at least, constitute a new class of buildings in the metropolis, being almost the only ones which answer to the character of palazzi—palatial structures, plainly distinguishable from public buildings either for business or amusement. While, too, they eclipse in external appearance almost every town mansion of our nobility, they are upon a far more spacious scale internally, because, except for the domestic part of the establishment, no other apartments are required than what in a private mansion would be called the state and reception rooms,—no bed-chamber floor, and perhaps no dining-room of any magnitude. The rooms themselves are besides greatly more spacious and lofty than in private town-houses of the very first class, except one or two, such as Mr. Hope's, Stafford House, and Grosvenor House, which have a single room or 'gallery' rivaling in extent a club-house drawing-room. With the exception of the picture-gallery, even the state-rooms in Buckingham-palace are of moderate size in comparison with some of those in the Reform and Conservative Clubhouses, and certainly not more striking in style.

Club-houses may therefore well be considered a class by themselves—distinct from all other edifices, public and private alike, and from the latter not merely as being larger or more ornamental, for that may be found in every instance not an exception, but for carrying with them an expression not to be counterfeited by clubbing two or three houses together, and uniting them into a single façade, which, however decorated, betrays itself at a glance for what it really is, and the more extensive it is, the more danger of its looking very bar-girl-like instead of palatial. However they may differ as to design in other respects, with a single exception (the Reform) the clubhouses resemble each other in one particular—in showing off two ranges of windows in their façades, one of the ground-floor, and of the piano nobile or principal floor; a circumstance highly favorable to composition, whether symmetrical or columnar, and productive of an air of dignity which cannot possibly be obtained by piling up story on story to make a lofty house with comparatively low and moderate-sized rooms. Concomitant with the greatness of manner arising from only two ranges of windows, is the other which is derived from fenestraion, or the spacing of the windows, that is, not more than a single story to the twenty feet or upwards of frontage. What, besides, contributes in no small degree to architectural finish and completeness of design in those instances where it has been adopted, as in the Travellers' and Reform Clubhouses, is the plan of encircling the building with a colonnade, which is part of the façade, surrounding the window boxes by means of parapet and balustrading, which, while it effectually conceals what is not intended to be seen, even where it is allowed to be seen, is highly ornamental in itself. In most of the principal clubhouses the basement is exceedingly deep, nearly one-half of the structure being below ground, In the Travellers', for instance, it is on one level with the first floor, containing a multiplicity of rooms for various domestic purposes. The floor above the mezzanine over it and immediately beneath the ground-floor, is fitted with baths and dressing-rooms for members, and here also are placed the rooms for the housekeeper and other servants required by the accommodation. Adjoining, on the other side, the being built out over the garden, is a low range of habitable spaces also got out of the upper part of the house in such a manner as not to interfere at all with the external design: a modern club-house, in short, affords a complete Wasard of every convenience for convenience and comfort, and for the systematic management of a large domestic establishment. 

Notwithstanding that the London Clubhouses have nearly all many points in common, they differ considerably as to style. 

The Travellers' at the outset, in the year 1810, was designed by Smirke, and was considered one of the most striking of the modern period. In 1820, the Union (1827), and the United Service (1828), are tolerably characteristic of their respective architects, Wilkins, Smirke, and Nash. The Athenaeum, by Busby (opened Nov. 1830), corresponds in its general mass with the United Service, the two buildings occupying the opposite angles of Carlton Place next Pall-Mall; yet though not of degree of uniformity is kept up between them, they are shot in contradiction to each other as regards style and taste; the Athenaeum, built as business buildings, being so remarkable for its very extraordinary degree of importance and richness, as that of Nash's for its utter insignificance. Even now the Athenaeum continues to be the only example we have in London of the grand simplicity of the Regency period carried along the whole exterior of the edifice. In fact the Athenaeum seems to have furnished the hint for the mode of design introduced immediately afterwards (1831) by Barry in the adjoining Travellers' Clubhouse, viz. symmetrical composition, crowned by a colonnade, and the Pall-Mall form, in which gimcrack, were treated as principal features. It was that club-house which first brought Barry into notice, and stamped his reputation as an architect of superior taste: its carefully finished grounds and simplicity of design, of which richness of detail are hailed as welcome novelty after the dull blankness of or pseudo-Greek school, and of Palladianism with mere holes in the walls for windows. Yet happy as was the application of it, the style then brought forward by Barry was so far from being more suitable for London than that of Nash, that it is not improper to say, that we will not say a plagiarism from, but a tasteful and improved version of the façade of the Palace Pantheon at Florence, as is strikingly evident on comparing it with the latter Eman's Architectural Texts, familiar, it may be presumed, to every professional man. It was in the other front of the Travellers' that Barry displayed his originality and produced a most charming and graceful composition, one which he has never since surpassed. However even equalled in style and situation, towards the garden, that front is all but quite withdrawn from public view, for though the building itself is visible, all its beauties of detail are completely lost. Fortunately, however, the celebrated Architectural Monograph, which supplies a series of admirably engraved illustrations, comprising not only plans, elevations, and sections, but plates of the ornamental details, internal as well as external. No less fortunately the elevation of the edifice from there shows it in its original state, previous to its being marred by an excrecence now built upon its roof, to answer the purpose of a smoking-room. The Reform Clubhouse (by the same architect) was erected 1839-41, immediately adjoining the preceding, and forms together with that of the Athenaeum a rich architectural group and scene, extending nearly 900 feet back and front, by 105 in depth. It is strange that while Barry's first clubhouse was spoken of as standing altogether original, his second should have been to be little more than an expression of the Pantheon facade at Rome, though the difference is much greater than any sort of resemblance, and the only point of similarity is that both structures are crowned by a massive cornice, and have windows in the sides of the ground-floor, with a fine unbroken and uniform mass, all the three fronts being alike, some slight differences of detail excepted. It is also considerably loftier than the two adjacent buildings, having as additional story, not a mere mezzanine, one that is nearly the same height as the mezzanine proportions. This floor forms quite a distinct part of the interior, with a separate entrance to it from the street, and is let out in private chambers to members of the club. The public apartments of the Reform are more spacious and sumptuous.
than in those any other clubhouuse of previous date: the
inner hall or saloon is a very striking and scenic apartment,
occupying the entire height of the ground floor and principal
one, and lighted through the core of its ceiling, which is
perforated and filled in with cut glass. The coffee-room on
the ground floor, and the drawing-room over it, are each 117 feet
by 26.

Raised upon a ground-floor basement; and in regard to
the order itself, Corinthian, the design is perfectly satisfactory;
the entablature and ornamental sculpture beneath it, being
the capitals of the columns and pilasters, give an air of noble-
ness and richness which the case of the basement floor is in very
meagre taste, more French than Palladian; and there is so little
unity of character, between the upper and lower division, that
they seem to be the distinct work of the respective architects.
But it is for its interior and its decorations that this clubhouuse
rivals the Reform, and, indeed, it is almost as large as
hospitals a little into the shade: the central hall, staircase,
upper hall or saloon, drawing-room, and card-room, are
all gorgeously embellished with polychromatic encasuating
painting, by Sang, the chief artist who was employed in the Bank
of Exchange. Being the first instance of such decoration here,
it has attracted much notice, and is certainly a very striking
novelty, but not particularly satisfactory after the first
impression wears away. The effect would have been much better,
if colour had been employed upon a polished wall and staircase, and the full display of it
been reserved for the two
evening rooms. In that case the other apartments would not
have looked so plain and bare as they now do in comparison
with the hall, which raises expectation too highly. The
annexed plans of the two principal floors of this building will
not only describe it more clearly and briefly than we could
do, but also serve to give an idea of the accommodation
required in buildings of the kind.

CLUSIA, a genus of plants belonging to the natural order
Guttiferae, named after Charles de l'Ecluse, or Chasius, one
of the most celebrated botanists of the sixteenth century.

CLUB ROOMS. [CAROLUS, P. C. S.] It has a calyx of four
imbricate, coloured, the outer ones small, usually doubly bracteate at the base; the corolla of 4-deci-
duous petals; the stamens numerous and free in the male
flowers; few, sterile, and connected in the female flowers,
the style slender; the stigma 5-12, radiately peltate, sessile,
perennial; the flowers usually polygonous; the ovary
surrounded by a short staminiferous nectary; the capsule
fleshy, 5-12-celled, opening by valves from the top to the base,
with a dissepiment in the middle of each valve; the placenta
thick, triangular, the seeds empty, sur, central, the pericarp
surrounded by pulp, suspended from the inner angle of the cells;
the embryo straight, inverted; the cotyledons separable.
This definition includes the genus QUAPoya of Aublet.
The species are trees and shrubs, usually parasitical, and yielding
a viscid resinous juice of a balsamic flavour; hence they are
called in England balsam-trees.

C. Roesi, Rose-flowered Balsam-tree, has polygonous
flowers, a rose-coloured 5-6-sepalate calyx; the base
of the dense nectaries shows; the flower sessile,
veins, obtuse, vcinless, sometimes emarginate, on short striated
petioles. It is a native of the Carolinas and St. Domingo,
and other parts of tropical America. The trunk is green,
and of the size of an apple-tree, with eight limbs, like the radi-
dians of a globe: when it ripens it opens at these lines,
disposing its scarlet seeds lying in the midst of a pulpy
muclaginous matter, similar to the pomegranate. The whole
trunk is very handsome, but few fruits offer so beautiful a piece
of mechanism. It grows on rocks, and frequently on the
trunks and limbs of trees, occasioned by birds scattering or
voiding the seeds, which, being glutinous, like those of the
node, take root in the same manner; but the roots, not
yielding sufficient nutriment, spread on the surface of the tree
till they find a decayed hole or other lodgment wherein is
some small portion of soil: the fertility of this being exhausted.
the root is discharged out of the hole till it reaches the ground,
where it fixes itself, and the stem becomes a large tree.
(Laun.) The fruit is conserved from this plant for an external
application in veterinary medicine, and also is em-
ployed for covering boats instead of tallow and pitch.

C. Alb is hermaphrodite flowers, a many-leaved calyx;
flowers with 5-6 sepals; the ovary is oblate, 5-6-styled;
short staminis 5-6; leaves like the preceding, but not
emarginate. An elegant tree, native of South America,
and epiphytically on larger trees. The fruit is frequently
a foot in diameter. It abounds in a badly glutinous green
flour, which becomes brown on being exposed to the air.
The fruit is scarlet, and contains its seeds embedded in a
scarlet pulp. Birds are very fond of the seeds, and pluck
them out of the fruit while hanging on the tree. The Ca-
ribbeans use the juice for painting the outside of their
boats. The flowers are white, but not handsome.

C. QUAPoya has stalked discous flowers; the calyx of 6
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or 6 sepals; the corolla of 5 or 6 yellow petals; the neerst
short, 4-5-lobed; stigma 5; fruits globose; leaves obovate,
acute. It is a native of the woods of Guiana, where it is
called White-fish, and as a fish it is esteemed with yellow flakes
and when cut into yields a white transparent juice. C. pa-
naparani is a similar plant, yielding a yellow juice. C. 
flava is a tree closely resembling C. alba.
All the species grow well in a light sandy loam, and cut-
tting is made only in some under a hand-glass in heat.
The pots in which the plants are grown require to be well drained
with potsherds.
(Des. Gardener's Dictionary; Loudon, Encyclopedia of
Plants.)
CLU'SIUS, CAROLUS, or DE LE'CLOSUE, or DE LE
CLUSE, CHARLES, was born at Antwerp on the 18th of
February, 1529, according to Speuenl, 1525. He con-
ducted his education at Ghent, and from thence was removed
by Louvain with the object of studying the law. He studied here
for about two years, and then went to Marburg, where he be-
came disgusted with the law, and pursued the study of phi-
losophy. During this period he acquired a love for the study
of plants, and devoted much of his leisure to this pursuit. At
Marburg he formed a friendship with Hyperius, who inspired
him with an admiration of Melanchthon, and in 1540 he left
Marburg for the purpose of studying at Wittemberg. From
Wittemberg he proceeded to Strasbourg, and from thence to
Montpelier, where he bestowed some time, and devoted himself to
the study of medicine and took his degree of doctor of medicine.
He resided for three years at Montpelier, and then proceeded to
Paris, where he remained for some time, compelled by the war
which broke out at that period. From this time he visited
most of the countries of Europe for the purpose of add-
ing to his botanical knowledge. In 1564 he travelled through
Germany, from thence went with Fuggers to Spain, and afterwards
visited Portugal. In 1761 he returned to Belgium, and again visited
Paris, whence he went to England, where he remained some time,
being much interested with the results of the voyages of Sir Francis
Dake and other English botanists. He returned to Germany in 1567,
and occupied himself with publishing the result of his bot-
nanical labours. He was invited by the Emperor Maximilian
II. to become curator of the botanical garden at Vienna.
This office he accepted, and he remained there till 1587,
when, through the influence of court intrigue, he was obliged
to retire. He then lived at Frankfort in a state of perfect
obscurity till, in 1588, in the sixty-eighth year of his age, he
was called to the chair of botany at Leyden. This position
he held for sixteen years, and died on the 4th of April,
1609.
Few men have suffered more in following a favourite pur-
pursuit than Clusius. He has on this account been called 'The
Martyr of Botany.' As early as his twenty-fourth year, by exer-
cising himself contracted a disease, which he said his tutor Rondelcourt
died with choler. At the age of thirty-nine he broke his right thigh
during one of his botanical rambles, and a short time after his right arm.
Whilst at Vienna, he dislocated his left ankle, and eight years after this
accident he dislocated his right hip. For this he was treated
unskillfully, and ever after was obliged to use crutches for his
support. The want of exercise in one who had habituated
himself to so much brought on other diseases, the most dis-
tressing of which was stone in the bladder. During his exer-
cisions in the early part of his life, he also contracted a hernia,
which troubled him to the end of his days. But his bodily
infirmities never diminished his mental activity, and he con-
tinued teaching and writing to the very last. His works are
very numerous, for he not only published original descriptions
of new plants, but he translated into Latin works from the
French, Spanish, and Portuguese, and from the Latin into
French, thus rendering a most important service in the dif-
fusion of a knowledge of the plants that were known in his
country.
The following are his principal works:—1. 'Histoire des
Plantes, en laquelle cet contenece la Description entiere des
Noms des plantes, formes, noms supremaus, vertus, et
eoperations,' Antwerp, 1557, folio. This is a work by Dodoens,
to which Clusius appended a chapter of his
own, on gums, liquors, woods, fruits, and aromatic
roots. 2. 'Antidotarium Florentinum,' Antwerp, 1561, 8vo.
This was Clusius's chief work, as it was appointed
an account of the medicines used by the Greek, Arabian, and Florentine
physicians. 3. 'Aromenam et Simplicium aliquot Medica-
torium apud Indos nascendum Historia,' Antwerp, 1567, 8vo.
This work went through many editions, and was origi-
nally a translation of a Portuguese hook by Garcia de lheis,
which was subsequently translated into Latin and
also translated into Latin two works of the same kind, the one
from the Spanish of Nicolas Monardes, the other from the
Spanish of Christopher Acosta. These were published
at Antwerp in 1574. 4. 'Barbierus aliquot Stirpium per
Hancipriam Historiam,' Antwerp, 1562, 4°. This work
was the result of his travels in Spain. It was illustrated with
229 figures of plants, some of which were from the works of Dodoens.
5. 'Alquid Nota de Barbierius Stirpium Historian Historia,'
Antwerp, 1589. This book
work contained an account of many things he had observed
in England, more especially an account of plants, fruits, &c.
which had been brought to England by Sir Francis Drake.
6. 'Barbarius aliquot Stirpium et Plantarum per
Panassae, Austrian, et viscos quassae Provincea observationes.
Misura quator libris express,' Antwerp, 1582, 8vo. This
work was of a similar character to the Flora of Spain, and
was illustrated with 358 plates. 7. 'Barbarius Plantarum
Historia,' Antwerp, 1601, folio. This was a union of the
two works on the plants of Austria and Spain, containing
many additions from then living botanists, as Penney, Lobi,
Plateau, Dortmans, and others. 8. 'Exoticon Libri 1,
qubis Animalium, Plantarum, Aromatum et aliorum Per-
centurum Stirpium Historia,' Antwerp, 1562, quarto. This
work contained descriptions of animals as well as
plants, and other objects of interest, which had been discovered
by himself and other travellers.
He omitted many genera tok of less importance, chiefly
translations. The industry with which he compiled the labors
of others and combined them with his own observations, renders
his works of importance for reference at the present day.
He was not perhaps so philosophic a naturalist as his contem-
poraries Dodoens and Lobel, but he had an important
and exercised a not less important influence than either on the
botanical knowledge of his day.
(Bischoff: Lehrbuch der Botanik; Biographie Médicale:
Loudon, Encyclopedia of Plants; Adamson, Famille des
Plantes.)
CLUTCH. (COUPLING, P. C. S.)
CLYP'ENIA, a group of fossil Cephalopoda, thus
defined by Count Münster, who has described a considerable
number of species from some calcareous beds in the Paleozoic
terrain of the Fichtelgebirge. Some of these, with several others (in
all seven), occur in the strata of Devon and Cornwall, and
have been described by Professor Phillips. See the article
Gastropoda, Vol. I.
CLYP'EU5, the generic name given by Klein and Leek
are a group of fossil Echinidae, frequent in the oolitic forma-
tions. Clyp. sinuatus of Leske is the largest British spec-
ies. Clyp. cunealisis of Smith is now ranked as a Nucleid.
Clyp. subaustriacus of Cuvier, was named by Goldfuss, for some fossils usually ranked as Mantellia
and Siphonia.
COACH-MAKING. The mechanical details involved in
the manufacture of a coach or other vehicle depend in
peculiarity which they present, rather on the choice and com-
bination of materials than on the actual working processes.
There are however a few points which merit attention both
to materials and to processes.
The timber employed in coach-building comprises ash,
beech, elm, mahogany, cedar, deal, pine, fustic, larch,
and birch. Mr. Adams ('Treatise on Pleasant Or-
agies') gives the reasons for the selection among these species
of wood, according to the purpose for which it is to be used.
The timber most employed in English-coach work is
the 'hedge-row' ash, growing in open spots, is of slower growth,
but is much firmer, stronger, and tougher than that of the
'coppee,' and is therefore preferred to it for making the
heavy framework of a carriage, and is thus chiefly used for
carriages, and not for coaches. The 'hedge-row' ash
is a tough, fleshy fibrous than an elastic wood, and is well calculated to bear
the hard shocks and the weight with which the supporting framework of a coach
is exposed; it is best fitted for use when arrived at maturity,
just before it has attained its extreme size; it is less
susceptible to the heat of the climate, and is best fitted for the
purpose in view; it is sometimes so wrinkled in grain as
to be scarcely to be planed smooth, and is then in its
toughest state; it requires by steaming or boiling a plastic
property, so that it bends and is fitted up for the carriage
timbers. These various qualities, together with the absence
of any tendency to twist or warp, render more suitable for
dốn
Beech is a timber used only in building carriages of an inferior kind, since it cannot well bear alternation of air and moisture. Elm is used largely for strong planking. Of the two kinds, 'hedge-row' elm is more employed than 'wych' or 'white' elm. The advantages of enabling the wood to be turned to best account are: it forms the spokes of wheels [Waxax, P. C.], and is used in some cases as a thin planking, or 'wainscot.' Mahogany is chiefly in request for forming the panels or broad plain surfaces of the body of a coach. In the use of this kind of wood there is a difference between coach-building and ship-building: the former prefers 'Spanish' mahogany, on account of the beautiful curved grain which gives such diversity of light and shade; whereas the latter employs 'Honduras' mahogany, because the curved grain of the Spanish prevents it from being bent. The curvatures required in coach-making. Hornbean wood can be procured in planks four feet in width, perfectly straight-grained, and free from knots and blemishes, and is therefore a kind of timber well fitted for bending. Cedar, of considerable use, is, in the earlier stage of ship-building, the species of mahogany for coach-panels, when they are to be covered with leather; it is too porous to receive a painted surface. Deal is employed for the flooring of carriages, and also for panels which are to be covered; wide American pine, cut into very thin laths, and used for the same purpose, is employed for the wood obtained from Central and South America, is sometimes employed for the naves of wheels which are intended for hot climates, as being less liable to shrink than English timber. Leather is preferred for rendering a body, the surface of which, when wetted, was formerly much used for the straight sharts of carriages; but when curved shafts became general, the employment of this wood for the purpose lessened. American birch is much used for flat boarding, on account of its great width, its fine texture, its ease in bending and setting, and the smoothness of its pores, its ready yielding to the plane, and the non-appearance of the grain when painted; it is however brittle, and cannot be bent like mahogany for panels. Sycamore, chestnut, and plane-wood, are occasionally used as substitutes for some of the above-mentioned woods.

In working up these varieties of timber, tools and processes are employed similar to those witnessed in many other trades. In the first place, a 'mould' of the coach-body is prepared from the pattern, as in the earlier stage of ship-building, the same is, thin pieces of wood are cut out so as to give the size, form, and curvatures of all the separate parts of the coach; and these afterwards act as guides in cutting and shaping the timber. 'The body, or 'frame,' is a framework, in a plank of which is fastened, is carried on by different sets of workmen: one relates to the 'body,' and the other to the framework or 'carriage'; the former depending more upon delicacy, and the latter upon strength. In bending thin pieces of timber to form curved panels, the wood is wetted on the side which is to be convex, and heated on that which is to be concave: the unequal expansion of the two surfaces gives the curvature, and it is the workman's business to secure this curved form when once obtained. With a few exceptions, the processes connected with coach-making may be regarded as very similar to those of cabinet-making.

In the making of the carriage which supports the body, the flat surfaces are so few in number that the plane is scarcely employed. The different parts are generally made to a shape by the hand-tool resembling a spoke-shave. The complexity of the framework, and the number of pieces which compose it, depend a good deal on the circumstance whether the carriage has a 'one-piece' or a 'two-piece' head; in the former, the two wheels are drawn by one horse, or two horses. In the Dennen and the Stanhope, two-horse vehicles drawn each by one horse, there is very little under-framing. In the Tilbury and the Cabriolet, pliable leather bands are introduced between the springs and the body of the vehicle, which is so arranged as to prevent the wheels of a two-wheel vehicle from being drawn by two or three horses. Where there are four wheels, the under-framing is much complicated, since the wheels have to be connected one with another, and also with the body. In some vehicles of this kind, there are elliptical springs beneath the body and the axle; while in others, besides these springs, there are pliable leather bands between the body and the wheels. Four-wheeled carriages of the coach-body frame work; in which case the framework which supports the fore and hind springs is connected together by a long central piece of timber called the 'perch.' Occasionally this perch is made of iron, and is bent into a form called the 'crane-neck,' as a substitute for a large central timber, and may be of finely turned and polished wood as a narrow street. The general class of four-wheeled carriages for two horses, such as the coach and the chariot, have double sets of springs: viz. horizontal springs immediately on the axles, to support the carriage and to intercept the concussion; and circular upspring springs to sustain the body. If more close, such carriages comprise the varieties of the Coach and the Charlat; if it opens occasionally, the Landau and the Land-oulet; if to remain permanently open with a leathern hood to defend the passenger from the weather, the Barouche and the Baroulet; and a modification of this latter kind, the Britzcha (Adams, p. 85). All these varieties of forms render necessary corresponding changes in the formation of the framework beneath. The form and nature of the springs above alluded to are described in Sainoxis, P. C.

The arrangements of the under parts of the mechanism depend a good deal on the facilities afforded for turning the coach. In a four-wheeled carriage there is an axle connecting the wheels, and another connecting the wheels and the framework. The coach-builder may adopt a system of springs which, for coach-panels, is neither more nor less than a piece of mahogany. For straight sharts of carriages, a piece of mahogany is used, and where these two axles are so fixed as to remain constantly parallel, the carriage could not turn. In practice, the front axle is made to turn upon a pivot, and the wheels connected with it are so small as not to go under the framework of the carriage during the whole of its motion. It is for this reason, and this alone, that the front wheels are made smaller than the hinder ones; and as a great disadvantage in draught is thereby occasioned, various contrivances have been adopted to prevent this turning as it is effected even when all the four wheels are of equal size. This he does by having the carriage so divided in the middle as to turn upon a pivot; or, rather, the pivot, or perch-axis, which in a common carriage is placed immediately between the two front wheels, is on the quadrantal plane of which therein is a radius of the body by which they are not touched by the body, and may therefore be made of equal size with the hinder wheels. The mode of adjusting this pivot depends upon the kind of carriage. In a carriage which is for the carriage with two seats, the front one higher than the lower, the hinder half of the body is hinged to the front half. In a chariot or a coach, the coach-box is connected with the framework of the front wheels, and the body with that of the hind wheels, and there is a pivot which connects the two halves together.

The axles of a carriagio form an important part of the manufacture, since they are the medium of communication from the wheels to the body. When this part of the mechanism was made wholly of wood, its general designation was 'axle-tree;' but iron is now more extensively used, and the name 'axle' is given to it. Formerly the axle was made to evolve with the wheels, but now the wheels are fastened on the axle. There are three parts in the axle, the 'arms,' which pass into the naves of the two wheels, and the 'bed' or central part, which connects the two arms. The adjustment at the nave or centre of the wheel requires much attention; and it is to this point that Collinge's 'patent axle' chiefly relates. In earlier modes of construction a ring was put within the hollow of the nave, and the end of the arm of the axle worked within this ring; an arrangement which was intended to prevent the carriages from being driven by the friction of the axle. In the present practice, however, the axles are fitted with iron boxes to the arms. To lessen the friction arising from the two surfaces working together, black-lead or other substances are employed, partly on account of the ingenious way in which this lubrication with oil is effected that Collinge's 'patent axle' is so much employed. Besides the mechanism for connecting the axle with the wheel, there is contained a little cup for holding
oil; and as the wheel rolls along, this oil is pumped or drawn out of its receptacle, and made to lubricate the adjacent surface.

In a well-finished coach, the leathering and the painting are among the more important processes after the wood and iron are completed. The forms of these, however, are remarkable. In the common kinds of wood the wheels are ironed with paint laid on to a considerable thickness; but for the better kinds, leather is applied to the roof, and the upper part of the back, front, and sides, previous to the process of painting. A singular example has been shown of the pliability of leather; for one hide, without seam, knot, or joining, is made to cover the whole. 'The hide, which is of a large size and sound quality, is first thoroughly moistened through and through; it is then placed over the top of the coach, the edges hanging down on all sides. They are then rubbed or pressed down all over the roof, until it lies close and even in every part. He next proceeds to one of the sides, and in like manner rubs and scapes the leather till all irregularities disappear. The leather is in that soft and pliable state that it will yield to the movement of the tools, and enable the workman to fit it to every part of the coach with perfect closeness. A little consideration must show that a superfuous fold of leather is useless, since it be placed against a central point at the back or front, the currier succeeds in erasing or pressing out all irregularities, and in producing a surface sufficiently flat and smooth for the subsequent operations of the painter. The division between the upper and lower portions of a coach is usually made by the use of some kind or other, and the leather is trimmed or cut to this line of division.' Penny Magazine, No. 625.

A coach receiver a far thicker coating of paint than the vehicle itself, since it be placed against a central point at the back or front, the currier succeeds in erasing or pressing out all irregularities, and in producing a surface sufficiently flat and smooth for the subsequent operations of the painter. The division between the upper and lower portions of a coach is usually made by the use of some kind or other, and the leather is trimmed or cut to this line of division.' Penny Magazine, No. 625.

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In the west of Scotland the proportion of children and young persons to adults was smaller than in England; in the east of Scotland it was larger; and in Wales it was about the same. From the following table it appears that the employment of females in coal-mines had extended much more largely in Scotland than in England:

<table>
<thead>
<tr>
<th>County</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lanarkshire</td>
<td>121</td>
</tr>
<tr>
<td>Derbyshire</td>
<td>127</td>
</tr>
<tr>
<td>Yorks</td>
<td>125</td>
</tr>
<tr>
<td>Lanarkshire</td>
<td>127</td>
</tr>
<tr>
<td>South Durham</td>
<td>164</td>
</tr>
<tr>
<td>Northumberland</td>
<td>556</td>
</tr>
<tr>
<td>North Durham</td>
<td>506</td>
</tr>
</tbody>
</table>

The proportion of young persons to the whole number.

Coals brought into the Port of London.

<table>
<thead>
<tr>
<th>Country</th>
<th>1841</th>
<th>1842</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newcastle</td>
<td>750,585</td>
<td>866,281</td>
</tr>
<tr>
<td>Sunderland</td>
<td>408,454</td>
<td>594,851</td>
</tr>
<tr>
<td>Stockton</td>
<td>169,345</td>
<td>180,808</td>
</tr>
<tr>
<td>Total</td>
<td>1,382,445</td>
<td>1,411,975</td>
</tr>
</tbody>
</table>

being more than three-fourths of the entire quantity exported. Of this quantity there were exported to

<table>
<thead>
<tr>
<th>Country</th>
<th>1841</th>
<th>1842</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td>451,003</td>
<td>515,975</td>
</tr>
<tr>
<td>Germany</td>
<td>173,487</td>
<td>170,038</td>
</tr>
<tr>
<td>Holland</td>
<td>180,378</td>
<td>180,518</td>
</tr>
<tr>
<td>Denmark</td>
<td>151,146</td>
<td>145,285</td>
</tr>
</tbody>
</table>
| Coals shipped from one port of the United Kingdom to another.

<table>
<thead>
<tr>
<th>Country</th>
<th>1841</th>
<th>1842</th>
</tr>
</thead>
<tbody>
<tr>
<td>From Newcastle</td>
<td>2,257,977</td>
<td>2,327,480</td>
</tr>
<tr>
<td>Stockton</td>
<td>1,482,618</td>
<td>1,501,596</td>
</tr>
<tr>
<td>Sunderland</td>
<td>973,935</td>
<td>559,231</td>
</tr>
<tr>
<td>Newport</td>
<td>506,005</td>
<td>508,300</td>
</tr>
<tr>
<td>Swaithes</td>
<td>459,141</td>
<td>474,244</td>
</tr>
<tr>
<td>Whitehaven &amp; Maryport</td>
<td>451,370</td>
<td>442,638</td>
</tr>
<tr>
<td>Total</td>
<td>4,704,922</td>
<td>4,734,797</td>
</tr>
</tbody>
</table>

\[7,648,899 \times \frac{7}{3} = 7,649,469\]

In 1835 the coal duties were repealed. Mr. M'Culloch, in the supplement to his 'Dictionary of Commerce,' published next after this change, says, 'We are glad to learn that the duty thus saved by exported coal in English ships is repealed; and that the duty on the imports of coal from foreign ships is reduced to 4s. a ton. The increased exportation of coal this measure has occasioned cannot fail of being highly advantageous. Ships that might otherwise have been put out of employment have an opportunity of taking with them what may prove a profitable cargo, at the same time that the cost of conveying the mineral abroad operates as a premium in favour of our own manufacturers. The fact, too, that there is a demand for coal is a most happy circumstance, as it is likely that the demand will be sufficient to meet the present demand of the empire for more than 2000 years, shows the futility of imagining that the measure can be injurious by its hastening the exhaustion of the mines.' In 1842 however coal was again subjected to a duty, which on large coal exported in British ships was amounted to 3s. per ton, and on coal and cinders exported in foreign ships not entitled to the privileges conferred by treaties of reciprocity, the duty was 4s. per ton. This duty gave a check to the rapidly increasing foreign trade in coal, which had trebled in 1836, encouraged the opening of foreign coal-mines, and produced only a comparatively trifling addition to the revenue. In 1845 the duty was repealed. This change took place in March. Two months afterwards another alteration was made of great importance: the regulations which the coal-owners of the north of England had acted upon since about 1771, and by which they regulated the supply of the London market, were abolished. The opening of this market to the coal-fields of the midland counties, by the extension of railways, probably led to this change.

The question respecting the available store of coal in this island has been lately much canvassed. Mr. T. Sopwith, in an Essay recently published (The National Importance of Preserving Mining Records), remarks, 'The opinion that our stores of coal are all but inexhaustable rests wholly on assumed data, and not upon an accurate and detailed statistical accounts, such as alone could warrant a confident opinion. The question therefore becomes a subject of serious concern, unless some measures are taken to found our calculations on a solid basis. It is an easy matter to assume that a considerable thickness of available coal extends over hundreds of square miles; but the different opinions formed by men of the highest respectability, and of the most strong principle, show how meagre and unsatisfactory are the only data on which their estimates are founded. It is not however the mere quantity of coal that is to be considered. Especial regard must be had to its quality, depth, thickness, extent, and position. Many of the inferior seams can only be
worked in conjunction with those which, by their superior quality, repay the expense of working them at depths varying from three hundred to six hundred yards; and it may readily be seen that such coal could not be profitably raised from pits equal in depth to three or four times the height of St. Paul's Cathedral, unless the price of such inferior coal was raised to more than the present price of the larger species. It is not unlikely that the period at which they can be profitably worked, that merits earnest and immediate attention. These remarks from a man who is well acquainted with the subject are worth more than the vague assertions made by some geologists and writers on statistics. In this as in other branches of industry we must not only consider the possible amount of supply, but also the price at which the thing can be brought to market.

Coal is one of the items included in the new Customs Tariff of the United States (1846).

**COBLEACEAE.** A small natural order of plants, separated by D. Don from Polygonaceae. It has a leafy 5-leaflet equal calyx; an inferior large-flowered regular 5-lobed corolla, imbricate in activation; five unequal stamens rising from the base of the corolla, with 3-lobed compressed anthers; superior 3-celled ovary, surrounded by a fleshy annular hypogynous disk; the ovules several, ascending; simple style; trifid stigma; the fruit capsular, 3-valved, with a single seed; the placenta 3-cornered along the axis, its angles touching the line of delineance of the pericarpium; the seeds flat, winged, imbricated in a double row, their integument mucilaginous, fleshy albumen, and a straight embryo; the cotyledons foliaceous; the radicle inferior. They have alternate or opposite, leafy, scale-like leaves, and climbing habit. Distinctions, I fear, of too little moment to be admitted as of ordinal value.

There are two species of Cobsea, **C. scandrae** and **C. latens**, with a short tube of a dark dirty purple colour; the latter has yellowish flowers, about half the size of those of **C. scandrae**. The **C. scandrae** is a great favourite in our gardens, and is a rapid-growing and abundant-flowering climber. It will grow in the open air, in summer, and must be trained, as most other species, against a house, when it flowers profusely. It is adapted for conservatories and greenhouses. It may be propagated by seeds or cuttings.

**Cobsea.** (Don, Gardener's Dictionary; Lindley, Natural Systems; Coblitz Pyrites. (Convolvulaceae).)

**COCCOLOBUS.** A genus of plants belonging to the natural order Polygonaceae. It has a parted calyx, eventually becoming succulent; the filaments 6, inserted into the base of the calyx, and forming a short ring by their union; the styles 3; stigma simple; the nut 4-seeded, bony, covered with the succulent enlarged calyx; the embryo in the middle of the seed.

**C. uniflora.** Sea-side Grape, has cordate, roundish, shining leaves. It is a tree twenty feet in height, with flexuous branches. The leaves are very beautiful, being of a full bright glossy green colour, with the principal nerves of a dark blue-black. The flowers are small and white, but when it becomes a tree is surrounded by the succulent perianth, which forms an obvolute reddish purple berry, not unlike a small pear. The nut in the inside is roundish, very acute, 3-lobed at the base, and attached by the centre. The embryo has foliaceous cotyledons. The leaves, wood, and bark of this plant are powerful, and a decoction of them is evaporated to form the substance called Jamaica kino. The starchy gum is present in the presence of tannin, but there is in addition present in the coconut that interest called coconut oil. The coconut is a dye for cloth. The wood is also valued for cabinet-work. The fruit is edible, and is exposed for sale in the West Indian markets, but is not valued much. It is a native of the sea-coasts of most of the West Indies, and is the adjoining shores of America. There are several other species of Coccolobus natives of the West Indies. They are all of them evergreen trees. They grow freely in a light loamy soil, and ripened cuttings taken off at the joint and placed under a bell-glass in a pot of sand will root freely. They require a stove.

**Cocconeis.** (Flow, Fossil, P. C. S.)

**Coccosteus.** A genus of fossil fishes, with a tuberculated scale covering, from the old red-sandstones of Gneiss. Common in the formation of Devonian age. (Aguas)

**Cochin,** a town in Hindustan, on the western shore of the peninsula, in 9° 51' N. lat. and 76° 18' E. long., is the place where the first European settlement was formed in the East Indies. In 1605 the Portuguese fleet, under the command of Custa de Sequeira, went to the assistance of the sovereign of Cochinn to erect a fortress there in remembrance for the assistance they had given him in his wars with the Zamarin of Calicut. The country in the neighborhood is extremely fertile, the soil not only very advantageous but also one of the many great advantages which the place possesses.

There is hardly any place in Hindustan except Calcutta better situated for trade than Cochint. It is the best port in the presidency of Madras, and the only port for ship-building, and therefore the gathering place for all the shipping that either enters or leaves the great Western coast. In the beginning of the war between Holland and England, in 1756, it was taken possession of by the British, to which it was finally ceded in 1814. Since this place has been in the hands of the British, it has been greatly extended. In spite of the many great advantages which the place possesses.

The trade continued to flourish under the Dutch government, so that in the time of Stavoren, more than seventy years ago, it was for them what Bombay is for the English, the emporium of the Western coast. In the beginning of the war between Holland and England, in 1756, it was taken possession of by the British, to which it was finally ceded in 1814. Since this place has been in the hands of the British, it has been greatly extended. In spite of the many great advantages which the place possesses.

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ant kernels cut into slices and dried for exportation), ivory, gold-dust, iron, and drugs. Indigo grows spontaneously, and the cane, coffee, clove, nutmegs, pimento, and raw silk succeed very well. The hills are covered with forests. Timber of all kinds, some species valued by the natives for maritime purposes even as teak, and considered hardly inferior by Europeans, is to be had in unlimited abundance and at the lowest price. Much timber is sent to Bombay, but hardly any vessels are built at Cochin for European merchants. The immense wealth of Myndus holds the coast for harbour for ship-building, and most of his vessels have been built there. There are also a few country vessels annually built. The trade of this place, though it has much declined, is still considerable. Many, half-embazoned, sumptuous conveyances are carried on between it and Bombay in country vessels, especially in timber. The trade with Arabia and the countries surrounding the Persian Gulf is more important. As these countries have no forests, they receive from Cochin all the timber required for repairing their different craft. Rice, coco-cuts, copra, and spices are exported to them to a great extent. There is also some comerce carried on with Singapore, to which place pepper and other spices, with fish-maws, are exported for the Chinese market. In the vicinity of Cochin a number of Catholic and Indian Christians are found, and also many Jews.

(Carvounis, Voyages to the East Indies; Buchanan, Journey through Mysore, Canara, and Malabar; and Brown, On the Bays and Harbours of India as a Place of Trade, in London Geog. Journal, vol. iii.)

COCHIN. CHARLES NICOLAS, called Cochin fils, a celebrated French designer and etcher, was the son of C. N., the elder, who died in Venice in 1786. His father, likewise an able engraver, was his instructor, and Cochin early displayed a peculiar aptness for art, and general quickness of ability. In 1749 he made a tour through Italy with the Marquis de Marigny, and in 1756 published a critical account of the various works of Italian art, as a species of artist's companion's in a journey through Italy — Voyage Pittoresque d' Italie, in 3 vols. 8vo. The work became popular among his own countrymen: Cochin published the second edition in 1768. In 1770 he published a collection of his Voyages Pittoresques. Cochin published an account of the antiquities of Hereculaneum, Observations sur les Antiquités d'Herculanum, &c. by M. Cochin et Belliard, which went through two editions: the second contains many etchings of ancient works of art and other objects of antiquity.

Cochin was knight of the order of St. Michel; keeper of the Royal Collection of Drawings; and secretary to the Royal Academy of Painting and Sculpture.

He was the most productive of the French engravers; his prints amount to upwards of fifteen hundred, comprising almost every variety of subject, from original designs, and from the works of other masters, chiefly French and Flemish. Cochin's etchings appeared among the first of the sea-ports of Vernet. A Catalogue Détailé of his works was published by Jombert in 1770, and copied by Heinck in his Dictionary, with the addition of some works published after 1712. The sixteenth century male from the drawings of Attiret and others, sent from China, though not engraved by Cochin, were executed under his direction.

(Affeet, P. C. S.)

Cochin was the author of some other literary works besides those already mentioned. He died in 1757, Reflections sur la Critique des Ouvrages Exposés au Louvre; and a Résumé des quelques pierre concernant les Arts, avec une Dissertação sur l'effet de la Lumière et des Ombres relativement à la dissipation, &c., published in Paris in 1765, Lettres sur les Vies de Stodtz et de Deshayes, and Projet d'une Salle de Spectacle.

(Hencksen, Dictionnaire des Artistes, &c.; Huber, Manuel des artistes, &c.; Biographie Universelle.)

COCHIN, garry is the capital of the state, and the leaves of the species being boiled out like the bowl of a spoon), a genus of plants belonging to the natural order Cruciferae, the suborder Pleurocharium, the tribe Alyssonem. It has sessile oval or globular tubers, with vonrose leaves with convex valves, with a prominent dorsal nerve; many seeds not margined; the calyx equal at the base, spreading; the petals entire; the stamens toothless. The species are annual or perennial herbs, usually smooth and flitk, but sometimes pubescent. The flowers are mostly white.

One of the most common species of this genus, as formerly defined, is the common Horse-radish (Cochlearia Armoracia). This species however is now referred by some botanists to a new genus, Armoracia, and is described by Badington, in his 'Manual of British Botany,' as A. rusticolor. The genus Armoracia differs from Cochlearia in the racemes being destitute of a prominent dorsal nerve. The Horse-radish, though described in books on British Botany, can scarcely be considered a native of Great Britain, as the wild specimens are evidently escapes from gardens. For the me- lan"
The alternative bed, which is not planted, a dwarf annual crop may be grown, such as mustard or radishes."

(Don, Gardner's Dictionary; Babington, Manual of British Botany; Loudon, Encyclopædia of Plants.)

COCHELARIA ARMORICA, Medical Properties of—The herbaceous perennial herb, growing in Alpine meadows, and along the banks of rivers as well as on the sea-coast in the south and south-eastern parts of Europe. The root is the official part, and is always obtained from cultivated plants, as it is enjoined to be used in a fresh state.

It is finely tapering, that is, to two feet long, and when bruised or scraped into shreds, emits a highly acrid penetrating odour, which causes a secretion of tears when received by the eyes; put in contact with the skin, it specifically causes rubefaction. The taste is more or less acrid, according to the season of the year, or age of the plant: young plants possess much mucoilaginous starchy and saccharine matter, by which the pungency is lessened.

The analysis by Goutet shows its composition to be acid and volatile oil, bitter resin, extractive, sugar, gum, starch, woody fibre, vegetable albumen, acetic acid, with acetate and sulphate of lime. A little sulphur is stated to exist in it. The volatile oil is the active principle. This is of a pale yellow colour, heavier than water, and so volatile that a single drop of it can fill a large room with a pungent odour of horse-radish. In this respect it resembles the volatile oil of mustard. The taste is at first sweetish, afterwards burning and acrid. It has a sensible effect on the brain. When applied to the skin, it causes violent inflammation and rubefaction. [

SINAP, P. C.] It is sparingly soluble in water; freely in alcohol. The outward application of horse-radish causes vescication; the internal application causes sensitive warmth of the stomach, with augmented power of digestion.

A warm infusion exerts vomiting, in the same way, as mustard does. This kind of emetic is useful to rouse the stomach from the insensibility consequent on narcotic poisons being taken, but it must not be forgotten that violent or even fatal inflammation of the stomach may ensue if vomiting does not occur, and the stomach-pump is a more certain means of emptying that viscus.

Horse-radish is well known as a condiment taken with beef, fish, and other kinds of food difficult of digestion. Its powers are heightened by associating it with vinegar, as in the horse-radish sauce.

The official preparations are the Infusum Armoricae and the Comp. This, when made with boiling water as ordered in the Pharmacopoeia, soon spoils, notwithstanding that some compound spirit of horse-radish is added to it. It would be much more advantageous to make it with cold water, especially as its power depends upon a principle of such remarkable volatility.

The compound spirit is employed as an adjunct to diuretics and anthelmintics. Horse-radish powder or shreds and digested in red wine forms a vinum armoracium, which is eminently useful in warding off a relapse of intermitent fever, when the employment of it is persevered in for some time.

(Dierbach, Die Neuesten Entdeckungen in der Materia Medica, i, p. 81.)

COCHLIOIDUS, a genus of Placoid fishes, from the carboniferous limestones of Arran and Bristol. (Agassiz.)

COCHLOSPERMUM. [Wettsteinbachia, P. C.]

COCK, or STOP-COCK, a kind of valve contrived for the purpose of permitting or arresting at pleasure the flow of a liquid through a pipe. The contrivances adopted for this purpose must, however, be those commonly used to expel the air from a short tube of brass, intersected by a nearly cylindrical plug, capable of being turned on its axis at pleasure, and so perforated or cut that, while in one position it completely prevents the passage of fluid through the pipe, it may be so turned as to permit the fluid to pass through it; and consequently to flow through the pipe as though there was no plug to intercept its progress. In addition to the differences in the construction of the plug or valve itself, many variations in the form and arrangement of cock, to meet the various circumstances under which they are applied. Those which, under the name of taps, are employed for drawing off the contents of barrels, simply need to be opened into the line provided for them, which, before the barrels are topped, is filled with water to prevent escape of their contents. This kind of cock, which has been selected for illustration in the following figures, usually terminates in a curved nose, or spout, from which the liquor may be conveniently received in a jug or other open vessel; but

where it is desired to transfer the liquor from the cask immediately to bottles, the nose is prolonged into a long slender tube, which will enter the neck of a bottle, and obviate the necessity for a funnel. Longitudinal furrows should be cut on the outside of the tubular nose, to allow the escape of air from the bottle as the fluid enters. Other cocks of similar construction are adapted for inserting in the mouths of boilers, and fitted with a flange to bear against the outer face of the cistern, and a nut, wound on to the portion of the tube of the cock which passes into the cistern, by which they may be screwed up firmly. Others again are adapted for siphoning to the end of a leaden pipe, such as the service-pipe for laying water on to a house. Some stop-cocks, again, have no nose or spout, but are made alike at each end, for the purpose of being soldered between two lengths of leaden pipe.

Fig. 1. A common kind of cock or tap, constructed for insertion in a barrel, as represented by the dotted lines at d; a is the end driven into the barrel, and perforated with a number of small holes, through which the surrounding liquor passes into the interior of the cock, but which, by their minute size, prevent the entrance of foreign bodies which may be floating in it; b is the nose or spout, through which, when the cock is opened, the liquor runs out into the vessel placed to receive it; c is a nearly cylindrical plug, rather smaller at the lower than at the upper end, accurately turned, and ground into the opening formed through the cock to receive it; and having a vertical slit or passage formed transversely through its axis, which, may, according to the position of the plug, either coincide with or be made to lie across and be totally disconnected from the tubular passage through the cock. This point is more fully explained by Figs. 2 and 3, which represent horizontal sections of the plug and its socket or barrel, Fig. 2 showing the plug in the position represented in Fig. 1, in which position it completely intercepts or closes the passage through the cock, and Fig. 3 showing the plug as turned a quarter round, a as to cause its passage to coincide with that of the tube of the cock. The upper end of the plug is prolonged into a T-shaped head or handle, by which it may be conveniently turned; and it is usual to add a stop-pin, indicated by dotted lines in the upper part of the plug in Fig. 1, which, by limiting the inner end of the plug, lessens the risk of leaving it improperly turned off. The plug, which is inserted from above, is secured in its proper position by slightly riveting its lower extremity, so that, while it may be turned round freely upon its axis, it cannot be driven further in; and to provide for this contingency the slit or passage through the plug is usually made, as represented in Fig. 1, somewhat longer or deeper than would be necessary merely to coincide with the tube or bore of the cock. The escape of cock on the side of the cock would prevent it from being injured by the force required to drive it into the barrel.

One of the first improvements on this contrivance which claims notice is that of securing the plug in its place by a screw in its lower end, instead of riveting; by which arrangement the plug may be readily withdrawn for the purpose of cleaning the cock. Of the many improved cocks in which the common form of the plug is departed from, that represented in Fig. 4 is highly ingenious. In this the last
mental tube or bore of the cock opens into a vertical cylindrical chamber or barrel which is lined with a hollow cylinder of cork, and within the cylinder of cork is another hollow cylinder of metal, which constitutes the moveable plug of the cock.

Through one side of this hollow plug a circular hole is formed in such a way that in one position of the plug it will coincide with the horizontal passage of the cock, which is continued through the cork lining of the vertical chamber, and thereby allow the liquor to escape by the vertical nose or spout, while by turning the plug half round the solid side of the plug is exposed to the air at pleasure, and the liquor may be kept from escaping by the cork plug. The cork is represented in the cut by a dark tint, and in this, as in the case of the common cock, separate cuts are given to show the transverse section of the plug, Fig. 5 showing the portion of the plug which has been cut away to disclose the interior, and Fig. 6 representing it as turned round to open the passage. For the sake of variety this cock is represented without the usual T-shaped handle, the top of the plug being so formed as to be turned by a moveable key, which is inserted in a hole, Fig. 7, the groove in the cork serving to direct the plug to the top of the vertical chamber of the cock. To guard against the possibility of opening the cock without the key, by unscrewing this cap, it is secured by the insertion of a little screw at c, which, from its position, cannot be removed while the cock is fixed in a barrel, although it may be easily taken out when it is desired to open the cock for the purpose of cleaning the interior. If kept from grit, which would cause the cork to wear away, a cock of this description will work for a very long time without damage; the weight of the cork causing it to swell so as to keep every part water-tight, without impeding the smooth and easy action of the cock. Another kind of cock, in which the elasticity and impermeability of cork is usefully applied, has no cork lining to the cylinder, but has what may be termed a skeleton plug of metal, one side of which is filled with a semi-cylindrical piece of cork, while the other is left open to allow the liquor to flow through it.

Such cocks have the principle of the revolving plug altogether departed from. The simplest of these is a kind of cock described by Hebert (Engineer's and Mechanic's Encyclopedia, vol. I., p. 391), consisting simply of a curved tube of which the end is constricted, and the cylinder of metal, covered with a leather washer, which may either be drawn into close contact with the end of the pipe, or pushed back from it to allow the liquor to enter, by means of a slender rod which passes longitudinally through the horizontal part of the cock, and through a hole just above the nose, which hole, as well as the part of the rod passing through it, is warded. A transverse handle being fixed on the projecting end of the rod affords the means of screwing it in or out, so as either to open or close the cock. This cock is superior though more complicated cock on this principle has the disadvantage represented in Fig. 4; and, instead of working the valve by means of an internal rod, the screw of which must be exposed to the action of the liquor, has two screwed rods, outside the passage for the liquor, which are moved simultaneously by the application of a key of the ordinary kind. In this and other cocks of similar character, leather has been found to be too liable to its liability to become hard and horny when frequently wetted, and, though we are not aware of its adoption by any manufacturer of cocks, caoutchouc has, we believe, been applied successfully as a substitutive for it. Another kind of cock, of which there are several varieties, is one in which the cork plug is capable of being either pressed into its seat, which must be ground with great accuracy, or removed from it to allow the liquor to escape, by means of a screw. In all cocks in which pressure is communicated to a valve, of whatever form, by means of screws, particular caution is required when, as in the case of large cocks, a lever handle or key, fixed on to a squared axis, is employed; as the purchase afforded by such a handle is apt to lead to the application of too great force, by which the valves are injured. Another ingenious but hitherto not very successful class of cocks consist essentially of two cocks, the one of which is fixed and the other moveable; which may be made to tally with one another when it is desired to allow the liquor to flow through the cock, but which, by a small change in their relative positions, form a perfect barrier to the fluid, by the solid portions of one being brought to cover the openings in the other, on the plan of a well-known ventilating apparatus employed to admit or exclude a current of air from a flute.

In drawing off liquors from a close barrel it is necessary not only to open the cock by which the liquor is expected to escape, but also to admit air to occupy the place of the liquor abstracted. This is commonly effected by means of a conical plug of wood called a vent-peg, which is inserted in a small hole in the upper part of the barrel, so as to prevent the access of air when it is not required, but which may be taken out while liquor is being drawn off. A very convenient substitute for the common vent-peg, intended especially for small beer-barrels, is manufactured in brass. It consists of a small tube, which is screwed into the peg-hole, closed by a valve which is kept in its place by a spring, but capable of being opened by pressing the finger on a small lever while the cock is open. Cocks which, for the purpose, are made with the means of opening the cock, the top of the barrel, above the surface of the liquor; the pipe being in the one case outside the barrel, while in the other it is carried up inside the barrel or vessel. The latter is used in vessels for large fixed vessels in breweries and distilleries, because the air-pipe being enclosed, is shielded from injury. Taps are manufactured for small beer-barrels, under the name of siphon-cocks, in which this object is effected without the aid of an air-pipe, the cock being added to the barrel itself, by which, whenever the cock is opened, a small current of air is caused to enter an aperture near the nose of the cock, and to pass along a little tube fixed longitudinally in its bore, from the inner end of which it bubbles out through the liquor.

The common mode of securing liquor-taps from improper opening by the use of a moveable key in lieu of the fixed T-shaped handle, is very imperfect, owing to the facility with which a key of the kind usually employed is imitated, and the comparative ease with which the plug is turned without a key, especially in the case of a cock resembling Fig. 1, in which the plug may be turned round by the application of a strong force to its lower end. Owing also to the large sizes of these cocks, the plugs and keys are made too large to be convenient for carrying in the pocket. In some cases an apparatus is put on to the cock after use, and secured by a padlock, which completely prevents the opening of the cock, but it is both cumbersome and expensive, and very inconvenient in use, as it must be removed every time the cock is opened. Mr. W. Russell, in a communication to the Society of Arts, published in the thirty-seventh volume of their 'Transactions,' pp. 94-100, describes a very superior contrivance of his own invention, in which a pin is depressed by a spring into a cavity in the plug, so as to prevent its turning, and drawn back, when it is necessary to open the cock, by means of a small tubular pipe, which the interior of which is cut with a few repairs to the end and curved to the position of the stoppin, which is of course inclosed in such a manner as to be inaccessible except by means of the key. The same paper contains a description, fully illustrated by engraving, of another apparatus at the same principle. The cock is provided with an additional box of guards resembling those which constitute the peculiarity of Bramah's lock. [Lock, P. C. S.] One of the advantages of Mr. Russell's contrivance is their applicability to cocks of a single valve only, and that of the key to secure even the largest cock, such locking key not being employed to open the cock itself.

Some of the superior kinds of cocks are manufactured in fine brass, and others, intended for use with vinegar or other corrosive liquors, of a white alloy less liable to be injured by corrosion.
acids; but the greater part are formed of a peculiar alloy known by the name of top-metal, which is defined by Holland (Manufactures in Metal, in Lardner's Cabinet Cyclopedia, vol. iii. p. 169) as inferior brass, or rather "copper, so saturated with lead, that on exposure to but an insignificant degree of heat the latter is driven off, and leaves the cores or pores of the mass." 'Crude lead,' observes this authority, 'does not amalgamate with copper in the composition of cock-metal; it is therefore arsenated, or "killed," as the workmen term it, as in the method of preparing it for shot. Cocks are cast in moulds, with a core, the plug of the plug formed separately, and the vertical perforation in which the plug works (to which the name of the barrel is in some cases confined) is afterwards turned smooth by means of a quadrangular file. To make the steel smooth, it is necessary to prevent its cutting angles from removing the metal too rapidly and in an irregular manner, slips of wood are applied to its flat sides, so as to fill the cylinder without interfering with the cutting, or rather, scraping angles. A very superior mode of cutting or boring the barrels of cocks, or any similar hollow conic by an ingenious addition to the common lathe, was communicated to the Society of Arts in 1810 by Mr. Charles Williams, and is described in the twenty-eighth volume of their proceedings,' pp. 196-198. The barrel having been thus bored, and the plug turned to fit it, the two are ground together with a little fine sand and oil. To remedy some of the defects of brass cocks, it has been attempted to manufacture them of cast-iron, and Holland refers to a patent obtained in 1806 by Mr. Cowwood, of Leeds, for a plan of making cocks of soft cast-iron, and afterwards fitting them with bushes and other parts of brass or bell-metal, attached by soldering. Cocks manufactured by this method, Holland observes, 'are not liable, as is often the case with those cast of the usual compound metal, either to become clagggy, or to expand and contract considerably with each change of temperature.' "They are moreover," he adds, 'readily renewed in the parts exposed to wear.' The best cocks for corrosive liquors are those known as Ridgway's porcelain cocks, which are made of the strongest porcelain or stoneware. Hebert gives a cut of one of these cocks, the construction of which, excepting in the absence of the cylinder of cork, closely resembles that of the cock represented above in Fig. 4. We see no reason why the cork cylinder should not be added whenever such cocks are used for liquors which would not act upon the cork; and probably the application would be found even more advantageous than with metal cocks, owing to the greater difficulty of rendering so hard a material as stoneware perfectly true and water-tight.

The four-way cock is an ingenious contrivance resembling in some respects the cocks above described, yet sufficiently distinct to be considered separately from the kind of cock to which this article chiefly relates. It consists of a plug perforated with two distinct passages, and mounted in a barrel into which four separate pipes or channels open; and its object is to connect the four passages with each other in alternation, by a continuous motion of the plug, or by an alternating motion through one-fourth part of a revolution. Figs. 7 and 8, in which a four-way cock is represented in section in two different positions, will illustrate this action. In these diagrams a, b, c, and d represent four pipes between which it is desired to establish a communication which shall afford the means of connecting at pleasure the pipes a and c, or b and d, by forcing the plug to disconnect these, and connect a and d, or b and c. This beautifully simple apparatus has been adopted by several of the inventors and improvers of the steam-engine, as a means of altering the steam steam to and allowing it to escape from each end of the engine. In the above figure, the pipe marked a may be supposed to be the steam-pipe communicating with the boiler, c the waste-pipe for the exit of steam after it has impelled the piston, and b and d the pipes communicating with the top and bottom of the cylinder, respectively. In the position of the cock represented in Fig. 7 the steam-pipe is placed in communication with the top of the cylinder, while the lower end of the cylinder communicates, through the waste-pipe, with the atmosphere, so that the piston will be impelled downwards; but in the position shown in Fig. 8 the pipe a and c are connected, and a motion of 90° brings it into the position of Fig. 8, in which the steam from the upper part of the cylinder may escape by returning through the pipe b, by which it entered, to the waste-pipe c, while fresh steam will be admitted underneath the piston by the communication of pipes b and d. The piston will consequently rise, and by so doing will set in motion the apparatus for returning the cock to its first position, ready for a repetition of the process. The great improvement of slide-valves, however, has reduced the use of four-way cocks as do when of large size, and admit of more ready adjustment to the admission and cutting-off of the steam, has led to the disuse of four-way cocks for this purpose, excepting, in a few cases, in very small engines.

COCOA. [Cacao, P. C.; Theobroma, P. C.]

CODEX. [Code, P. C.]

COELACANTHUS, a genus of fossil fishes, which occur in the coal formation and the magnesian limestone of the north of England.

COELLO, CLAUDIO, a celebrated Spanish painter, born at Madrid in the earlier half of the seventeenth century. His father Faustino Coello, who was a Portuguese bronze-worker, wished to bring up his son to his own business, and placed him in Lisbon with his master. Coello, however, very soon perceived the great abilities of young Coello, persuaded his father to allow him to become a painter. By the instruction of Rizi, and by copying a few of the pictures of Titian, Rubens, and Van Dyck in the palace at Madrid, Coello became a very able painter, and produced several excellent altarpieces while still with Rizi. He executed also several works in fresco in company with Jose Donoso, especially on the occasion of the marriage of the king Charles II. and Maria Luisa of Orleans. In 1800 he was appointed court painter to that king in the palace of Carreio, deceased with a salary of twenty ducats per month.

In consequence of the death of Rizi, Coello was ordered by the king to paint the great altarpiece for the church of the Escorial, in place of one which had been commenced by Rizi. The subject was the procession and ceremony of the Collection of the Host on the altar of the Sacristy, 'Colocaciones de la Santa Forma,' which took place in 1684. In the presence of Charles II. and his officers of state, the picture contains portraits of fifty and was completed by Coello in three years, to the utmost satisfaction of the king. It is Coello's masterpiece, and one of the finest productions of the school of Madrid. It combines the design of Rizi, the colour of Murillo, and the effect of Velasquez. Coello's special gift was in the highest terms of this picture; he calls it an admirabl composition, and says that it maintains its rank, though in company with the productions of Raphael, Titian, and Van Dyck. The first advantage of his composition upon this subject, he continues, 'ever to have seen such a striking effect of chiaroscuro and force of perspective. In the group of persons who form the grand procession of the Collection they are to be found the portraits of the king and all the principal nobility of his court, executed to the life itself; everything is traced with the most masterly and determined pencil. Such a majestic and orderly solemnity is observed in the arrangement of his figures, as bespeaks the art of the composer, suit the dignity of his subject; all the scheme is so arranged as to produce such perfect harmony, and the colouring of the parts so rich and glowing with such forcible and clear relief, that it forms the most ravishing spectacle that art can form.' In Cunningham's opinion, Coello's style very much resembles that of Paul Veronese. Coello died at Madrid in 1837. He had been living in that city since the year 1683. In consequence of the arrival of Duccio Giordano at Madrid by the invitation of the king to paint in fresco the great staterooms and other principal parts of the Escorial, Giordano arrived at Madrid in 1698. Coello, hearing that the king was having from the time of Giordano's arrival, with one exception, resolutely adhered to a determination to paint no more. The Martyrdom of St. Stephen, for the Dominican convent at Salamanca, was the only work that he finished, of all he had undertaken, and the arrival of Coello at Madrid was a great loss to Spain.
COELOMN, WILHELM VON, or William of Cologne, a
erated old German painter, of the latter part of the four-
th century, and a master at the Cathedral picture, which he 
availed himself of in his works. He was also a
impoed by the Church, and his style is marked by an
artistic expression.

COEOLEPTICHIUM, a genus of Sporangiaceae, proposed
by Goldfuss, for some foals of the chalk.

COGNOITI, VON, a Latin term, signifying the
existence of a legal fact, whereby the
defendant acknowledges or confesses the justice of the plaintiff's demand against him (cognoscit actionem). By this plea a trial is avoided and judgment is entered up for the plaintiff. But where the action is for damages, this judgment is not entered up as the amount of damages remains to be ascertained by a jury, under a writ of inquiry, which is executed by the sheriff, by the agency of his under-sheriff. When the jury have assessed the damages, the sheriff returns the inquisition, which is entered upon the roll in the form of a sejorn, and the judgment is then complete, the defendant's plea having already confessed the cause of action, and the damages having been assessed by a jury. If the action be for the recovery of a specific amount, as in an action of debt, the judgment entered up upon a plea of cognitio is useless, as there is no need for the services of a defendant, as it confesses the entire declaration. On this ac-
count it is a common practice for a debtor to strengthen the security of his creditor by executing a warrant of attorney to the attorney named by the creditor, authorising him to confess a judgment by a plea of cognitio of the debt to be brought by the creditor against the debtor for the specific sum due to him. But in order to prevent fraud, it is provided by 1 § 5 Vict. c. 110, § 9, 10, that such warrant of attorney or cognitio is of no effect, unless it is presented by one of the superior courts, on behalf of the party who gives it, expressly named by him, and attending at his request, to in-
form him of the effect of the instrument before he executes it, and to, in court, to the execution judge, publicly declare himself to be the attorney for the plaintiff. In order to make this process effectual as against the assignees of the debtor, if he should become bankrupt or insolvent, warrants of attorney and cognitio must be filed in the Court of Queen's Bench within twenty-one days after execution, or judgment must be signed or execution issued thereon within the same period.

(§ Geo. IV. c. 39; § Geo. IV. c. 16, § 108; 1 & 2 Vict. c. 110, § 50, 61; 6 & 7 Vict. c. 66. Harrison, Disputes of Re
cognised Cases, title Ball, "Warrant of Attorney; Stephen, Comm. vol. iii. p. 684.)

COHESSION, MAGNETIC, is that power by which two
magnetical bodies adhere together, as iron to a piece of load-
stone.

The nature and laws of this power have been stated under Magnet and Magnetism (P. C.), and it is intended here to notice merely the means employed to increase its intensity.

Loadstone is frequently combined with substances which have small or no attractive powers; and the bodies, or pieces of contrary nature with respect to attractions and repulsions, being irregularly distributed, counteract in part one another's effects: thus a mass of loadstone often exhibits a comparatively small effect. The power of a loadstone to attract iron is broken in pieces, some of the portions, containing a con-
siderable quantity of the attractive material favourably disposed, exercise a greater power than was exhibited by the entire mass. It is found that a piece of loadstone will seldom suspend more than 6 or 10 times its own weight, though some small specimens have been obtained which are said to have suspended more than 200 times their weight.

If a piece of iron be placed in contact with either pole of a magnetized bar, the force of its coherence is that which is due to the direct action of that pole only on the contrary magnetism of the iron: the intensity is at least doubled when the substance to be suspended can be placed at once in contact with both poles; and this is frequently effected by giving to the magnetized bar a length or section such that the opposite poles may be near one another: but the most effectual method of increasing the power of a magnetic body is that of armig.

Preparatory to arming a piece of loadstone the situation of its axis, that is, of a line joining its poles, must be determined by trial: the loadstone is then reduced to the form of a cube or parallelepiped nearly, having two opposite faces perpen-
dicular to the axis; and these faces are ground very smooth. Two plates of soft iron equal in length and breadth are placed side by side, and the opposite sides are applied to the latter so as quite to cover them, and are connected together by a bar of soft iron which is attached to them at the upper end of each (supposing the two plates to lie in a vertical position). The edges of this bar are fastened to a book or ring by which the whole apparatus may be suspended.

The inferior extremity of each plate is formed with a foot

(Forf.fo, Geschichte der zeichnenden Künste in Deutsch-
land, &c.; Passant, Allbk.che Mauerschule, in his "Kunst-
eut durch England und Belgien"; Dillim, Verzeichniss der
Gemälde in der Künstlichen Pinakothek zu München.)
upon both; and horizontal bands of copper or silver usually surround the loadstone and side pieces in order to keep the whole together under the feet of the animal, iron, touching both; and this is provided with a ring or hook from which is to be suspended the weight to be held by the attractive force of the loadstone. Artificial magnets have been armed in a similar manner.

The poles that are situated in the poles of a natural or artificial magnet seem to be diffused over the two surfaces in which those poles are situated; and the plates of iron which cover those surfaces; serving to condense the powers, cause them to set up a mutual attraction at the extremities of the apparatus, by which means the power is greatly increased. The feet of the side plates should not however be made to approach each other too nearly; since in such position they would diminish each other's attractive powers.

If a magnet when strongly exerted a force more than one hundred times as great as that of the magnet in its natural state; and it has been ascertained that, as much weight has been applied as the armed magnet will suspend, if at certain intervals of time other weights be added, the magnet will suspend two or three times as much as before.

Daniel Bernoulli discovered by experiment that the attractive forces of magnets vary in proportion to their superficies and not to their masses; a circumstance in accordance with Newton's experiments, which is discovery respecting the magnetic attractions of iron spheres.

**COIRE.** The manufacture of cordage, mats, matting, coarse canvas, and sailcloth, from the fibres of vegetables, has been known to the inhabitants of nearly all countries with which we are acquainted. Coire, or cocoa-nut fibre, is one of the materials so employed.

So far however from the source from which the material is obtained being alike in all plants, it differs considerably In flax and hemp, the fibrous material is furnished by the stem, deprived of its ligneous centre or core. In the Spanish broom the fibres are furnished by the young plant branches of a shrub; and these fibres are occasionally wrought both into cloth and into cordage. In the stalk of the hop plant, and of the common nettle, are made to yield fibres applicable to a similar purpose; and so likewise may be those of the bean-plant and of the mallow. In other cases it is rather the bark of a tree than the stem of a young plant, that yields the fibres. Such is the case with the paper-mulberry tree, the bark of which is so prepared by the natives of Tahiti as to yield fibres fitted for a kind of cloth. Such is likewise the case with the linden-tree, the bark of which, prepared in a suitable way, is used for the manufacture of mats, baskets, bags, and also of cordage; it was estimated three or four years ago that fourteen million mats are made annually in Russia from this material, that for this purpose the bark of a million trees is required; and that the traffic equal to half a million sterling is in the produce of this single article. Other examples of fibres furnished by the maho-tree (Hibiscus tiliaceus) and the Theobroma angustia, two East Indian plants, the stalks of which are steeped and disentangled from the fibres of the inner bark. Another class of materials for similar purposes are furnished by the leaves of certain plants. The Phormium tenax, or New Zealand flax, has leaves which produce such fibres. The enormous leaves of the Agyne, or American aloe, yield fibres capable of answering a similar purpose; and so likewise do several species of the Coffea family.

But Coire differs from all these in its origin. It is the fibre of the husk of the cocoa-nut; bearing some such relation to it as the downy fibres of cotton do to the seeds of the cotton-plant. The inhabitants of Ceylon make great use of it for the manufacture of mats, baskets, cords, and also of cordage. Sir Archibald Marshall, a Scotch gentleman, who resided many years in Ceylon, published a few years ago a 'Contribution to a natural economical history of the cocoa-nut tree,' from which we gain information as to the mode in which the fibre is prepared. The nut is gathered before being completely ripe; and in order to remove the husk, an iron spike or sharp piece of hard wood is fixed in the ground, and the nut is forced upon the point in such a manner as to separate the rind from the shell; one man can clear about a thousand nuts in a day, and is paid for the work by the modern market. The nut is soaked in water for several months, then beaten upon a stone with a piece of heavy wood, and afterwards rubbed with the hand until the intermediate substance is completely separated from the fibrous portion. The nut supplies about six pounds weight of the fibre. This fibre constitutes the coire, which is then ready for use in the same way as hemp or other fibrous materials.

In the early part of the present century, Dr. Roxburgh communicated to the Society of Arts an account of a series of experiments which he had made on the magnetic and attractive strength of coire and other kinds of fibre; from which it appears that this material possesses great tenacity. Indeed Dr. Roxburgh remarks, that 'coire is certainly the very best material yet known for cables, on account of its great elasticity and not much weight.' The material is generally found at sea; and well suited for making ropes of large diameter. Mr. Marshall states, that until chain-cables were introduced, all the ships which navigated the Indian seas had cables made of this substance; but he observes, 'that it has now been replace'd in the commerce of the sea, in the use of these ropes,1 which have been improved in sea-water; but that the smoothness and elasticity of the coire-cordage, though very advantageous to running-rigging and the light lines of a ship, render it less fitted for standing-rigging.

There has been a branch of manufacture introduced with the last few years in England, in which coire is employed rather differently than in the above-described instances. This is for the production of rugs, druggists, mats, matting, mattresses, and similar coarse goods. During or about two or three centuries ago the production of coal from a material; for he says, in his 'Voyage Round the World,' 1 have been told by Captain Knox, who wrote the 'Relation of Ceylon,' that in some places of India they make a sort of charcoal out of coire, which is put in the coire. The husk of the coire is disposed of. We have seen coire, Myself have seen coarse sailcloth made of such a kind of substance.' Besides the actual weaving or plaiting of this material into textile fabrics of a coarse kind, it is used as a stuffing for mattresses, cushions, and paper-mulberry is also used for the use of the fibres to caulk the seams of ships; and Mr. Marshall speaks of the employment of them in India in stuffing mattresses, cushions for couches, and saddles, as a substitute for horse-hair. The availability of the material for such a purpose seems to depend very much upon the climate; for it is very indigestible; that it does not harbour vermin, is a horse-hair would in a warm climate; and that it is free from offensive smell.

COKAIN, or COKAYN, SIR ASTRON, was born in 1608, at the country-seat of his father, a Derbyshire esquire of old lineage and considerable property. After having been educated at both universities, he entered for form's sake in the inns of court, and travelled on the Continent. He was a Roman Catholic and royalist; and both of these characters exposed him to much suffering in the civil war. In the latter part of his life he was obliged to part with his estates, reserving a small annuity for his support. He died at Derby, in 1684. He published four plays, which, with other poems, are extant. In 1662, in two volumes, small octavo, he wrote very rare. The plays and the poems are equally worthless, but Sir Astron's name deserves some notice for his close intimacy with the dramatic poets of his time, and for the information which he has furnished, in his works, of the original and other papers the same in style, and the manner of composition. In the same spirit, and the manner of composition. In the same spirit, the introduction of railways has occasioned a very large demand for coke for this purpose, though its use in the manufacture of iron is greatly diminished by the adoption of the blast-blow for fames, the use of which uncoked coal may be used in lieu of coke.

The simplest mode of cooking coal, which is still occasionally followed, is to lay the coal in large flat-bottomed retorts, covering the top of the retort with sand, and then covering it with ashes and earth to confine the heat, so that the mass of coal may be slowly burnt in a smothered manner; men being employed during the process, to renew the coverings whenever the covering becomes too loose. In the manufacture of forges and crucibles, particularly of those in iron, in Ure, in describing various modes of making coke in Germany (Dictionary of Arts, &c., art. * Flintcoke, Coke of*), represents both circular and oblong cooking vessels or moulds of
the character, the former being piled round a central chimney built of loose bricks, towards which small horizontal flues are laid through the church; but the papers of his father, who was a member of the directors of the East India Company, naturally led to the selection of another career for him, and in 1782 he was appointed to a writership in India. For the first three years he went out to Calcutta and was attached to the Board of Accounts; he was then transferred to the same department at Tirhut. During his residence at this station he acquired a fondness for field sports, which he retained while he lived. In 1789 he was removed to Furness; and then his father appointed a member, who was a descendant of a family that had been of the government service for many years. The Company, which, besides a mass of new and valuable information, announced some propositions much beyond the current ideas of the time; among others, that of a free trade between India and England. Colebrooke's portion of this treatise was reprinted and published at London, in 1806, under the title of 'Remarks on the Husbandry and Internal Commerce of Bengal'; and an account of it may be read in the Edinburgh Review, No. 19 of 1798, (pp. 314 and No. 40, p. 477.) Some time before this Mr. Colebrooke had begun to study the Sanscrit; and, having now undertaken the translation of the collection or digest of Hindu law formed under the superintendence of Sir William Prinsep, he proceeded, before his return to England, to the very interesting work of the Board of Revenue, and a member of the Supreme Board of Bengal. He was also for some years a Director of the Asiatic Society of Bengal; and many of the best valuable papers in their transactions (The Asiatic Researches) were contributed by him; particularly, 'On the Duties of a Faithful Hindu Widow,' in vol. iv.; 'Examination of Indian Classes,' in vol. v.; three 'Essays on the Religious Ceremonies of the Hindus,' and of the Brahman especially,' in vol. v. and vii.; 'On Sanscrit and Pracrit Languages,' and others, in vol. vii.; a highly curious discourse 'On the Vedas, or Sacred Writings of the Hindus,' in vol. vii.; 'Observations on the Sect of Jains,' On the Indian Poems of the Arabic Division of the Persian Poetry,' and 'Documents containing Sanscrit Inscriptions,' and others, in vol. ix.; a very elaborate dissertation 'On Sanscrit and Pracrit Poetry' (or rather prosody), in vol. x.; and 'On the Notion of the Hindu Astronomers concerning the Precession of the Equinoxes and Motions of the Planets,' in vol. xi. Transactions of the Royal Asiatic Society of Great Britain, after his return to his native country, he contributed a 'Discourse,' read at the institution of the Society (15th March, 1823), and other papers, in vol. i.; and five volumes 'On the Philosophy of the Hindus,' in vol. i. and ii.; and he was also an occasional writer in the Asiatic Journal. He likewise published at various times the following separate works:—A Collection of Compositions in Sanscrit, for the use of the Students; Five Books of the Compositions of the Confusion of the Hindu Ideas [BIDPAI, P. C. iv. 388], with Introductory Remarks, 4to., Calcutta, 1804; 'Grammar of the Sanscrit Language,' folio, Calcutta, 1805; 'A Grammar of the Sanscrit Language,' 4to., Calcutta, 1808; 'Explanations and Notes on the Sanscrit Language,' 4to., Calcutta, 1809; 'Explanations and Notes on the Sanscrit Language,' 4to., Calcutta, 1809; 'Two Treatises on the Hindu Law of Inheritance, translated from the Sanscrit,' 4to., Calcutta, 1810; 'Algebra, with Arithmetical and Mensurational Theorems,' 4to., London, 1817; a tract 'On the Import of Colonial Corn,' 8vo., London, 1818; and Miscellaneous Essays' (or reprints of previously published papers and prefaces), 2 vols. 8vo., London, 1887. He also, in conjunction with Professor Augustus Wilson, translated from the Sanscrit a celebrated treatise, the Table of the Sun, Moon, and Planets, and the Sandhyakarika, or Memons, or Miscellaneous Verses, in the Sandhika Philosophy, also the Bhagavata, &c., 4to., Oxford, 1837. Mr. Colebrooke, who held, along with his two brothers, the patent place of Chargropher in the Court of
How should it be otherwise? Who could always follow to the turning-point his long arrow-flights of thought?

Yet the book must always possess a deep interest. Of its literal truth as a record of Coleridge's opinions, however, it may fall short of giving an adequate notion of his end of words, his manner of speaking. The tale of the Fables, followed in 1836 by two octavo volumes of 'The Literary Remains of S. T. Coleridge,' also edited by his nephew; and a third volume of the same series was published in 1838. The same was the case with this character. The Fables, to the outside, have given to these fragmentary materials—ship line-leaves,—notes of the lecturer, memoranda of the investigator, and, for the solitary and self-conscious student,—a permanent value. In 1837 Mr. Henry Coleridge prepared 'The Fables: a new and improved periodical work.—one of the most remarkable books in modern literature. In 1840 he was also edited 'Confessions of an Inquiring Spirit,'—a series of letters on the inspiration of the Bible, prepared by Mr. Coleridge in MS. at his death. In this mass of materials, which we owe in great part to the unwieldy industry of Mr. Henry Coleridge, amidst the skir relieves of a laborious profession, will be found the best evidence of Coleridge's claims to a lasting reputation as a critic and a philosopher.

We have little to add to this imperfect notice. In 1842 Mr. H. Coleridge had a return of the painful maladies which had received a temporary relief in 1825. For many years his health was much impaired by a pauper searching for what a reasonable fortune and cheerfulness, supported by that strong religious feeling which formed a principal feature of his character. He died on the 25th of January, 1845, and was buried by the side of his uncle, in Highgate cemetery.

COLIN, the sculptor of the excellent marble altar-rilievo of the celebrated tomb of the emperor Maximilian I. in the Krienskirche at Innsbruck. Colin was born at Meechin in 1526, and in 1538 was invited by emperor Ferdinand I. to F. the altar-rilievo of his grandfather's tomb, which had been commenced by the brothers Abel. They were completed by Colin, with the help of assistants, in three years, for on one side of the monument is—"Alexand. Colinus Macchiatinus, sculptor, anni 1566."

The sculptures consist of twenty-four marble tablets, fixed into the four sides of the tomb, and record all the principal acts and victories of the emperor Maximilian. The figures are small, but they are executed with great skill and extreme care. The tomb is surrounded by twenty-eight colossal bronze statues of heroes of the middle ages: it is altogether one of the most magnificent monuments in Europe, and is still visited by the curious and modern travellers. The bronze statues were executed by a founder of the name of Hans Lendenstreich, and Godek Lodtter, two other Tyrolese sculptors and founders. Colin executed also the two monuments of his patron the archduke Ferdinand, in the chateau of Liechtenstein, at Gmunden, and in a chapel in the Hofkirchen at Innsbruck: the latter was the date of 1561. They are both extremely costly and elaborate works. There are other works by Colin in Insbruck and its vicinity; some in wood, and of very unusual and elegant workmanship. He was court sculptor to the emperors Ferdinand I. and to his son the archduke Ferdinand of Tyrol, and died in Insbruck in 1612.

(Von Lenmen, Trzékiess' Künstlerlexikon.)

COLossAL, enormous, of great size, large. A COLUMBAE ET ROMANARUM LEGUM COLLATIO, or LEX DEI, is a compilation, probably made in the sixth century of our era. It consists of a comparison between the Law of Moses and the Roman Law, in steady titles. Each title is a legal rule at the head of the Law of Moses, headed thus, 'Moses did; to which are subjoined, by way of comparison, rules of Roman law taken from the five Roman jurists—Papinian, Paulus, Gaius, Ulpian, and Modestinus—and from the three compilers of the Corpus Juris Civilis. In 1697 it was printed as the Lex Antoninae—Justus by the Grotius, Hermogenianus Codex, Hoenogenianus Codex, and Theodosianus Codex. The value of the Collatio consists solely in the extracts which it contains from the source above mentioned. The first and best edition of the Corpus Juris Civilis, in the work of Colaus, Ante-Justinae, in the separate edition of 1833, 8vo. The first edition is by P. F. Faber, Paris, 1573, 4to. It is also printed in Schulting's Jurisprudentia Vetus Ante-Justinae, Leyden, 1717.

COLLE, RAFFAELLO DAL, a celebrated Italian...
OLLISION, or PERCUSSION OF BODIES, is that part of Dynamics in which are contemplated the effects arising from the contact of a moving body on one which is either at rest or in motion.

The effects will evidently depend upon the directions of the motions, with respect to line joining the centres of gravity of the bodies; and, in consequence, this force may produce effects in themselves. If the directions coincide with such line, the bodies having spherical forms, so that the point of contact may be in the same line, and the plane of impact perpendicular to it, the impact is said to be direct; but if the directions are otherwise, the impact is said to be oblique.

All bodies in nature have certain degrees of softness by which their particles yield to the force of impact: all have at the same time certain degrees of hardness by which they resist the force of impact. For the sake of simplicity, we will suppose the other certain degrees of elasticity by which their particles, after being displaced, tend to recover their original positions: these properties exist in bodies in different degrees.

In the case of direct impact, the body struck, if previously at rest, is set in motion; and, if in motion, its movement is merely accelerated or retarded; but in the case of oblique impact, both bodies being in motion, their velocities and the directions in which their centres of gravity were moving are changed so that there may be produced rotary motions about those centres.

When a body in motion strikes another, whether at rest or in movement, the particles of the first body, at the place of contact, have their forward motions retarded; in consequence of which the body is moved forward, or driven, in a direction of the line of the greatest compression; when, for a moment, both may be conceived to move with a common velocity. After this, the force of elasticity overcoming the force of compression, the particles of both bodies gradually return to a perpendicular; and, when the elasticity is diminished, the part would be the same as that in which they were before the impact: the force of restitution thus causing the bodies to separate as if repelled from each other. A certain interval of time will elapse between the instants of first contact and separation, but this is so short as to be scarcely measurable.

If the striking bodies have spherical forms so that the contact may take place, at the first instant, in a point, their surfaces about that point will have their figures changed; and if their masses have different velocities, and if an instantaneous acceleration may take place in that which is last hard, the other penetrating to a certain distance in it. When the bodies are soft, like balls of wet clay, the change of figure produced by collision would be greater; but, if two balls point to point, which is nearly perfect, they far recover their original figure after impact, that the change is not perceptible: it may be rendered evident however on covering one of the spheres with ink and suffering it to impinge on the other, the latter then receives a stain which, instead of being a point, is a circle of sensible magnitude; and this proves that the surfaces must meet at the point of impact.

In order to account for the effect of percussion in impelling a body, a wedge for example, being much greater than that of mere pressure, it may be observed that both effects depend on the product of the mass of the impelling body and its velocity. But, when a body moves in consequence of percussion, the velocity is extremely small; therefore, in order that the effect of simple pressure may be equal to that of percussion, the mass imposed must be very great. It is evident, however, from what has been said, that the two forces are of the same nature. It should be added, here, that the shock produced in a material, when divided by a wedge, or penetrated by a nail, either of these being driven with a force produced by a sudden blow of a hammer may, by displacing the particles of the material, diminish their cohesive power; and this may be, in part, the reason that the effect of percussion often exceeds that of a weight many hundred times greater than that of the hammer.

The force of elasticity is very different in different bodies: spheres of glass are those in which the force of restitution (after impact) approaches nearest to the force of compression; and, in such spheres, the ratio between the forces is as 15 to 16: in spheres of ivory the ratio is as 8 to 9; and in spheres of steel, 5 to 9. In investigations relating to the impact of one body, the elasticity is represented by a fraction whose numerator and denominator have to one another the ratio of the force of restitution to that of compression; and, if a body were perfectly elastic, the force would, of course, be represented by unity.

The bodies upon which experiments on collision are usually made are generally of a spherical form; in order that when they impinge upon one another directly it may be indifferent at what part of the surface of the bodies the contact takes place: the bodies are usually suspended by a string or rod from fixed points; and they are made to impinge upon one another while describing circular area, in a vertical plane, about the point of suspension. The absolute momentum, or quantity of motion in a body, is represented by the product of its mass and the velocity with which it is moving: but the effects of the collision of two bodies depend on their relative velocity, or that with which they approach to, or move from, one another; this is the sum of the absolute velocities when the bodies, in approaching each other, move in opposite directions, and the difference when they move in the same direction.

The formula for the velocities of two bodies, elastic or inelastic, after collision, may be readily derived from the following process: Let $m$ and $m'$ be the masses of two bodies in motion with different velocities and in the same direction: let $V$ and $V'$ be the velocities at the moment of impact; let $v$ and $v'$ the velocities after impact. Then $mV + m'V'$ will be the moment of impact, $m$ and $m'v'$ the moments after impact. Also let $P$ represent the force of percussion, or the momentum lost by the striking body and gained by the body struck in consequence of the impact. Then

$$\frac{m}{m + m'} \frac{m'v' + P}{m}$$

will express the accelerative force of impact; and, by Dynamics, these are respectively equal to $dv$ and $dv'$ ($t$ being the duration of the shock).

From the equations thus formed we have by addition,

$$mdv + m'ddv = (mV + m'V')dt.$$  

This being integrated, and the constant determined by the condition that when $t = 0$, $v = V$, and $v' = V'$, we get

$$m(v - V) + m'(v' - V') = (mV + m'V') t.$$  

or, considering the second member as zero on account of the smallness of $t$, we obtain

$$v = mV + m'V' - m'v', \quad v' = mV + m'V' - mv.$$  

(A)

When the bodies are inelastic, they move together, after impact, with the same velocity: in this case $v = v'$; consequently

$$v = \frac{mV + m'V'}{m + m'}.$$  

From the above equations for $dv$ and $ddv'$ there may be
obtained that which has been designated, for the collision of perfectly elastic bodies, the 'Preservation of Active Forces.' Thus, subtracting the latter from the former, we have
\[ dv - dt = \frac{(mV - P - m'V' + P')}{m'} dt; \]
but, if \( m \) follow \( m' \), and move with greater velocity, the space described by the former during the shock will be equal to the space described by the latter in the same time together with the depths of the two impressions. Let \( s \) and \( s' \) be the spaces, \( x \) and \( x' \) the depths of the impressions for the two bodies respectively; then
\[ s = -x + x' + ds \]
and \( ds = dx + dx' + dd'; \]
but, by Dynamics, \( v = \frac{dx}{dt} \) and \( v' = \frac{dx'}{dt} \);
whence \( dd' = \frac{v}{v'} dv. \)

Representing the coefficient of \( dt \) in the above equation by \( X \), and substituting this value of \( dt \), the equation becomes
\[ (v - v') (v - v') = X (dx + dx'); \]
which being integrated, gives
\[ \frac{1}{2} (v - v')^2 + \text{const.} = X (dx + dx'); \]

But, at the commencement of the shock, when \( x = 0 \) and \( x' = 0 \), the velocities are \( V \) and \( V' \); therefore the complete integral is
\[ \frac{1}{2} (v - v')^2 + \frac{1}{2} (V - V')^2 = X (dx + dx'); \]
Again, at the end of the shock, \( x = x' = 0 \), and the second member of the equation is zero; therefore
\[ v - v' = \pm (V - V'). \]

In this equation substituting first the value of \( v \), and subsequently the value of \( v' \) (at (A) above), we get
\[ \frac{2mV + (m'V + mV')}{m + m'} \]
and
\[ \frac{2m'V' + mV + mV'}{m + m'} = : (B) \]

Note, the lower signs are to be used when the bodies move in contrary directions. After squaring these equations, if the first result be multiplied by \( m' \) and the latter by \( m \), we shall obtain, by addition,
\[ m'v^2 + mv^2 = mV^2 + mV'^2; \]
which is the equation alluded to. It must be observed that the equation does not hold good when the bodies are inelastic; in this case there is always a loss of active force by collision.

By making \( V = 0 \) in the equations for \( v \) and \( v' \) (at (B) above) we may obtain the velocities of two elastic bodies after impact, when the body struck was previously at rest; and in this case, if \( m = m' \), or the bodies have equal masses, it will be found that the velocity of the mass that strikes the resting mass and the body struck moves with a velocity equal to that of the former body at the instant of impact; it follows that, if several equal spheres are placed in contact in one straight line passing through all their centres; on causing the first to be struck by an equal body moving in the same line, the effects of the impact will be destroyed in all the bodies except the last, which will move with a velocity equal to that of the striking body.

It is easy to prove by Dynamics, that the velocity of the common centre of gravity of two bodies \( m \) and \( m' \) before impact is expressed by
\[ \frac{mv + m'v'}{m + m'} \]
and after impact by
\[ \frac{mv + m'v'}{m + m'} \]

but, from the above equations at (A) or (B) we have
\[ m + m' \]

hence it follows that the velocity of the common centre of gravity of two bodies is not altered by collision.

If two spherical bodies move in any plane in different directions and come in contact with each other, their motions after collision may be determined by the parallelogram of forces. Each velocity at the moment of impact being resolved into two, one in the direction of a line joining the centres of the spheres, and passing through the point of contact, and the other in a direction at right angles to this line; the velocities of the bodies in the latter direction will, after the impact, be the same, whereas the velocities, after impact, in the direction of a line joining the centres may be found by the formula above for \( v \) and \( v' \), from the resolved velocities in the same direction before impact. Consequently, compounding these velocities, in the two directions, for each body, there is

obtained the velocity of each body and the direction of the motion after the impact.

If \( m \) and \( m' \) are spherical bodies impinging in any direction on a plane, the movement of the body after impact may also be determined by the parallelogram of forces. For the resolution of the plane being supposed to be in a line perpendicular to the plane of the paper when not passing through the point of contact, the centre of the sphere, also the force of elasticity is the reaction being known; let a line in the direction of the ball be able to represent its velocity, and let it be resolved into two velocities passing through the centre of the body; the other perpendicular to the first, and resolved parallel to it: then, after impact, there may be conceived to exist two forces, one parallel to the plane and (neglecting friction) equal to the resolved force in the same direction before impact; and the other perpendicular force of recoil (which if the elasticity were perfect would be equal to the force perpendicular to the plane before impact); therefore, by composition, the velocity and direction after impact may be obtained. It is evident that, in the case of perfect elasticity, the angles of incidence and reflection are equal to one another. On this principle may be found the direction in which a ball must be impelled that, after reflection from a plane or from any number of given planes, it may strike an object.

For investigations concerning the magnitude of the impulsion on a body struck, the duration of the shock, and the rate of percussion force to that of gravity, see Atwood's 'Treatise on Motion,' Gregory's 'Mechanics,' and Whewell's 'Mechanics' concerning the effects of bodies; however be their forms, see Poisson's 'Traité de Mécanique,' No. 465, etc., second edition.

COLLISION OF SHIPS. [Ships, P. C., p. 492.

COLGOMA (From eddis, belonging to the natural order Polemoniaceae. It has a campanulate, 5-cleft or somewhat 5-parted; the lobes lanceolate or linear, equal, entire; the corolla salver-shaped, with a slender exserted tube, and a spreading 5-parted limb; the segments oblong, entire; the stamens inserted at the middle of the tube; the anthers ovato-roundish; the cells of the capsule 1-2-seeded. The species are annual herbs, with alternate leaves and dense heads of flowers. They are all natives of America. C. linearis is an erect branched plant, clothed with glandular hairs; the leaves ovate lanceolate, quite entire, opposite, reniform, the upper ones downy beneath; the calyx echi- shaped, 5-parted; corolla more than twice as long as the calyx; the cells of the capsule 1-seeded. This plant is a native of North America, from Lake Winnipesaukee to the Western States. The corolla has a reddish tube and a rose-coloured limb. The seeds of this as well as the other species are covered with a testa, which is composed of a spiral tissue held together by imprinted mucus. On the seeds being placed in the gum the testa is dissolved and the spiral fibres start up on the surface of the seed.

The species of Collomia are showy plants, and may be easily cultivated in any common garden soil. The seeds should be sown in an open ground in spring.

(Don, 'Gardener's Dictionary.')

COLLUMPTON. [Devonshire, P. C.]

COLOCYNTHUS. [Cumulus, P. C.]

COLOGNE CATHEDRAL. [See also Gothic. The present church is a restoration of the old Gothic cathedral, which, at the close of the thirteenth century, was destroyed by fire. It was replaced by a new building which was completed in 1880.]

The Cathedral of Cologne is the chief example of the Composite style of Gothic architecture, which was adopted at the beginning of the fourteenth century, and most celebrated monument of German Gothic architecture, with the intention of fully completing it on the scale originally proposed, is an undertaking not only as vast as itself, but also as far more beneficial to the nation, inasmuch as it would afford employment to a large body of artificers, and would also be a great landmark in the progress of art and good taste and at length emancipate Europe. The time is not yet arrived when the influence of Gothic architecture was looked upon as a purely antiquarian one, for which the professional man had no occasion, and the public no sympathy, whereas it has now become popular, and the taste for it a passion. To the former neglect, if not exclusion of the Gothic style, this great work may be said to have contributed the greatest disfigurement of them by modern improvements and additions, has succeeded a degree of veneration and zeal for them which is one of the characteristics of the nineteenth century. Cologne is by no means the only city, where a restoration and completion has been going on for some time upon the Continent. In Germany the cathedrals of Bamberg, Magdeburg, and Regensburg (Ratisbon) have been restored or embellished, and that of Speyer (Spire) is
about to be similarly treated, and also that at Aachen (Aix-la-Chapelle). In France, the abbey church of St. Denis has been reinstated in its pristine magnificence—its walls and pillars, statues and sculptures, profusely decorated with gilding and colours. Even in Italy some attention is beginning to be paid to some monuments of mediaeval architecture: the interior of the Duomo of Florence has lately undergone complete repair (1838) by Baccacini, and it is now at length seriously intended to complete the exterior of that structure by erecting a facade. As to what has been so long done and undone, will it be possible ever to mention in evidence of the movement in favour of our olden architecture and art—the interior of the Temple church in London, and the new Palace of Westminster.

The structure was completed the present cathedral of Cologne was founded by Charlemagne in the ninth century, and erected 816-71. Three centuries afterwards it acquired great repute throughout Christendom, for possessing the relics of the so-called Three Kings or Magi, which had been brought from Milan by the Emperor Frederick Barbarossa when he took that city by storm, in 1170; and highly improvable, not to say utterly impossible, it was that the bones of all those three persons should ever have been collected together and brought over from the East, the legend was a profitable one for Cologne: the city became the resort of all pilgrims from all parts of Europe, and most costly presents were offered up at the shrine of the Three Kings. During this prosperous state of affairs for both the place and the church, the structure suffered greatly: a fire which broke out in the adjoining one of St. Mary, about 1290, and destroyed both the towers of the cathedral, which were only of timber; wherefore it was determined by the then archbishop Engelbert to erect a new edifice, but his death shortly after (1295) frustrated the project entirely. (till) it was revived by Conrad von Hochstaden (archbishop from 1297 to 1261), and accelerated by the occurrence of another fire in 1248, the 16th of August of which year is recorded as the date of the laying the foundation stone of the new edifice. Who was the architect who conceived a pile upon such an extraordinary scale both as to magnitude and magnificence, will probably ever remain an historical enigma. That honour has been claimed by some for a certain Gerard von Trond, but though there is direct evidence of his having been honorably rewarded for his services, by the chapter, in 1257, it is exceedingly doubtful whether he was more than the superintendent of the works. The design itself has been attributed by some to the celebrated Albertus Magnus (1138-1280), who is said to have been no less eminent an architect than as a schoolman, and to have erected the church of the Dominican church at Freiburg and that of the Dominican church at Cologne. Of so colossal a pile the mere foundations and substructure—extending in some places to the depth of fifty feet—were a gigantic work, and the further advance of the building was retarded for many years by dissensions between the archbishop and the citizens, by the papal interdict on Cologne, and the removal of the episcopal see to Bonn. It was not until the close of the century that the works were resumed, but when they were, they were prosecuted with energy, and the choir was consecrated and opened for service, September 27, 1251. But it was not long before the zeal began greatly to relax: there were complaints of gross peculation on the part of those who had the administration of the funds furnished by the populace; and another cause of hindrance was that fresh dissensions broke out between the clergy and the people. In the meanwhile no work whatever was done in adorning the ebor and its chapels, and among other sumptuous embellishments were the statues of the twelve apostles, of silver gilt. This part of the edifice, at least, that forming the sanctuary and containing the shrine of the Three Kings, had a narrow escape from destruction in October, 1454, when a violent hurricane flung down one of the largest pinnacles, an enormous mass of stone, from the east end of the church, which not only crushed in the vault of that chapel, but injured the shrine itself. This was of course attributed to the malice of the Evil One, who had left the imprint of his talons on the stone itself. The occurrence seems to have been ominous, for about three years afterwards (1457) the works came to a stop when the southern tower of the west front was carried up about 200 feet, or the intended height of the nave, but not half its own altitude. From that period all idea of continuing the fabric seems to have been abandoned. The ebor was suffered to remain a stupendous fragment at one end, and the tower another at the opposite extremity. Nothing further was done until about the middle of the last century (1745-5) when it had become necessary to put the choir into repair. All that was then and afterwards done, further than absolute necessity required, was of more injury than service, for there existed neither feeling for nor intelligence of Gothic architecture, and accordingly all the alternations were in a vile and discordant taste.

Whatever regret may have bitherto been felt at the condition of a structure so glorious even in its incomplete and marred condition, it has perhaps been a piece of singular good fortune for Cologne cathedral that no earlier attempt was made to complete it after the decline of the Gothic style, for in that case it would almost to a certainty have proved a very heterogeneous mass; whereas now, we, or at least our posterity, may behold an edifice as thoroughly consistent throughout, if not more so than had it been funded without interruption for a century later. In 1816 Schinkel was commissioned by the present king, then Crown-Prince of Prussia, to survey and report upon the condition of the cathedral; and in 1824 the restoration of the choir was begun by Bau-inspector Abert of Cologne. In 1829 he commenced the repairs of the exterior of the choir and its flying buttresses. Abert died in 1833, and was succeeded by Ernst Zwirner (the restorer of the abbey of Altenberg near Cologne), who has prosecuted his important task with earnest affection, and with a most scrupulous fidelity to the character of the original work in regard to the execution of the details. After the interior of the choir had been fully reinstated by him, and embellished with carving and statues, polychromy and gilding, the first stone of the Neu-bau, or works for completing the rest of the structure, was laid with great solemnity by the King of Prussia, September 4th, 1843, since which considerable progress has been made with them, four compartments of the south side having been finished in 1849, and three others in the follow-
place; yet considering the enormous mass of the two western towers, and their height, 500 feet from the ground to the summit of their spires (several feet loftier than those of Strassburg or Vienna), the promise seems a bold one. Fortunately the original design for the façade is still in existence: in 1814 an old drawing was found, three feet long and nearly five feet in length, which had been found concealed in a garret- loft, was brought to Moller, the architect, and well known author of the 'Denkmale Deutscher Baukunst,' who on examining it found it to be the elevation of the portal and north tower of the façade of Cologne, published in 1472, and in existence two years afterwards, Sulzpf-Boisneré (who has published a magnificent work on Cologne cathedral) had the good fortune to discover at Paris the drawing for the other tower, also upon publication of the original, printed by Aldus, and now in the possession of the present Professor of Architecture at the Royal Academy earnestly recommended it in one of his recent lectures (1846), representing it to be equally calculated to inspire with a passion for architecture, as Robinson Crusoe with a yearning sea adventures from sea. From this it would naturally be inferred that the work must be at all events attractive and engaging, and abound with highly graphic and picturesque descriptions; whereas it is precisely the reverse,—so obscure in many parts as to be scarcely intelligible at all, and written in a Belin jargon of Italian, Latin, and other languages and dialects. He must be exceedingly clever, observes Tiraboschi, who can, I will not say understand the book, but even tell in what language it is composed. Apollozio Zenno again says, that he has never seen a page of it, excepting the first, which he thought a sort of a work of science; and that the mysteries of science and knowledge, and having accordingly studied it, if with no great profit, certainly with patience.

Another edition of the 'Hypnerotomachia' was published at Venice by the younger of the Aldi in 1545. It has twice translated into French, first by Boreale de Verdeille (folio, Paris, 1600); and again by the architect Legrand, under the title of 'Songe du Polyphile,' in two volumes, 12mo, printed by Didot, to which it is divided into five books, and published in 1786.

Those in Boreale of Verdeille's translation are said to have been designed by no less an artist than the celebrated sculptor Jean Goujon; but as far as they are at all architectural is their subjects, which is the case with but few of them, they do not materially differ from the familiar one, and it is to the author, that are so exceedingly rude as to drawing and design, that they are now more likely to disgust than attract those who, in consequence of the laudatory character given by some to the work, might turn to it as the initial example of true architectural truth from the ground. Among those who hold it up for admiration is Temanza ('Timanza, P. C.), who speaks of it at considerable length in his Life of Colonna.

After this bibliographical notice of the singular work which has been the subject of so many jargons of complimentary kinds, the history of the writer himself may be briefly told. He was born at Venice about the year 1433, and in his youth fell in love with Ippolita, the niece of Teofilo Lelio, bishop of Treviri, in the Venetian territory; and she was the lady who has celebrated under the abridged name Polia, in his allegorical romance, and who is supposed to have died shortly after her uncle, in 1466. Colonna then took the Dominican habit, and entered the monastery of Sant Giovanni a Paulò at Venice, where he lived in July, 1630, at the age of ninety-four years.

COLOPHONIA (from the Greek word kolla, glue, or L. colloidon, the glue of plants belonging to the natural order Burserceae. It has an unctuous, yellow, 3-lobed calyx; for the sepals of the flower are compound and composed of four, five, or six wedge-shaped leaflets, which the plant is able to close and open at pleasure. The flower has no filaments or stamens, but a terminal ovary, as described as a small tree, with 7-11 leaflets on long stalks, ovate-oblong, acute or shortly acuminate, quite entire, smooth; stipules oval; the panicles of flowers terminal, diverging; the flowers 2-3 together, almost sessile, when young covered over by broad ovate concave silky bracts

Colonna, Fra Francesco, a learned Dominico and architectural writer of the fifteenth century, was author of a very singular, strangely rhetorical, mystical, and fantastic work with the highly fantastic title of 'Hypnerotomachia Poliphili,' first printed by Aldus in 1499. This extraordinary production, which is a sort of romance, or rather vision, interwoven with descriptions of imaginary edifices, has drawn forth the most opposite opinions, being treated as a curious and entertaining poem by most, and as a masterpiece of imposture by others. While Milizia, Nagler, and many more speak of it as a more tissue of absurdities, others, who ought to be competent judges of it in that respect, praise it as a work of high originality and rare merit. The admirers of it say, therefore, that it is admirably beautiful in its kind.
the calyx silty externally; the drupes obovate, black. The bark of this plant yields a limpid oil, with a pungent turpentine smell, which congeals into a hattery camphoraceous substance. It possesses the same properties as Copalita. Don says, When the nuts are mature they contain a sweet kernel, which does not become rancid, and which resembles a sweet chestnut; they are eaten both raw and dressed by the inhabitants of the Moluccas, Banda, and New Guinea; and an oil is expressed from them, which is used at the table when fresh, and as a substitute for the fats of the sea seal, orca, cokes, biscuits, etc., for the table. Eaten fresh they are apt to bring on diarrhoeas and dysenteries, and to occasion an oppression at the breast. The same tree is also said to yield East Indian Elemi. It is a native of the continent of India, and has been introduced into China, where it reaches the east, he observed that the solar image was strongly tinted with all the prismatic colours, violet, indigo, blue, green, yellow, orange, and red [Dioscorea, P. C. S.: on removing the screen further from the sun, the surfaces of the image were divided into red towards the axis of the latter; and at the focus of the lens, by the complete mixture of the colours, a white spot was formed. Afterwards, on intercepting at the surface of the lens the violet, blue, and green rays, the spot on the screen disappeared; but a degree of whiteness which, as the angles in passing through all the rings; and this circumstance serves to show the tints depend wholly on the distances between the lenses. If the angle made by the rays with the perpendicular is diminished, the tints in the rings will be increased, the tints remaining the same; and Newton has given a rule for determining, when the angles of incidence are oblique, the interval between the lenses at the distance where any particular tint is produced. When the lights are formed by homogeneous light they are found to be more numerous than when the light is mixed; they are also of the same colour as the light, and are separated from each other by narrow spaces which are quite black. The diameters of the rings in the corresponding bands at the places where the lights are the brightest, are different when the bands are formed by homogeneous lights of different colours, being least when the light is violet, and greatest when red; and Newton computed, from the measured diameters of the rings of different colours, the intervals between the lenses at the places where the brightest part of the first rings from the centre are formed: these distances are found to be equal to 1/20 of a air-ray for extreme red, and 1/20 of a air-ray for extreme violet rays, or to the lengths of a undulation for the different kinds of light. The order and the dimensions of the coloured rings are the same, whether air occupy the space between the lenses or whether the latter be in the substances received it an air-space; but when the substance between the lenses is a fluid, the refractive power than air is interposed between them, the tints are fainter and the diameters of the rings are less; or smaller distances between the lenses are requisite in order to produce the same tints: it is ascertained that, with different abises, these distances are inversely proportional to the refractive indices. Corresponding rings of colour were observed by Newton in thin plates surrounded by media less dense than the air. In a bubble of air, exterior to a thin plate of glass, the gradual subdence of the fluid, rings of colour exactly concomital to those between glass lenses; and, when the bubble bursts, a dark spot, about half an inch in diameter, is formed at its upper part. The like phenomena have been observed between the plates of mica and in bubbles of glass blown thin as to burst. Newton also examined and described the phenomena of the coloured rings or bands between lenses when the light is transmitted through them: if a thin plate of glass is observed through these bands, which are formed by reflection; but when the obliquity of the transmitted rays to the plane of the rings is considerable they are sufficiently distinct: in the centre is a white spot, and the colours of all the rings are exactly complementary to those of the fellow rays. The corresponding rings on the back band are seen by the reflected rays. Newton's arrangement of the coloured tints in the first and second rings or bands, reckoning from the centre, is given in the following table, with the thickness of the plates of air, water, and glass, at the place where the tints are produced. The unit of measure is one millionth part of an inch. THE \thick plate of air concave on its upper and lower sides. On bringing the pair of lenses to an open window, and receiving the rays of light from the sky by reflection from them, there were observed, the plates being gently pressed together, seven series of coloured rings or bands about a black spot in the centre: beyond the black band the colours could scarcely be distinguished. The diameters of the bands being measured, where the colour in each was the brightest, Newton found that those diameters were proportional to the square roots of the series of even numbers 2, 4, 6, 8, &c. &c. at the places where the colours were the least intense; that the tints were found to be proportional to the square roots of the series of even numbers 2, 4, 6, 8, &c. The radii of the curvatures of the lenses being known, Newton computed the thicknesses of the plates of air, or water, or glass, which had the greatest and least degrees of brightness; and he found (Optics, lib. ii.) that, at the most luminous part of the ring nearest to the centre, the thickness was equal to 1/28 inch: the thickness at the most obscure part of that ring was equal to 1/28 inch. Hence, from the law above mentioned, the thicknesses of the air at the most and least luminous parts of the succeeding rings may be obtained; those thicknesses being considered as proportional to the semi-diameters of the rings.
This table, extended so as to include the seventh band of reflected tints, constitutes, which is called Newton's Scale ofColours.

It was to explain the phenomena of coloured rings or bands that Newton proposed the hypothesis of 'Easy Reflexion and Transmission' (Umbulatory Theory or Light, P. C., p. 61), and on that hypothesis the phenomena may be very satisfactorily accounted for. The following expressions for the places of the rings are, however, obtained from the principles of the undulatory theory.

\[
\frac{(1 - \sigma^2) + 4\epsilon \sin^2 \frac{\pi V}{\lambda}}{(1 - \epsilon^2)^2 + 4\epsilon \sin^2 \frac{\pi V}{\lambda}}
\]

The sum of the two expressions is always equal to \(\sigma^2\) which proves that the reflected and refracted tints are complementary to one another, conformably to observation.

Sir Isaac Newton also discovered that when a slender pencil of light issuing from the sun is reflected from the concave surface of a glass mirror of the kind called concavo-convex; as receiving the reflected pencil on a screen at the focus of the mirror, a hole being made in the screen to let the pencil pass through, four or five concentric rings of colour are produced: these are called the colours of thick plates, and they are similar to those which are formed by transmission through thick plates of air, as above mentioned. The reflected rings were produced whether the back, or convex surface, of the glass was silvered or not, but in the latter case they were very faint: they were not produced by reflexion from a metallic speculum.

When the light was homogeneous all the rings were of one colour, and the squares of the diameters of the most luminous parts of the rings were in the ratio of the numbers 1, 3, 5, &c., while the squares of the diameters of the darkest parts were as the numbers 1, 3, 5, &c. On using glass mirrors of different thicknesses, Newton found that the diameters of the rings were inversely as the square roots of the thicknesses of the mirrors.

The cause of those coloured rings, as explained by Sir Isaac Newton, is a scattering of the rays in a pencil of light when it enters a refracting medium, as glass, with a polished surface.

Thus, if a pencil of rays proceeding from C fall perpendicularly upon a concave mirror of glass, the part of the rays pass directly through the medium to B, and are reflected from thence back in the line BA to C; but many of the rays, entering the glass at A, are scattered (on account of irregularities in the polished surface) in different directions, as AB: these rays are reflected at the opposite surface of the glass in directions such as ac, bd, as if they came from a certain point Q; and, in passing from the glass to the air, they are refracted as if they came from a certain other point q; at the same time many of the rays reflected in the direction BA, or arriving at A, are scattered (as the incident rays were scattered at the same point) in different directions, as AD, AE, so as to meet the rays reflected from such points as a and b. Now, when the difference between the lengths of the lines diverging from A and Q is equal to a multiple of \(\lambda A\), or half an undulation, the waves of light are in opposite phases, and consequently destroy each other's effects; while, in the intervals between these, coloured spaces form themselves by the mixture of the waves: as this takes place conically about the axis CA, it is evident that the interferences will form a number of concentric dark rings on a screen-placed so as to receive the light in places of convergence. If the medium from which the light is reflected be a concavo-convex mirror, it is evident that the interfering rays from a number of incident pencils diverging from the centre of curvature will cause the coloured spaces between the dark rings to have considerable brightness.

By an analysis which may be seen in the 'Treatise on Light,' by Sir John Herschel (Encyclopaedia Metropolitana, 2c,
A is the known lie ascribed 1798, the sixteen of early end as from to tier, much appears the years a ascribes in the phenomena contained in statistical quantities, and of lines, colours.

Dr. Young, looking at a luminous object through two plates of glass, having a little moisture between them (mixed plates) observed about it fringes of colour like those which are seen in water, a body of liquid ; the distance from the glass, that fringes were formed in the same directions as the others, but many times larger. When a lens of long focus was laid upon a piece of plate glass, with a little grease between them, he observed, on looking at the edge of a bright object, a series of concentric rings, in which the rings on one side of the diameter corresponding to the edge of the object were complementary to those on the other side: the diameters of the rings were found to vary with the refractive power of the glass, being of the same kind of fluid between the plates.

COLOMBIA, a genus of plants belonging to the natural order Rosaceae. It has a cone-8 parted calyx in two rows, the five exterior sepals being smallest: 4-5 petals: the receptacle ultimately large, fleshy, spongy, and persistent: the style lateral near the summit of the nut, the seed ascending. There is but one species of this genus, C. palustris, Marth Cinquefoil. It has an ascending stem, about one foot high, has pinnate leaves, dark purple flowers, and numerous carpels seated on the dry spongy receptacle. This

friend, the Thanes Police Act—40 Geo. III. c. 87, a measure now understood to have been suggested by Mr. Harriot. In the same year he published 'A Treatise on the Commerce and Police of the River Thames: containing an Historical View of the Trade of the Port of London: and suggesting several Important Measures thereon, by a legislative system of River Police.' Mr. Columba was a qualified member of the system of charity-schools, holding the opinion, which is every day obtaining additional adherents, that the education of the people is the true protection of society from internal disorders. The Picts, Scots, and Scots-Irish, or Scotch-Irish, is believed to have been one of the earliest teachers of Christianity in Scotland, and is known in history as the founder of the abbey and college of Iona in the Western Isles. He was a native of Ireland; his biographers give his pedigree with great precision, but even if its precise accuracy could be trusted, its repetition here would afford the reader nothing more valuable than a series of strange names. He is said to have been born in the year 521. According to the best collations of recent investigators, he arrived in Scotland in the year 562. The island of Hi, or Iona, where he established himself with his disciples, may be presumed, from the vestiges of a worship earlier than Christianity still exist there, and commonly called Druidical remains, to have been inhabited probably of the most ancient period of history in the day, and it is probable that Columba desired to attack the lion in his den. The greater part of the neighbouring west coast of Scotland was peopled by the Scots, who had emigrated from Dalriads. Which those who supposed that a description of comparatively level land stretching westward, were inhabited by the people called Picts. Columba is said to have established an equal influence with both races. In the much debated question whether the Picts were of Celtic or Teutonic origin, there is no such conflict of the views of the most distinct, though very limited, evidence that exists on the subject. It states that Columba, who as an Irishman must have been of the same Celtic origin as the Scots or Irish Dalriads who superseded him, was an interpreter when he communicated with the king of the Picts. The Life of Columba by Adamnan is a work frequently consulted by investigators into the early history of Christianity in Britain. An accurate list of the various shapes in which this little book has been republished, appears in the several works of Adamnan in the Biographical Dictionary of the Society for the Diffusion of Useful Knowledge. A translation of this work, with critical comments, was published in 1786, with the title 'The Life of the Holy Patriarch Columba, or Saint of the ancient Scots and Picts,' by John Smith, D.D., a work full of very absurd blunders. Adamnan's Life contains few biographical facts which can be depended on, but it is a very curious memorial of the manners of the day. Even the dreams in its wearisome narrative are carefully and critically examined. Columba is believed to have been the founder of the Culdees [Culdeans], and in connection not only with them, but with the pagan rites which he superseded, his memory is traditionally preserved in the highlands of Scotland. There is a Highland proverb, of which the translation is— 'Earth, earth, on the mouth of Oran, that he may blab no more.' The tradition connected with this is, that Oran was one of the followers of Columba, who was building of Iona, and Columba cursed, whether alive or dead is not stated. This tradition, which is given as the version of the pagan priests, says that Columba opened the grave three days afterwards, and Oran told him that hell was not such a place receptacle, of the nut, the seed ascending. There is but one species of this genus, C. palustris, Marth Cinquefoil. It has an ascending stem, about one foot high, has pinnate leaves, dark purple flowers, and numerous carpels seated on the dry spongy receptacle. This
COMB.

Comb-plates are generally made of a thin plate of wood, horn, tortoise-shell, ivory, bone, or metal, which may be either flat or curved, having one or two of its edges indented with narrow slits, which divide the substance of the comb into separate points. The points employed for woolen manufacturies, for disentangling the fibres of wool, which contain two or more rows of metal teeth, not formed by cutting the edges of a plate, but by inserting the teeth in a separate row, and by other means, and by cards and carding machines, which consist of many rows of fine teeth fixed together, so as to form what may be styled a brush of metallic combs, are described under Wolfers and Worsed Manufactures, F. C., pp. 561-564, Cotton Spinning, F. C., p. 96, and Cards, F. C. S., p. 289. Somewhat similar to the last are the curry-combs used in dressing horses, which consist of a number of iron plates notched on one edge to form saw-like teeth, and attached by the other edge to an iron handle, parallel lines, so as to form an instrument the action of which is between that of a scraper, a comb, and a brush.

In the mode of cutting and shaping the plates of which combs are formed there is little to call for remark, but in the act of working the teeth in their comb-position, the teeth are cut of a uniform size, at equal and often very minute intervals, and, in many cases, of extreme thinness or fineness, much ingenuity has been called into exercise. The old method of forming the teeth was by means of a double saw, consisting of two separate saws placed parallel with each other, and adjusted to such a distance from each other as to embrace a tooth of the required fineness between them. These two saws are so arranged that while one cuts into the comb to the full depth required, the other cuts only half that depth, and by this contrivance the uniformity of the comb is secured, because, while the deeper saw is completing the first cut, the shallower one is forming the commencement of the second, and when, on the completion of the first cut, the deep saw is put into the second cut to complete it, the shallower one immediately commences a third. The cuts thus formed are subsequently enlarged and rendered smoother by means of a very thin wedge-shaped file, which also points the teeth. With such accuracy may these operations be performed, that delicate ivory combs, with from fifty to sixty teeth in an inch, are produced in this way. Though this method of comb-cutting is still practiced, a superior and much quicker mode of performing the same operations by means of circular saws and revolving planes is pointed at the teeth. A machine for this purpose, having a series of saws or cutters fixed upon one axis, with washers between them to regulate the distance of the cuts, and consequent size of the teeth, have been patented by Mr. Bundy in 1798.

By the above-described modes of comb-cutting all the material of the interstices between the teeth is lost or destroyed, but by the operation known as the parting of combs such loss or waste of material may be avoided in the manufacture of combs of tortoise-shell, because the other tough materials of two combs being, by this process, made out of one piece, the teeth of one being cut, by the pressure of chisel-like instruments, out of the interstices of the other. According to a paper in the third volume of the Society of Arts, descriptive of the improved machine contriv'd for this purpose by Mr. Rogers, this ingenious mode of forming combs was invented by an artist named Ricketts, who was led to the invention by being engaged in the production of ornamented tortoise-shell combs in which the decorative parts were formed by the pressure of cutters. The name of Ricketts is not referred to in the articles on comb-making in Dr. Ure's Dictionary of Arts and Hether's Engineer's and Machinist's Dictionary, but both notice, and the latter an engraving, of a machine for performing this operation, which is described as the invention of Mr. Lynce. In this machine, the various motions of which are effectually combin'd into a lever handle, the piece or handle of tortoise-shell or horn and ivory, which the tooth in one of combs is secured upon a traversing carriage, which is capable of motion in a direction perpendicular to that of the teeth of the comb, by means of a screw turned by a ratchet-
workers should be free, from such restrictions as regard the rate of wages and the terms of working, and he left at perfect liberty to make such agreements as they may naturally think proper.

That therefore the statute laws while interfere in these particulars between masters and workmen should be repealed; and also that the rule of law by which a personable owning of masters or workmen may be prosecuted as a conspiracy, should be altered.

Immediately after the passing of this act a number of widely varying combinations were formed and manufactures for the purpose of controlling the masters as to the way in which they should conduct their business; and the extent to which the act had repealed the common law being doubtful, and the act having clearly gone beyond the restraints of the two previous combinations, Mr. Huskisson, then President of the Board of Trade, moved early in the session of 1825 for a committee to consider the effects of the act 5 Geo. IV. c. 95; and a committee was appointed with Mr. (afterwards Lord) Wallace, then Vice President of the Board of Trade, for its chairman. This committee recommended the repeal of the act of the previous session, and the enactment of another: and in consequence of their recommendation the 6 Geo. IV. c. 129, was passed, which is the law now in force relative to combinations.

This act repealed the 5 Geo. IV. c. 95, and all the statutes which that act had repealed. It relieved from all prosecution and punishment persons meeting solely to consult upon rate of wages or any other article of agreement, verbal or written, on these points. And it provided that the punishment of not more than three months' imprisonment, with or without hard labour, for any one using violence or threats to make a workman leave his hiring, or return work unfinished, or refuse to accept money or anything else, was null and void, and any common fund, or pay any fine for not belonging to a club, or contributing to a common fund, or refusing to conform to any rules made for advancing wages or lessening the hours of work, or regulations of the mode of carrying on any business, and for the punishment of other violations to make any master alter his mode of carrying on his business.

By the act 6 Geo. IV. c. 129, therefore, combinations of masters and workmen to settle as to rate of wages and hours of labor were made void and freed from all punishment: but the common law remains as it was as to combinations for otherwise controlling masters.

9 Geo. IV. c. 31, assents in pursuance of a combination to raise the rate of wages are made punishable by imprisonment and hard labour. A committee of the House of Commons sat in 1838, presided over by Sir Henry Parnell, to consider the effect of combinations of workmen; but nothing followed from this commission.

COMBRETACEAE. [Terminalia, P. C.]

Combustion, a process in which both light and heat are emitted by chemical agency: thus, when a piece of charcoal is ignited and put into oxygen gas, combustion commences; chemical agency is implied that the charcoal disappears, or the oxygen has undergone a change which renders it incapable of further action as a supporter of combustion.

In the same way, if we ignite a slender piece of iron and immerse it in oxygen gas, much light and heat are given out by the combustion of the iron; the gas disappears, and the iron, by combining with it, has acquired a new form and properties; or, in other words, it is converted into oxide of iron.

These two cases will exhibit instances of the more important changes which accompany combustion: in the first a solid body, charcoal, by combining with oxygen, becomes gaseous, being converted into carbonic acid gas, and the oxygen, though it still retains its gaseous form, is found to be so entirely altered in properties, that it is no longer capable of supporting life or combustion, but is soluble in water, and precipitates carbonate of lime from lime-water. In the other case, the oxygen does not retain its gaseous form, nor does the iron, like the charcoal, lose its solid form, being, as already stated, converted into oxide of iron, which is a solid body.

But that the combustion may be divided between combustion and ignition. In the former, heat and light are elicited by chemical agency; but the substances by which it is produced undergo so complete a change of properties, that if we were to take fresh charcoal in the carbolic acid gas resulting from the combustion of the first piece, no combustion would again occur, so obtained; the second case were heated in a fresh portion of oxygen gas, that it would suffer any change of properties, or give out any light or heat by chemical agency.

It is however well known that if certain bodies, such as a mass of oxide of iron or a stone, be ignited, it will continue to give out both light and heat for a longer or shorter period, according to the cooling power to which it is exposed. But in this case the ignited oxide of iron or stone gives out the light and heat which it had previously received from the contact of bodies in combustion.

It is then to be understood, that while incombustible bodies which have been ignited yield only the light and heat which they had previously received from bodies in combustion, combustible bodies yield a light and heat which they generate by chemical agency.

In all common cases of combustion the heat which is generated by it is accompanied by flame, but not necessarily so. Some idea of the difference may be formed by observing the circumstances under which bituminous coal and anthracite burn; the former burns with flame, and the latter with scarcely any.

Combustion, Spontaneous Human. This term is applied to a singular phenomenon which occasionally occurs in the human system. Many of the older medical writers spoke of a mysterious burning of the human body, which, as it seldom occurred, was frequently doubted. Cases however of a consuming or decomposition of various parts of the body during life, and which had been constantly put on record, and although often misrepresented by superstition and ignorance, the evidence of such a combustion of the human body is admitted as perfectly satisfactory by the best writers on medical jurisprudence of the present day.

One of the earliest well-authenticated cases put on record occurs in the Transactions of the Copenhagen Society. A woman of the lower classes, who had for three years used spirituous liquors to excess, and took little of any kind of food, sat down one evening on a chair to sleep, and was consumed during the night, so that next morning no part of her was found entire except the skull and the joints of her fingers; all the rest of the body was reduced to ashes. In the forty-third volume of the Philosophical Transactions there is a case related which occurred in 1744. A woman of the name of Grace Pett, who was in the habit of getting up in the night to smoke by the kitchen fire, was found one morning by her daughter dead. The body was extended on the hearth with the legs on the deal floor, and it had the appearance of a log of wood consumed by a fire without apparent flame. The girl immediately ran and procured water to pour over the burning ashes which produced a suffocating smoke and brought in the neighbours; but the woman was quite dead. The trunk was incinerated, and resembled a heap of coals covered with white ashes. The head, the arms, the legs, and the thighs had also participated in the burning. It is put on record that a day before a similarly fatal case occurred in the same house. There was no fire in the grate, and the candle had burnt entirely out in the socket of the candlestick which was close to her. There were also found near the body the clothes of a child and a paper screen which had sustained no injury from the fire. Her dress consisted of a cotton gown.

Since the period at which this case was recorded many others have occurred to competent observers and been accurately described. Beck in his Medical Jurisprudence gives references to twenty-eight cases, which have only occurred to half that have been related in various places. Dr. Appleton, in the article Spontaneous Human Combustion, in the 'Cyclopedia of Practical Medicine,' relates four cases which have occurred within the present century. All were females and addicted to ardent spirits.

The following conclusions may be deduced from the various cases which have been related:—

1. The subjects were nearly all females. Of seventeen cases collected by Lair are all of the same sex. They were far advanced in life.

2. Most of the individuals had for a long time been addicted to the use of ardent spirits, and they were either very fat or very lean.

3. The combustion occurred accidentally and often from a slight cause, such as a candle, a coal, or even a spark.

4. The combustion proceeded with great rapidity, usually
COM 400

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consuming the entire trunk, while the extremities, as the feet and hands, were occasionally left uninjured.

5. Water, instead of extinguishing the flames which proceeded from the parts on fire, sometimes gave them more active development.

6. The fire injured very slightly or not at all all the combustible objects which were in contact with the human body at the moment when it was burning.

7. The combustion of these bodies left as a residuum fat for ashes, with an acrid, stinking, and very penetrating soot.

8. The combustions have occurred at all seasons, and in northern as well as southern countries.

If it is true that under similar circumstances the question arises as to what is the nature of the process by which this decomposition of the body has been effected? That it is not an ordinary combustion of the body from external agents is very evident. Dr. Beck says that large quantities of fuel are needed to convert the body to ashes. It is necessarily slow in its progress, and the heat required, being high, would extend itself to surrounding substances. The combustion also in ordinary cases would often be incomplete, and particularly so as to the bones. Again, if the body were not wholly consumed, there would be blisters, scars, &c., on various parts. It must therefore arise from some change in the chemical composition of the body, which favours its combustion at a lower temperature than usually occurs at the surface of the earth. All union of carbon, hydrogen and oxygen forms carbonic acid gas, and phosphorus, in the process of combustion. This is constantly going on in the lungs of all animals, and generating animal heat. The heat evolved in this process is not sufficient to produce light, but if the temperature be raised above a few degrees above that of the human body, it would be possible for light to be emitted, and this actually takes place in the burning of highly inflammable compounds, such as ether. There can, we think, be little doubt of the possibility of such a chemical composition of the blood and solids of the body taking place, under the influence of a stimulating compound containing the combustible elements carbon and hydrogen, which would under certain circumstances produce a slow combustion by contact with the oxygen of the atmosphere. Such theories have been advanced, but are not so free from objection as the one we have advanced above. Pierre Amie Lair and others attribute it to the impregnation of the tissues of the body with alcohol, but Fontenelle imputed pieces of meat for a length of time in alcohol, and could not consume them by setting fire to them. Male, Le Cat, and Kopp suppose it to be an electrical phenomenon. Mare, in the article Spontaneous Combustion in the 'Dictionnaire des Sciences Naturelles,' supposes that it may arise from inflammable bodies such as carburetted hydrogen, generated in the human body; and the probability of this mode of production Dr. Apjohn is inclined to adopt.

The consideration of this subject may be the object of medical inquiry; and although within a recent period it has been stated by the civil courts, the following case indicates its relations in medical jurisprudence. It is related by Le Cat. The wife of the Sieur Millet of Rheims was in the habit of induding in the use of ardent spirits, and the economy of her household was managed by a handsome female servant. On the 20th of February, 1725, she was found consumed at a distance of a foot and a half from the hearth in her kitchen. A part of the head only, with a portion of the lower extremities and one of the vertebral column, had escaped combustion. A foot and a half of the flesh was eaten up; and while the body had been consumed; but a burning-trough and a tub which stood close by sustained no injury. Millet, being interrogated by the judges, stated that his wife had retired to rest; he did not know what had left him there at the time; excepting she was warming herself by the kitchen fire, fell asleep, but was awakened about two in the morning by a strong odour; and having repaired to the kitchen, he found his wife in the state above mentioned. The judge, supposing he had conspired with the servant to kill his wife, condemned him to death; but, having appealed to a higher court, the circumstances were again examined, and the judgment reversed, the case having been pronounced one of spontaneous combustion.

(Foder, Traité de Médecine Légale; Beck, Medical Jurisprudence; Apjohn, Cyclopedia of Practical Medicine; Mare, Dictionnaire des Sciences Médicales.)

The genus of plants bringing to the natural order Euphorbiaceae. It has delicious flowers. The staminiferous flowers are formed of bracts united into an anemum, the stamens are numerous and united into a single column. The pistilliferous flowers are racemose, the calyx is 3-parted, the styles 3, the capsule 3-lobed.

C. cochichinensis is a small tree with a resinous juice. It has a strong, sweet, smooth, aromatic odor. The male flowers are imbricate, smooth, amentaceous, the cajanus consisting of imbricated 1-flowered scales, axillary and short; the female racemose, terminal, and small. This tree yields a gum which possesses emetic and purgative properties. It is recommended in cases of dropsy, but has not been introduced into European practice. It is a native of Cochin China.

(Lindley, Flora Medicina.)

COMMISSARY, an officer who is delegated by a bishop to act as a mediator between the people and the Bishop or his commisaries. The function resembles that of the chancellor of the diocese in the consistory court of the diocese. A commissary has, generally speaking, the authority of official principal and vicar-general within his limits. An appeal lies from his decisions to the metropolitan. In some dioceses there is a commissary court for each archdeaconry. The commissarial courts were established for the convenience of the people in parts of the diocese remote from the consistory court. A commissary must be learned in the civil and ecclesiastical law, a master of arts or bachelor of law, not under the age of twenty-six, and be must subscribe the Thirty-nine articles (Canon 127).

In Scotland the same classes of questions which in other parts of Europe were intrusted to the ecclesiastical judicatures came under the authority of the bishops' courts while the episcopal polity continued, and subsequently devolved on special judges, who were called commissaries. The four provinces of the church of Scotland have established a Supreme Ecclesiastical Court, which had jurisdiction in questions of divorce, and of declarations of the existence or non-existence of marriage. The district commissaries had the administrative authority of confirming executors to persons deceased, a function resembling the granting of letters of administration in England. By 4 Geo. IV. c. 97, the functions of the provincial commissaries were vested in the sheriffs of the respective counties, who, before the passing of that act, were ex officio commissaries. In 1834, however, the 12 Geo. IV., 1 Wm. IV. c. 69, the jurisdiction of the commissaries of Edinburgh, as above, was vested in the Court of Session.

COMMISSION. [AGENT, P. C.; BROKER, P. C.; FACTOR, P. C.]

COMMISSIONERS, LORDS. [AMSERY, ROYAL, P. C.; ADMIRALTY, P. C.]

COMMISSIONERS OF BANKRUPTS. [BANKRUPT, P. C.]

COMMISSIONERS OF SEWERS. [Sewers, P. C.]

COMMITTEE OF A LUNATIC. [Lunacy, P. C.]

COMMON RECOVERY. [RECOVERY, P. C.]

COMOCLIA DIA (from eden, hair, and ad660, a branch), a generic name. It is a genus of trees belonging to the Compositae. It has bermaphrodite or monocious flowers; a 3-parted persistent calyx, 3-4 long petals; 3-4 short stamens; a single ovary with no style, and a single stigma, an ovate 1-celled 1-seeded drupe; the seed somewhat resembles a curved furculous originating at the base of the cavity; no albumen.

C. dentata, Tooth-leaved Maiden Plum, has pinnated shining leaves, green above, with a round rachis 5 inches long, 1-2 toz on the young and with a green oblong, acuminate, spiny-toothed, velvety, and somewhat downy at the back. This plant is a tree reaching a height of about thirty feet. It is a native of the woods of Cuba and St. Domingo, whence introduced to Europe. It has an erect stem much branched. A milky juice exudes from it, which is glutinous and becomes black by exposure to the air. It stains linen and the skin black, which cannot be washed out of the former, and only comes off from the latter by the embrittlement of the surface it has adhered to. It is said that the inhabitants of Cuba that it is death for persons to sleep under this tree, especially if they are fat or a full habit of body. It is, undoubtedly, a poisonous tree, although nothing is recorded of its mode of action on the system.

C. integri/olia has stalked leaflets, lanceolate, quite erect, smooth. It is a tree twenty feet high, with small scented deep red flowers. The berries are black and succulent, and can be eaten with impunity, but are not agreeable to taste. The wood is hard, of a fine grain, and reddish colour. The tree gives out a watery juice, which is slightly glutinous, and
grows black on exposure to the air. Like the juice from the last, it stains linen and the skin indelibly. It is a native of Jamaica.

(Don. Gardener's Dictionary: Lindley, Flora Medica.)

COMPLEMENTARY COLOURS. (COLOURS, COMPLEMENTARY, P. C.S.)

COMPOS, or NON COMPOS MENTIS. (Illegibility, P. C.)

COMPOUNDING A FELONY. (Felony, P. C.)

COMPRESSIBILITY OF WATER. Like almost every other substance, water expands in volume by an increase of temperature, and contracts by a decrease; but it has the peculiar property, that at a temperature expressed by about 40 degrees of Fahrenheit's thermometer it attains its greatest compressibility. To express the amount of pressure to which water will stand, if at 60 degrees, would occupy one cubic foot, at 40 degrees occupies only 0.9907 cubic foot; while at the temperatures both of 45° and 35° (its fluidity at the latter temperature being preserved by the avoidance of all agitation) the volume is 0.9901 cubic foot (Gilpin, Phil. Trans., 1792): the increase of volume at temperatures below 40° is ascribed to some tendency of the water to crystallize while it is still fluid.

The variations produced in the volume by variations of temperature, as well as the fact that water is a conductor of sound, and consequently that it possesses some elasticity, are to be considered as arguments that water may be capable of being compressed by mechanical means; but the quantities of compression which may be obtained by experiments made for the purpose are so small as to render it very difficult to determine its precise value.

In 1861 some members of the Academia del Cimento at Florence made experiments of different kinds in order to ascertain the compressibility of water; and one of these consisted in filling a hollow globe of silver with water at the point of freezing: an effort was then made, by blows with a hammer, to diminish the volume of the globe by altering its form, when it was found that the water escaped through the pores of the metal. The like experiment was made by Muschenbroeck in 1731, with a globe of gold, which was attended with a like result; and, till the year 1762, it was considered that water was incapable of being reduced in volume, for it was stated that year Mr. Canton, introduced water at a certain temperature into a glass tube, and having, by an application of heat, made the water fill the tube so as to expel the air, he sealed the tube hermetically; then, having reduced the temperature to its former value, he broke off the upper extremity of the tube in order that the atmosphere might press on the top of the column of liquid, when the height of the latter was found to be thereby diminished. The like experiment was tried with alcohol, oil, and mercury; and it was found that their fluids were found to suffer different diminutions of volume by the pressure.

It has been imagined that the apparent diminution of the volume of water was only the result of an expansion of the air contained in the tube. But, this does not bear out the conclusion. The latter was not allowed to enter it; but, if such expansion alone had produced the effect, it would have been the same, and would have caused equal depressions, in the columns of different kinds of fluid, whereas the depression of the water was about fifteen times as great as that of the mercury; there is little doubt therefore that the observed diminutions of height were results of the compressions of the fluids by the weight of the atmosphere.

The experiments of Canton show that, under a weight equal to that of an atmospheric column in its ordinary state (29.74 inches of mercury), the compressions of the four following fluids, in millionth parts of their volumes, and at a temperature equal to 50°.

<table>
<thead>
<tr>
<th>Substance</th>
<th>Compression</th>
</tr>
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<tbody>
<tr>
<td>Alcohol</td>
<td>66</td>
</tr>
<tr>
<td>Rain-water</td>
<td>46</td>
</tr>
<tr>
<td>Sea-water</td>
<td>40</td>
</tr>
<tr>
<td>Mercury</td>
<td>3</td>
</tr>
</tbody>
</table>

COMPRESSIBILITY OF THE BRAIN. (Head, Injuries, or, P. C.)

COMPTONIA, a genus of plants belonging to the natural order Myricaceae, named after Henry Compton, Bishop of London, by whom the herbarium of plants attached to the episcopal palace at Fulham was formed. The male flowers have cylindrical loosely imbricated catkins, with deciduous 2-flowered bracts; 2 sepals; 6 stamens, adhering in pairs; the female flowers have ovate densely imbricated catkins, with 1-flowered bracts; 6 sepals, larger than the bracts; 3 carpelary styles, and 1-s seeded nut. There is only one species, P. C. S., No. 51

the C. argentifolia, Sweet Fern. It is a small bush, three or four feet in height, yielding a powerful aromatic fragrance when rubbed between the fingers. It has long linear pinnatifid leaves, brown and rather downy on the under side, shining on the upper. It is a native of the woods and mountainous districts of the United States, and produces a remedy in the cure of diarrhoea. It possesses tonic and astringent properties. It is a handsome shrub, and will thrive in a peat soil or sandy loam, and may be propagated by layers or suckers. It was called Linnæus, but differs very much from that genus in its characters and properties.

(Lindley, Flora Medica; Loudon, Encyclopedia of Plants.)

COMPTUITION. We need not tell those who are acquainted with the existing treatises on arithmetie, that in no one instance do they pretend to give any mode of forming good habits of computation. The beginner, after receiving instructions as to what is to be done in the several great rules of arithmetie, is allowed to manage the details as he can.

The more mechanical art of computation, aart from arithmetical reasoning or application to subjects of interest, is he very lofty exercise of the mind. A wonderful degree of proficiency in it can be attained by many who find correct reasoning almost an impossibility: and on the other hand, some of the first among mathematical discoverers have hardly arrived at more than the expediency of an ordinary schoolboy.

It is one of those arts which may be learned by most people who begin with a determination to conquer difficulties, and a power of arriving at methodical habits: no person who, after beginning in the right way, is obliged to confess a total failure, has any ground to suppose that he could master a common arithmetical art: he will not go out of his way, but will sit down and begin anew.

That we may not frighten any one of the thousands who are miserable computers after going through years of school discipline, and whose minds are too well made to allow them to flatter themselves that they were ever learning in vain, but that even in what is merely arithmetical, nothing can compensate for the want of habit of operation duly learned at the proper time. Now computation is only an art: its elements are a small number of acts of memory, and its details consist in a still smaller number of operations, each of which, by itself, is of the utmost simplicity.

Many readers will suppose us, in speaking of the elementary rules of arithmetie, to mean addition, subtraction, multiplication, and division; but this is not the case. We very soon think of saying that the elementary operations of a journeyman tailor's business are the making of coats, waistcoats, and trousers. The rules just named are the perfection of denominations of number to the mind; but the mind, when it has learned how to think of their uses. But, under directions, he can really manage the last and executive process of any mathematical inquiry. Until he is something better, he is but a tool in the hands of others, but no one thinks the less of tools because they are not used for what they can do.

Is this then, we shall be asked, all that you propose, namely, to describe addition, subtraction, multiplication, and division? We answer, yes, and on these simple grounds, that thinking more is wanted, and that in what we have to say upon them, we shall touch the reason why so many persons are incapable of and disgusted with arithmetical process. There are but few who find much difficulty in comprehending what is to be done in a question of arithmetie: but there are many who find that, however clearly they may see the way, there is a heavy and broken ascent between them and the
answer. The figures will not come right, there is nothing but mistake after mistake: and though everything else is gained, you must not. For one who are thus persuaded are aware that nothing is wanting but attention to the elementary processes with a better method than a beginner invents for himself: every one knows that books and teachers give no method at all.

Two of the form of exercises constitutes the whole of what is necessary. The degree of attention with which each is to be practised must depend upon the circumstances of the learner’s case. Each one contains a difficulty which most persons very likely cannot avoid. Every one must be the means of another. Their several suppositions are true: and it is just as true that the trouble and risk with which an infant learns to walk upon its feet could be avoided: some could continue to crawl, others could contrive to walk on their knees: all would get on in a certain manner. Any person who is determined to succeed, and who has reason to know that his method has not answered as yet, should try our plan with the faith of a learner. But we can promise him no success unless he will make up his mind, from the outset, entirely and at once to abandon every habit which we condemn, and to adopt every mode which we prescribe; and this, though it should seem to him that what he has to take up is more difficult than what he is to leave off. He may take any time, and must not be discouraged by the feeling that the instructions are longer than the old ones. He must continually attempt more and more rapidity, remembering that quickness of operation will never come of itself by practising with deliberate caution. Some perform better than others—no one is quite wrong; so if one or the other must be the end of it; but quick and sure must be the motto of an arithmetician. All very correct computers that we have seen have been rather rapid workers: we believe the reason to be that those who cannot acquire rapidity grow in it in disguise.

1. Presuming that the learner can count one, two, three, &c., as fast as he can speak the words, he must then try if he can do the same backwards, as fifty, forty-nine, forty-eight, forty-seven, &c. He must then practise counting forward—by two at a time, as in 2, 4, 6, &c., 1, 3, 5, &c.—by three at a time, as in 1, 4, 7, &c., 2, 5, 8, &c., 3, 6, 9, &c.—by four at a time, as in 1, 5, 9, &c., 2, 6, 10, &c.—and so on up to 11 or 12 at a time. The same should be done backwards, as in the following by sevens, 90, 83, 76, 69, &c. In doing this he must not use any description, either vocal or mental: it must not be 23 and 6 are 28, 28 and 6 are 34, &c.; but 22, 28, 34, &c. These various processes should be carried on or from 100 at least.

2. Proceed to form with rapidity the number which must be added to a given number to make up the next number which ends with a given digit. Thus, one of the questions asked, at its fullest length, is: ‘Given 38 and 4, how much must be added to 97 to make the next number that ends with 4 if 38 and 4? But all that must be repeated, orally or mentally, is ‘38 and six are forty-four.’ Write down a row of numbers, as in 

| 2 | 3 | 6 | 2 | 3 | 4 | 1 |

and practice thus—72, 9, 7 are 79, 29 and 7 are 36, 46 and 7 are 108, 63 and 9 are 72, &c.; taking 72, 9, 63, &c. for the successive lesser numbers, and 9, 6, &c. for the successive unit figures of the general result. It will generally happen that the units are immediately to be written down and discarded, while the tens are to be retained in memory. Practice repeating a number, so as while repeating it to write down the tens and think of the units; thus, in 76, 17, the moment of writing down 6, think of 7.

4. Learn the multiplication table up to 12 times 12, but not with the usual practice of wording all the results, as in 1 times 1 make 1; 1 times 2 make 2; 1 times 3 make 3; &c. The table must be so learnt that the two factors suggest the product instaneously. Thus, 8 and 9 must give 72 the instant they come together in the mind; and so on. Take a row of numbers as before, and looking at the middle pairs, repeat the product. Thus, 2, 9, 8, 7, 4, 3, &c. is to suggest 18, 72, 56, 28, 12, 15, &c. as fast as the words can be spoken.

Those who have been accustomed to learn the multiplication table from the head of it, always putting either the greater factor before the other—put the table in the other order: 5 and 9, or 9 and 5, must suggest 45 with equal ease.

5. Augment the last exercise as follows:—Having three digits, learn to pass in thought immediately to the product of the first two augmented by the third; thus, 7, 9, and 8 must lead to 79, 9, 7, or 79. Take a row of figures, as above, say 2497163, &c. which must be made the means of suggesting immediately 17, 43, 64, 13, 9, &c. The usual repetition, ‘twice 4 are 8 and 9 are 17,’ &c. must not be tolerated for one moment.

6. The power of combining the fifth and second exercises as follows:—Having four digits, learn to add the third to the product of the first and second, and to pass on to the next number which has the fourth in its unit’s place. Thus, with the row of numbers 1792663, &c. should be rapidly suggested—18 and 8 are 26, 63 and 3 are 69, 28 and 4 are 26, 22 and 4 are 26, 54 and 9 are 63, &c.

7. Having four numbers, deal with the first three as in the fifth exercise, and then repeating the result, add the fourth. Thus, from 2, 7, 5, 8, get 19 and 8 are 27. Thus, the row of figures 7084361, &c. must give—71 and 4 are 75, 76 and 3 are 79, 35 and 6 are 41, 18 and 1 are 19.

8. Having a digit and a number of places, learn to arrive speedily and with few words at the number of times which the figures of 2, 3, 4, 5, 6, &c. are contained in the given number, and at the remainder. Thus, ‘7 in 58, 7 times 4,’ ‘8 in 29, 3 times 5,’ &c.

A person who really desires to become a good computer must be exercised in performing these exercises with quickness, and accurately. It is possible to dispense with them, and it is possible to dispense with rules and numerals altogether and to use pebbles. But we are very confident that when these exercises are once made very rapid and safe, the computer has gone through nine or ten parts of his training: he can walk, and will soon learn to find his way. The common error lies in imagining that learning to find the way is learning to walk.

We now take the four rules, insisting on the details of the mode of performing each of them, and presuming the usual process to be known.

Numeration.—Learn to distinguish tens, hundreds, &c., not by the places in which their digits come, but by the numbers of places which come after those places. Instead of connecting thousands in the mind with the fourth place, connect them with three places cut off. Thus 176493 has 1764 hundreds, 176 thousands, &c.

Addition.—Add as in exercise 1: thus, if the figures were to be 2, 3, 4, &c., it should not be 7 and 2 and 9 and 3 are 12 and 4 are 16, &c., but 7, 9, 12, 16, &c. Dwell upon the tens to be carried, in writing down the units. In the following question, every word that should be repeated, orally or mentally, is marked with an accent; each ten that is to be dwelt on for a moment is in italics:

<table>
<thead>
<tr>
<th>27649</th>
<th>18</th>
<th>22</th>
<th>30</th>
<th>36</th>
<th>forty-five</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>10</td>
<td>19</td>
<td>20</td>
<td>24</td>
<td>twenty-five'</td>
</tr>
<tr>
<td>308</td>
<td>11</td>
<td>16</td>
<td>24</td>
<td>27</td>
<td>thirty-five'</td>
</tr>
<tr>
<td>44615</td>
<td>3</td>
<td>5</td>
<td>9</td>
<td>18</td>
<td>twenty-five'</td>
</tr>
<tr>
<td>2799</td>
<td>3</td>
<td>7</td>
<td>nine'.</td>
<td></td>
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<tr>
<td>10868</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>95515</td>
<td></td>
<td></td>
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<td></td>
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</tr>
</tbody>
</table>

Let the method of verification be simply taking the columns in the opposite order, or downwards, as 9, 15, 25, 35, forty-five, &c. 

Subtraction.—Let the several subtractions be made by mental recovery of additions as in exercise 2: not ‘7 from 16 leaves 9,’ but ‘7 and 9,’ not repeating 16, which is unnecessary, inasmuch as when 9 is found, 16 is done with, and the carriage of one is all that follows to be considered. The following detail has every word of the process:

| 274631807 | 8 | 9 | 5 | 10 | 9 | 2 | 93519848 | 2 | 3 | 3 | 5 | 9 | 10 | 7 | 1 | 1 | 1 | 1 |
|------------|---|---|---|---|---|---|--------|---|---|---|---|---|---|------|---|---|---|---|---|
| 71832859 |

According to even recent books the computer should say, ‘8 from 7 I cannot, but 8 from 17 and there remains 9, set down 9 and carry one,’ &c. It would be shorter than this to say, ‘8 and 7 is 15, but the next higher number that ends with 7 leaves 9.’ Our plan is the abbreviation of ‘8 and 9 make up the next number that ends with 7’ repeating only the first three words.
Multiplication.—Apply the exercises 4 and 5 to the usual process. Here, as before, the detail given has every word which need be repeated. The figures to be written down are accented; all others are carried.

\[ \begin{align*}
7206 & \quad 2^4, 8^6, 20^8, 0^8, 30^9, 48^4, 14^3, 36^7, 48^6, 76^8, \\
809 & \quad 20^2, 20^3, 9^6, 8^6, 16, 252, 8, 12, 17, 4, 10, \\
3 & \quad 10, 16, 12, 9, 6. \\
\end{align*} \]

The usual process of casting out the nines, as it is called, though not an absolute verification, is a useful one. Without entering upon its demonstration, we describe.

Casting out the nines, means adding together the digits of a number and throwing out 9 as fast as it arises. Thus in 26547896 we have—2 and 8 are 6 and 6 are 12, throw out 9 and 5 remains; take in the next figure, 4, giving 9, throw out 9 and 0 remains; pass over the 9 and take in 6 which gives 11, on which 2 remains. All that is necessarily to be repeated is, 2, 5, 4, 1, 3, 7, 6, 11, 2. Cast the nines out of both factors, multiply the results, and cast out nines; the answer should give the same figure as the repeated product gives when the nines are cast out. Thus 7206 and 809 give 6 and 4, the product of which is 24, giving 6: and the repeated product 2687246 also gives 6. This is a high presumption that the result is correct, if any, lies in this fact, that it is of 2687246 which are too great are exactly compensated by others which are too small. Now it is very unlikely that this exact compensation of errors should exist; and in this unlikelyhood consists the strong presumption of verification which the rule of casting out the nines affords.

It may be observed that this rule applies to all operations, thus:—Do with the result of casting out the nines the same as was done with the numbers from which the nines were cast out, the result, with its nines cast out, should give the same result as arises from casting out the nines of the reputed answer.

Thus in the previous example of addition, the nines cast out from the several numbers to be added give 1, 6, 2, 9, 0, 5, the sum of which, with nines cast out, is 7, the same as from the reputed answer 9615. In subtraction, it may be necessary to take in a nine before subtracting.

Division.—This rule is considerably shortened, and (in our opinion, though we think many would differ from us) increased in safety, by performing each subtraction without setting down the multiplication. As a preliminary, suppose it required to subtract 7 times 39398 from 410843. Beginning with 7×8 instead of putting it down as 56, look at 3 and pass from 56 to 63, writing down the 7 and carrying the 6 tens just used. Take these 6 tens and 7 times 9, giving 53, and make them up to 74, putting down the 5, and carrying 7. All that need be repeated is as follows, dwelling on the tens carried:

\[ \begin{align*}
\text{From} & \quad 410843 \\
\text{Take} & \quad 29398 \times 7 \\
66 & \quad 66 \text{ and make } 7 \\
6 & \quad 65 \text{ and make } 7 \\
9 & \quad 91 \text{ and make } 21 \\
5 & \quad 21 \text{ and make } 2 \\
0 & \quad 2 \text{ make } 4. \\
\text{Suppose} & \quad 39398 \times 29398 \\
\text{Quotient} & \quad 410843 \\
65 & \quad 65 \text{ make } 7 \\
7 & \quad 7 \text{ make } 21 \\
10 & \quad 21 \text{ and make } 2 \\
205057 & \quad 2 \text{ make } 4 \text{ and } 0 \\
\text{Suppose} & \quad 3293814280 \text{ is to be divided by } 4798, \text{ instead of the usual plan, write the divisor on the left, or the quotient on the right: at any rate, the divisor and quotient should be near one another.} \\
\text{Quotient} & \quad 410843 \\
424582 & \quad 29398 \\
5799 & \quad 3293814280 \\
20521 & \quad 4798 \\
\text{The work is as follows:—The first quotient figure being 6, subtract 6 times 4798 from 329361, thus:—48 and } 3^2 \text{ are } 51, \\
59 \text{ and } 7^2 \text{ are } 66, 42 \text{ and } 1^2 \text{ are } 43, 46 \text{ and } 3^2 \text{ are } 49, 28 \text{ and } 4^2 \text{ are } 70. \\
\text{The } \frac{4}{5} \text{ being brought down, and 9 accreted to be the next quotient figure, we have } 72 \text{ and } 2^2 \text{ are } 74, 88 \text{ and } 9^2 \text{ are } 93, 6^2 \text{ and } 6^2 \text{ are } 72, 69 \text{ and } 9^2 \text{ are } 71, 43 \text{ and } 0 \text{ (uncessary) are } 43. \\
\text{Then } 8 \text{ and } 2 \text{ are brought down, 0, and } 5 \text{ written as quotient figures, and } 40 \text{ and } 2^2 \text{ are } 44, 48 \text{ and } 9^2 \text{ are } 81, 38 \text{ and } 7^2 \text{ are } 56, 28 \text{ and } 0 \text{ are } 28, 24 \text{ and } 0 \text{ are } 24. \\
\text{The last quotient figure is } 1, 8 \text{ and } 1 \text{ are } 9, 9 \text{ and } 3 \text{ are } 12; 7 \text{ and } 2 \text{ are } 9, 7 \text{ and } 0 \text{ are } 7, 4 \text{ and } 2 \text{ are } 6. \\
\text{Casting out the nines, the products obtained from the divisor and quotient, increased by the result of the remainder, ought, after casting our nines, to agree with the dividend.} \\
\text{Here the divisor gives } 7, \text{ the quotient } 3, \text{ and the remainder } 8; \text{ 7 times } 3 \text{ and } 8 \text{ is } 22, \text{ giving } 2; \text{ the dividend also gives } 2. \\
\text{We have put down every step of the work in all the rules. The very basis of this method is the acquisition of such exactness in the performance of the task, as will enable the computer to dispense with a large quantity of the ordinary halving-places. We need not enter upon the rules for the extraction of the square and cube root [Square, P. C.,] or of the solution of equations [Equation and Evolution, P. C.], at length; but we shall annex an example of each, leaving the reader to apply the seventh exercise in its proper place. In the contracted part of Horner's method, we add to the method of the last article cited, a provision for making the first figure of the right of the vertical line of contraction as direct as the process will allow it to be. This last process (Horner's method) is the best exercise of computation. It involves all rules in a form of considerable detail and dispersion.} \\
\text{First, we put down the process for the extraction of the square root of } 167. \\
\text{Now let it be required to find the positive root of } x^2 + 12x - 12 = 0. \\
1 & \quad -12 \\
1 & \quad 0 \\
4 & \quad 100 \\
7 & \quad 2100 \\
10 & \quad 22100 \\
100 & \quad 192100 \\
1000 & \quad 1821000 \\
10000 & \quad 17210000 \\
100000 & \quad 162100000 \\
1000000 & \quad 1521000000 \\
10000000 & \quad 14210000000 \\
100000000 & \quad 132100000000 \\
1000000000 & \quad 1221000000000 \\
10000000000 & \quad 11210000000000 \\
100000000000 & \quad 102100000000000 \\
1000000000000 & \quad 921000000000000 \\
\text{In both these examples the result is carried to about three times as many figures as are usually wanted. But this is what should be done in computing for exercise. No one does his very highest with ease or with certainty; and a person who can safely and rapidly knock off the seven or eight figures which are generally requisite must be one to whom a much larger amount of correctness is, or has been, familiar.} \\
\text{It is necessary to insist particularly upon acquiring the habit of rapid computation by attempts at rapidity. Taking any number of exercises which verify one another, as a multiplication and a division, or a raising of a square and extraction of the square root, the learner who has acquired a little familiarity with the rules should try them at the top of his speed. If the verification be attained, if the division, for instance, reproduce the multiplicand for a quotient, without a thousand to one that the whole process is correct. But if there should be a failure, as may, and almost certainly will at first, happen several times running, there is no occasion to examine closely into the reason of the failure. The whole question should be thrown aside, and another should be taken.} \\
\text{8F2} \]
this course it will soon appear that the attempts become more and more nearly correct, until at last failure is the exception, and not the rule. There must be no fear of error, whether there be cause for it or not. The young calculator should proceed as boldly as if he were infallible; for he may depend upon it that it is not infallible which is to be avoided by precaution, but accuracy which is to be obtained by habit.

With regard to minor points, every one must decide for himself whether actual vocal repetition of the words and numerals necessary to the process does or does not tend to accuracy. Some persons require to repeat to themselves, some persons again require to repeat to themselves; but it is worth while to give silence a fair trial. It would also be of assistance to some persons to invent a habit of signifying the multiplier, which is in actual use, at the position of the left hand. Thus, 1, 2, 3, and 4 might be signified by placing the corresponding number of fingers of the left hand on the paper, 5 by placing the thumb only, and 6, 7, 8, and 9 by the thumb, with a corresponding number of fingers.

In all those parts of computation which relate peculiarly to fractions, common or decimal, we know of no guide but reason. The ultimate process, the actual step for the time being, must be either addition, subtraction, multiplication, or division; and accuracy may be acquired mechanically. However desirable it may be that the learner should demonstrate these processes, his power of performing them does not depend upon his being able to do so. It is otherwise with regard to the new and distinct processes introduced in questions which require fractions and decimals. These are in fact, processes which are usually denominated, but directions for selection of processes.

The general run of commercial calculations hardly needs any distinct preliminary exercise. There is one great improvement in the way in which these methods are susceptible, namely, the expression of the parts of a pound decimal, instead of by shillings, pence, and farthings. Until a decimal coinage is obtained (Standard, P.C.), any person with a moderate knowledge of decimal fractions may procure for himself most of its advantages, by rules which are partially given in Interesting, P.C., and which we here make complete. The demonstration will be easy enough to those who consider the fraction which one farthing is of a pound, 00104166066... or, 1/104.

To write down any fraction of a pound decimal, proceed as follows:

1. Fill up the first place of decimals with 1 for every pair of shillings; and the second and third places with 50 for the odd shilling, if any, and 1 for every farthing in the pence and farthings, with an additional 1 if those amount to sixpence. Thus, as far as three places of decimals, 8s. 4d. is 4061, 9s. is 4062, 9s. 6d. is 4723, 9s. 9d. is 4759, 10s. 3d. is 49270.

2. Fill up the fourth and fifth places with 4 for every farthing above the last sixpence, and an additional 1 for every three halfpence. Thus, as far as five places of decimals, 9s. 3d. is 47201, 9s. 6d. is 47062, 9s. 9d. is 49270, 10s. 3d. is 49270.

3. Fill up all the remaining places with the decimal fraction derived from the number of farthings above the last three halfpence for a numerator, and 6 for a denominator. Thus, 9s. 4d. is completely expressed in 4062f, 9s. 6d. is 4723f, 9s. 9d. is 49270f, 10s. 3d. is 49270f.

For the fourth and fifth places are sufficient; and it is rarely that more than five are wanted. The inverse rule, namely, that for reading off a fraction of a pound into shillings, pence, and farthings, is done from the first three places, within a farthing, by allowing a pair of shillings for each unit in the third, another shilling for 50 (if there be so much) in the second and third places, and a farthing for each 1 that is left in the second and third places, deducting 1 if 25 or more be left. Thus 12345f is 2r. 5f. 2939f is 3s. 12d. 5f. 2937f is 3s. 1d. 5f. 2936f is 3s. 1d. 5f.

These rules look repulsive at first. None but those who have practised them until the transformation is easily made, can have any idea of the amount of labour which they save. They are in fact as good as a decimal coinage to those who have mastered them. Even those who doubt the question in the usual way, and compare it with the decimal mode.

When the government, for ease of calculation, proposed seven pence in the pound instead of 3 per cent., as a tax, how much tax, to a farthing, did they give up on 100 millions of income? On one pound 3 per cent, is 03, and seven pence is 0201606666... which falls short of the former by 0000333333... this, taken 100 times, is 3333333333..., or 3333. 6s. 8d.

Some development of the reasons for the plan which forms the main part of this article will be found in the 'Companion to the Almanac' for 1844.

Casa, SECONDIANO (Cavaliere), a celebrated Italian oil and fresco painter of the eighteenth century, was born at Gacta, in the kingdom of Naples, in 1767. He was for sixteen years the pupil of Solimena at Naples, but attracted some attention to himself at Rome. He is considered by the grand masters, he and his brother Giovanni determined to settle there, being convinced of the superiority of the Roman school. Conos, with an unparalleled resolution, laid aside the brush in his fortieth year, and for five years exerted himself almost exclusively with the portraiture, copying the best antique and modern works in Rome, with a view to improving his style of design. The reward however was not worth the price, for his works, though improved, were still mannered; habit had too strong a possession of him: he returned at length to painting, by the advice of Le Gros the sculptor.

Conos was one of the intimates of Pietro da Cortona, and possessed to a great degree the facilities of that master: he was in particular much in his house, and performed the frescoes in the church of the Chigi at Rome and in the Roman States: there is one at Siena which is considered his masterpiece, the Probatica, or the Sacred Pool of Siloam, in the hospital of Santa Maria della Sera. These are the principal works of Conos; he, however, worked with others, and he etched a few plates himself. He died at Naples in 1764. There is an eulogium upon him by De Riso in his 'Memorie delle Belle Arti.' Giovanni Conos acted chiefly as his brother's assistant.

(For memoir, Storia scientifica, &c. C. P.)

CONCEALMENT OF BIRTH. [Infanticide, P.C.]

CONCERTINA, a musical instrument recently invented by Professor Wheatstone, the principle of which is explained in the Scale of Accord, P. C. The Concertina, in its simple form, claims priority of the Accordina in point of date, though the former, in its highly improved state, and as now generally in use, was more lately introduced.

This instrument is composed of a bellows, with two hexagonal faces or ends, and on these are placed the various stops, or studies, by the action of which air is admitted to the laminas (or tongues, or steel bars) producing the sounds; and hereon are also fixed the thumb-straps and fingers-rest. The air is admitted through seven holes in the heads, or is fed into the bellows by seven keys, whose numbers in different keys are read, to cause the tones produced to be more perfect than on the organ or piano-forte, and by which also the fingering of the various scales is rendered equally easy.

The Concertina, when the bellows is extended, is twelve inches in length, and the sides are about six inches wide. Its compass is three octaves and three notes, commencing at G, the fourth space in the base, and thence ascending. Some instruments, however, are made with a higher, some a lower, compass, in which we here deal Double-Action Concertina, because two springs, or tongues, are given to each note, in order that the same sound may be produced, whether the bellows be pressed in or drawn out. The finger-board of the Concertina is divided into the two scales, for each note, yielding a sound only when the bellows is moved forwards; that is, pressed. But it is provided with a self-acting valve, in order that the bellows may collapse instantaneously, which closes while the latter is pressed, and opens to admit air when the bellows is withdrawn. A still further improvement of this instrument is said to be ready to be produced, which will give a complete treble and base.

There are also tenor and base Concertinas: the compass of the base is four, the treble five, to the second additional line above the treble: of the last, from the second additional line below the base, to the third space in the treble.

CONCUSSION OF BRAIN. [Head, Injuries of the P. C.]

When you consult the dictionary, you will find the expression 'concussion of brain' is not there. It is a word which is not used in ordinary conversation, and it is used only in medical circles. It is an expression which is used to describe a condition of the brain which is caused by a sudden blow or shock, and which results in a temporary loss of consciousness. The term 'concussion of brain' is not used in legal or medical contexts, but it is a term that is used in everyday conversation to describe a condition of the brain that is caused by a sudden blow or shock. It is a term that is used in medical contexts to describe a condition of the brain that is caused by a sudden blow or shock, and which results in a temporary loss of consciousness. It is a term that is used in legal or medical contexts to describe a condition of the brain that is caused by a sudden blow or shock, and which results in a temporary loss of consciousness. It is a term that is used in everyday conversation to describe a condition of the brain that is caused by a sudden blow or shock, and which results in a temporary loss of consciousness.
CONDENSER, a vessel employed to facilitate the liquefaction of aqueous or spiruous vapours, by exposing them to the cooling effect of a current of water, which may be either injected immediately upon or among the vapour, or, where it is required to cool a conductor of very great extent, to be received in a vessel or vessel-decking distinct, separated from the vapour by a thin partition of metal. In the latter case copper is the metal most generally employed, on account of the rapidity with which it conducts heat, and the ease with which it may be fashioned into thin sheets adapted for the purpose.

The condensers employed for suddenly diminishing the volume of steam after it has impelled the piston of a condensing steam-engine are noticed under STEAM-ENGINES, p. 474, and, Steam-Engines, p. 549, 550. The condenser forms a very important part of any steam-engine which works by condensation as well as pressure, but is especially important in a marine steam-engine. 'It is here,' observes Mr. Scott Russell, in the admirable treatise on Steam Navigation contributed by him to the new edition of the 'Encyclopædia Britannica,' 'that the whole process carried on in the boiler in so great bulk, and at so much expense, is instantly reversed, and all its laborious effects at once, as it were, annihilated.' The instantaneity of condensation forms, in this case, its most important characteristic, as the condenser must be capable of condensing the steam faster than it can be produced by the boiler and passed through the cylinder. In this case, it is essential that the power of the engine, would, as Russell observes, cease, ' the elastic force of the steam above the atmosphere would alone act, the steam being only condensed as the piston carried it out of the cylinder,' and, as he further remarks, 'the process would be that of a perpetual engine.'

'As it is,' he proceeds, 'by forming a perfect vacuum in the cylinder on the moment when the steam is about to enter on the opposite side, that the full power of the steam can alone be obtained in useful effect. A perfect condenser must therefore have much greater capability than that of merely condensing the steam as fast as the boiler is capable of evaporating it, or the engine of passing it through.' While, however, so much depends upon the power of the condenser, it appears that we are already not far from the limit to which a vacuum in the condenser more perfect fail to produce a corresponding increase of condenser power. Referring to Russell's treatise for his explanation of this matter, we can only quote the important practical remark that, 'If the barometer stand at 29 inches, the standard of this country, the vacuum in the condenser is too good if it raise the barometer more than 28 inches of mercury.'

For the condensation of spiruous vapours it is always necessary to prevent an intermixture between the condensing water and the vapour upon which it acts. Such condensers are alluded to under DISTILLATION, P. C., p. 27, and a fuller account of several contrivances for the purpose is given in Dr. D.
in a dry state, the water or syrup is to be added when the preparation is intended to be used; as in the cases of the aro-
matic, opiate, and almond confection. This is especially
necessary in the hot weather, for if bitter almonds should
be accidentally introduced, the presence of water might pro-
duce deleterious combinations.

When astrigent substances such as roses are to be pounded,
this process must be conducted in marble, not iron, mortars.
This is because the iron reacts more than does the mar-
bler, and more is required in wet seasons than in dry. The
conserves must be put into several small pots, rather than one
large pot, which should be glazed with salt, as in Bristol ware,
not in glass, as they would then be well closed, and kept in
a dry cool place. Patent jars, of a very useful kind, are
now manufactured for this purpose.

CONFERVA. [WATER-PLANTS, P. C.]

CONFERVITES, species of fossil plants, probably of the
Confervaceæ family. They are among the fossils of the
south of England, in the green-sand of Maidstone, and
chalk-marl of Hunsyey. (Mantell.)

CONFLICT OF LAWS. [Laws, Conflict of, P. C. S.]

CONGLOMERATES, a genus of Copholopoda, fossil on Lake
Huron. Denny founds the characters of it on the form of
the septa, which are convex towards the base of the con-
chostracan. The genus is very characteristic, and con-
sciences, which, as well as the word 'conscious', contains per-
haps nearly the same fundamental notion as the English word
conscience.

In some volcanic regions the materials thrown out by
eruptions are re-aggregated into conglomerate, by the opera-
tions of water.

CONOCERAS, a genus of Copholopoda, fossil on Lake
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his approval and disapproval of the principles or actions of others, as well as the principles or actions of the reflecting agent. But from other parts of his preface it seems that the conduct of others is not considered in his own principles or actions; which is the ordinary meaning of the word conscience, and that which is chiefly intended here.

No deity disputes that man has a moral judgment, or at least a capacity for having one; for it is possible that a man may have lived under such circumstances that this moral judgment has hardly ever been called into action, just as many faculties both corporeal and mental may, for want of being used, become quiescent. But this does not mean that he may not be conscious of the action of the faculty, which however is certainly not true, others form a judgment of his conduct by that rule: it is that rule and no other, combined with an estimate of his motives and dispositions, which determines whether he is or is not a good man.

But after a man has considered the acts and dispositions of another, and has determined that they are injurious to human happiness, why does he pronounce a judgment of disapprobation and not of approbation? And why do men, when they are all agreed that the actions of another are injurious to the happiness of mankind, also agree to condemn them? If there is one man so disposed as to look with approbation on acts of cruelty, fraud, and oppression, there are thousands on the other side who look on them with abhorrence. Their disapprobation cannot be called accidental, or capricious, for it is one judgment; and when a very large number of persons coincide in one judgment, that which is the foundation of their judgment must be one. Whether the foundation be a general principle: a general principle that self-conclusion must rest on one and the same foundation. Why then does a man condemn a particular act after he has satisfied himself that it tends to injure human happiness? Is he therefore under an obligation to that judgment, if he did not condemn the act? And is his reflex judgment that it is his ultimate rule. Is it simply because he sees that his approbation of what is injurious to society would itself be injurious to society, and that he is solely moved to declare his disapprobation by that consideration? It is sometimes assumed, and it seems that there are people who think, that conscience, or whatever is meant by any equivalent term, tells a man at once what is right and what is wrong. [Moral Senses, p. 201.] This is however a confused way of stating the same thing. Consequently, the liberty of forming an opinion of an action as right or wrong, and so one man's conscience may differ from another man's as to the same action. If there is right and wrong, both judgments cannot be right. Who must settle which is right? Clearly the majority of those who are for the one or the other opinion; and it happens that a very great majority of mankind do agree in their judgment of what is right and wrong: and this agreement is the sole foundation of morals. It is a common expression that people may hold opinions in common which are just as wrong as those they do not agree to as to the ultimate influence of such actions on the happiness of society, but that each believes that he has formed his opinion according to his best of his judgment, and that each opinion expresses the conclusion that he has come to. When we say that each believes he has expressed the conclusion that he has come to, we mean that each has examined the matter. We do not mean that the examination of one is as complete as the examination of the other; but we mean that each has examined as well as he can, and that each thinks so, and declares his judgment accordingly. There is therefore something which comes after the judgment that is formed of the influence of actions, and the dispositions from which they emanate upon human happiness, and determines whether we shall declare that judgment, or declare something which is not that judgment: and this something we here call Conscience.

CONSCIENCE, COURTS OF. [REQUESTS, COURTS of P.C.]

CONSIDERATION. This is a Latin word, 'consi dere,' which, as well as the verb 'considero,' was used by Cicero and others to express 'careful observation,' or 'reflection,' or 'deliberation before action.' It has nothing to do with looking at the stars, as the Latin grammarians Festus states, but it implies something which is nearer to the business of common life than star-gazing; it implies the sitting down of a man in a place alone or with others. The word 'consideration' means 'deliberation' in the right and apt language of common life. But consideration has also a legal and technical meaning, which seems to flow naturally from its primary and vulgar meaning. A consideration is something which enters into a contract, and is a part of all transactions of property, except they are made by will or testament. The following are ex-
samples of expressed considerations, from which examples the technical meaning of consideration may be collected:—If a man agrees to sell his land to another for 100L., the 100L. is the consideration for which he agrees to part with his land; or if a man promises to give 100L. to another man if he marries a particular girl, the 100L. is the consideration for the promise to marry the daughter. There is an implied consideration in many cases where none is expressed. A man may undertake to do a piece of work for another without any express bargain being made; but if he does the work according to his agreement, the other man may be compelled to pay him. The implied consideration here is the implied promise to pay if the work is done.

The word consideration applies either to agreements about something to be done, which in England are generally called contracts, or to something that is done, some transfer of property, which is generally done by the act which is called a deed.

Contracts cannot be enforced if there is no consideration. A man may promise to give another 100L., but the promise cannot be enforced unless there is a consideration, which has been defined to be a reason which moves the contracting party to enter into the contract. This is not a very good definition, but it will do; the meaning is, there must be a motive which the law considers a sufficient motive. A consideration must of course be a thing lawful.

Considerations are sometimes divided into valuable considerations and non-valuable considerations; as in the instance just given, that is, a marriage intended, and afterwards carried into effect, is a valuable consideration; money and any other thing which is of the nature of property, and has a money value, are valuable considerations. Therefore, if a man sells land to another, and the contract is valid, and he who gets the estate has, so far as the consideration is concerned, a good title. A good consideration is the consideration of natural affection between blood relations, and a man may give his estate to another for such a consideration. But this kind of consideration is not sufficient to maintain the validity of a conveyance of property against the claim of a subsequent purchaser for valuable consideration. Thus if a man after his marriage settles an estate upon his wife and children in trust, and then sells the estate for money, the purchaser will have the estate, and not the wife and children. (Hill v. Bishop of Exeter, 2 Taunt. 69.) Such a settlement after marriage is called voluntary or gratuitous. A settlement of property made in consideration of a future marriage, which afterwards takes place, is a settlement for valuable consideration. The actual settlement may be made after marriage, if it is made pursuant to a written agreement entered into before the marriage.

In the statute 13 Eliz. c. 5, the object of which is to prevent persons from cheating their creditors by disposing of their real or personal property, it is declared that the provision made by a man to set aside the interest of another conveyed 'upon good consideration and bonâ fida,' and the good consideration here means money, or money's worth, or a marriage which is then intended and afterwards takes effect. Good consideration here is therefore equivalent to what has been above defined to be a valuable consideration.

The acts 27 Eliz. c. 4, and 30 Eliz. c. 18, § 3, make void, as against subsequent purchasers, all conveyances, &c. of real property which are made for the purpose of defrauding such purchasers, unless 'upon or for good and bonâ fida.' This statute has received a singular interpretation, for it has been decided that it makes void a previous conveyance, though not made to defraud any one, if the consideration is not such as the statute intends; and accordingly, as in the case just stated, if a man settles his land after marriage on his wife and children, and then sells it, the prior settlement is void as a fraudulent conveyance.

A voluntary conveyance then by a man who is at the time intending to cheat his creditors, against his wife and children; but if a man sells his land to another, and is not insolvent at the time, a voluntary conveyance, that is, one where there is no valuable consideration, is valid against future creditors (13 Eliz. c. 5). A conveyance for valuable consideration, such as marriage, is a valid conveyance, even if a man sells his land to another, and is not insolvent at the time; therefore cheat his creditors by settling his property on a woman with a view to marriage, and then marrying her; but in certain cases, such settlements are not valid against creditors when made by a person who is subject to the bankrupt laws. A voluntary conveyance is not valid against a future purchaser for good consideration: it is a fraudulent transaction according to the construction of the 27th of Eliz., and as such is declared void against the purchaser. If the purchaser knew that there was such a voluntary prior conveyance, he can give no consideration, and there is no difference; his purchase is valid against such conveyance.

It appears from these instances that the legal notion of consideration is this:—the fact of there being a good consideration is evidence that there is no fraud, and the absence of it is evidence of fraud. The doctrine of consideration is intended to protect either the giver or grantor, or other persons whom he may wish to defraud by disposing of his property.

Every deed therefore or instrument by which property is conveyed ought to show some consideration for which the person conveys the property to another; for though a deed is valid between the parties to it, when no consideration is expressed, it may be invalid with respect to other persons who are not parties to it. There is no absolute amount of consideration which can be legally required, but a very small amount of consideration might in some cases raise a presumption of fraud, and indeed even if the amount of consideration should be the full value of the thing conveyed, it may be necessary in some cases to inquire whether the consideration expressed was actually paid.

In the case of a contract or agreement to give or settle property, the necessity for a consideration is obvious, both to prevent cheat, and to make the person to whom he is indebted, or whom it is his moral duty to provide for, no contract to give can be enforced unless there is a sufficient legal consideration. An agreement to settle property on a wife or child, must be such consideration; the child illegitimate is not such consideration, if the childless man is viewed as standing to his supposed father exactly in the situation of a stranger.

Many curious legal questions have arisen on the doctrine of consideration, even as to the necessity of a man promising to pay the debt of another man. The general principle is, as already stated, that there must be some advantage to the person promised, either certain or prospective, which shall be a reasonable and sufficient inducement for him to promise. When a man were, for a certain promise, to be bound to his executors to pay the physician a certain sum after his death, a case which has happened, the validity of the bond might be disputed if the circumstances under which it was given were such as to raise a suspicion of fraud; for instance, if no person was privy to the transaction except the man and his physician, and if the sum should be very large, and the services of the physician altogether disproportionate to the object.

CONSTABLE, JOHN, was born at East Bergholt, in Suffolk, in 1776. He was the second son of Golding and Ann Constable, and was originally intended for the church, but as he showed an aversion or disinclination to study, his parents consented to let him take the profession of medicine, which he preferred to the ministry of the church. He was instructed to pay the physician a certain sum after his death, a case which has happened, the validity of the bond might be disputed if the circumstances under which it was given were such as to raise a suspicion of fraud; for instance, if no person was privy to the transaction except the man and his physician, and if the sum should be very large, and the services of the physician altogether disproportionate to the object.
judgment of the Royal Academy; he was elected an academ-
ian on the 10th of February of that year, and when he re-
ceived notice of the honour which had been done him, he
observed—"It has been delayed until I am desolate and
cannot impart it." In allusion to a thousand of his wife, which
had occurred only a few weeks before his election; he was
then in his fifty-third year. He was taken ill on the night
of the 30th of March 1837, and died in less than an hour
afterwards.

Constable has painted many excellent pictures, and all his
works improve much in colour by age; the 'Corn-field'
the National Gallery is a very good specimen of his style, and
is indeed one of his best works. The "Chain Pier at Havens,
Tap-Foot:" this is one of his most successful. The "River,
time also among his best productions. His style is original and
peculiar, and his scenes are generally extremely simple, for
his attention was more engrossed by certain minutiae and
transient effects of nature, than by a love for the picturesque,
or what he termed scenery. In one respect he carried this
attention to minutiae to an extreme, namely, the effect of
the morning dew. He may have fallen into this error by his
habit of early sketching, but an exact and judicious observer
of nature, studying in all seasons and in all hours, could
not fail to observe that this effect is extremely transient,
and is but one, and not the most beautiful, of the ever vary-
ing effects of nature. Constable appears to have been very
easily influenced by his own views of things, for when a year
ago he was in London, he said that every minute picture
he proposed to adopt, he answered, "None but God
His Almighty's style, Sir George."
The effect of dew, of which he was so fond, is a dif-
current in his works, and has connected them to
be styled mouldy by some critics, who in the earlier part
of his career exercised their functions with little charity towards
the painter. Now, however, whether from the improvement
which time has effected in his colouring, or from familiarity
with his style, his critics are far from being his detractors,
and his pictures are increasing in commercial value.

Constable's character both as a man and an artist is well
described in the following account of him by his friend and
fellow artist, Henry Fuseli :

"He was always observed to be at the
Pantological Society in 1843. He seemed to think that poet
be came into the world to convince mankind that nature is
beautiful. Instead of seeking for the materials of poetic
steppe in foreign countries amidst temples and classic
pieces, or in our own amongst castles, lakes, and mountains,—
he taught that the simple cottage, the village green, the church,
the meadow covered with cattle, the canal with its barges,
its locks and weedy banks, contained all the materials and
also the poetry, if sought by the bishop's arm, by the historian,
but by the native fields. "I love," said he, "every stile, and
thump, and lane in the village: as long as I am able to
hold a brush I shall never cease to paint them." So great a
lover of simple truths could not tolerate the commonplace
of art. He wrote three articles on the subject, and when he
continues, both surprised and delighted the French
painters, at the time they were exhibited at the Louvre.
They seemed more like the works of nature than art. The
few of the morning was fancied upon the leaves and the grass.

"Originality in every art will always meet with opposition
from those whose ideas are bounded by the commonplace
of the day. It was Constable's glory that he did not escape.
The democratic judgment of the critics confirmed him in
his own exclusive claims to his exertions. "A great connoisseur,"
he says, in one of his letters, "called on me the other day, and told me he did not like my picture.
This convinces me there must be something good in it." But
while his pictures were thus increased in value by the privi-
lege of having been looked at by honest John Bannister he felt the wind
blowing in his face as he looked at his pictures, and Fuseli
declare that they made him call for his umbrella. "I care not,"
said he, "I can bear with turkeys, for the dogmas of science,
let me get at the heart in any way that I can," and he went
above extract clearly points out the style of Constable, the
peculiarities of his execution and of his character, though the
process of reasoning is not very evident which leads him to
conclude that he is not disposed to think highly of his own
works, because a connoisseur dislikes it, or to lead him to feel
delight in looking at his pictures makes one man feel the wind,
and another fancy it is going to rain. A gallery of pictures
which required its visitors to put on their great coats and hold
up their umbrellas would be as unpleasant as peculiar.

A very elegant Life of Constable, by his friend Leslie, was
published by Mr. Carpenter, with twenty-two engravings
from his works, by David Lucas.--Memoirs of the Life of
John Constable, Esq. R.A., composed chiefly of his
CONSTITUTIONS AND CANONS ECCLESIASTICAL. King James I., in the first year of his reign in
England, by his writ directed to the Archbishop of Canter-
bury, summoned and called the 'bishops, deans of cathedral
churches, archdeacones, chapters and colleges, and the other
officers of every diocese, to meet in Convocation, and there to
be heard and studied certain ordinances, and constitutions, to
the end and purpose by the king "limited and prescribed unto them,"
'to which the king, out of his 'princely inclination and royal care for the
maintenance of the present estate and government of the Church of
England by the laws of this realm now established,' gave his royal assent by letters-patent, according to the form
of the statute of the twenty-fifth year of King Henry VIII.
The king, by his prerogative royal and supreme authority in
causes ecclesiastical, commanded these said canons, orders, and
constitutions to be diligently observed, executed, and kept by
his loving subjects of the kingdom, both within the provinces of
Canterbury and York, in all points wherein they do or may
concern every or any of them; and the king also commanded
them to be observed by his loving subjects within the
30th year of the reign of King Henry VIII, upon all the
workings or proceedings in the said canons, orders, and
constitutions once every year, upon some Sundays or holydays, in
the afternoon before the sermon.
The canons and constitutions may be divided into fourteen
heads, which treat as follow:—1. Of the Church of England.
2. Of Divine service, and administration of the sacraments.
3. Ministers, their ordination, function, and charge.
4. Schoolmasters.
5. Things pertaining to the education of youth.
7. Parish clergymen.
8. Ecclesiastical Courts belonging to the archbishop's jurisdiction.
9. Ecclesiastical Courts belonging to the jurisdiction of the bishopric of
London, and archdeaconries and their proceedings.
11. Proctors.
12. Registrars.
14. Authority of synods. The number of constitutions is
one hundred and forty-one. The authority of these canons is
binding on the clergy, but not on the laity, except as so far as
is stated under the head CANON. P.C. The authority of
Canon 77 may be doubted: it is this: 'No man shall teach,
either in public school or private house, but such as shall
be designated by the bishop, and after due examination,
under his hand and seal; been found meet as well for his
learning and dexterity in teaching, as for sober and honest
conversation, and also for right understanding of God's true
religion; and also except he shall first subscribe to the first
three and third articles of the several clauses of the second article.'
The 78th Canon provides that 'curates desirous to teach shall be licensed before others:
and 79 declares 'the duty of schoolmasters.' The Constitu-
tions and Canons Ecclesiastical have been printed by the
Society for Promoting Christian Knowledge, London, 1841,
together with the Thirty-Nine Articles of the Church of
England.

CONTINGENT REMAINDER. [Remainder, P. C.
and P. C. S.]
CONTRACTION, in Surgery, an abnormal and permanent
alteration in the relative position and forms of parts, arising
from various causes. Under the heads of ARCTIUM, P. C.,
and P. C. S. treatment of contraction, P. C. S. will be found,
contractions have been pointed out. In this article we shall describe
the nature of club-foot and wry-neck, and point out the recent
mode of treating these contractions by surgical operation,
which has been recently made.

Club-foot, Talipes, is the term which has been applied to all kinds of distortion of the foot.
Four species have been de-
scribed—talipes varus, distortion of the foot inwards; talipes
valga, over-turn of the foot; talipes equinovarus, forced extension;
and talipes calcaneus, external and extended, is a common
consequence upon the leg. Till within a recent period it was a generally
received opinion that all forms of club-foot consisted in a mal-
formation of the bones of the tarsus, more particularly the
astragalus, and this malformation was traced to a diseased
condition of the bones. It is a curious fact however that Himpo-
mates attributed club-foot to the unnatural contraction of one
set of ligaments and the elongation of another. Whether this
be the original cause of the distortion may be doubted, but
there can be no doubt as to its being a result, and that the
only way in which this evil can be in any degree remedied is
by relieving the contraction of the ligaments. It is however
to Delpech in modern times that we are indebted for a sound
view of the nature of club-foot, and more particularly for
suggesting, though himself unsuccessful, the modern operation
for its cure, in which the contracted muscles, which had been pro-
duced after the bones had attained their full development, led
him to regard the irregular action of the muscles as the
cause. To this conclusion also Stromeyer of Berlin was led,
but in an instance which he supposed to be due to the occurrence
of ankylosis in the muscles of Inspiration. The following are
the various sources of distortion dependent upon irregular
action of the muscles, according to Dr. Stromeyer.
1. Structural changes in the muscles, inflammation and
wounds, with loss of substance.
2. Dehility and inactivity of antagonists, produced either
by wounds of tendons or the bellies of antagonist muscles, or
by paralysis of the nerves of antagonist muscles.
3. Distinction of voluntary power in the entire limb
through which the flexors or extensors preponderate over the
extensors or flexors by the constant organic contraction of the
muscles.
4. Painful affections of the part, restraining or prohibiting
motion as that from inflammation of a joint.
5. Increased energy in the muscle, morbid contraction or
motion in the muscular fibres, tonic spasm.
The various modes of treatment of club-foot formerly per-
pared indicated the operation of Dr. Little. Judge of its action,
these were mostly mechanical, and seldom effected the ob-
ject they had in view. The mode of treatment now more
generally pursued is the use of mechanical means after the
performance of a surgical operation. The operation consists
in dividing the tendons of the contracted muscles, which
permits of the restoration of the malformed parts to their normal
position, and the space between the divided ends of the ten-
don is filled up with new matter, and the function of the
muscle is thereby preserved. This operation was never performed
till the year 1844, when Lorenz, a surgeon at Frankfort, divided the tendo-achillis for the cure of a case of club-foot, under the direction of Thilenius. This
operation was afterwards unsuccesssfully resorted to by Sartorius and Michaelis. In 1816 and 1840 Delpech again attempted it, and upon more philosophical principles than his predecessors, but he also failed. This did not prevent Stromeyer from repea-
ting the operation in 1831, which was perfectly successful. In 1843 and 1848 he published two memoirs, containing six successful cases, and rapidly became the universal surgeon in England and on the Continent, and the value and utility of the operation are now universally admitted. The
principal rule to be observed in the operation is not to cut through the tendo-achillis, but to separate it, and thus create a necessary
contracture of the contracted muscles. The division of the tendo-achillis is however only calculated to relieve talipes equinus, and the slighter cases of varus. But in the severer forms of varus, the
tendons of the tibialis posterior, flexor longus pollicis, and sometimes of the tibialis anterior, require division. In such ties the tendons of the peronei as well as the tendo-achillis require division.
The principal part of the operation is the division of the
muscles for the restoration of the parts to their normal position. This
treatment is generally commenced from two to four days after
the operation. A great variety of apparatus have been de-
digned for the purpose, but each case requires a peculiar
adaption of the means for effecting the reduction of the
parts.
Club-hand does not occur so frequently as club-foot, but
the distortion is of precisely the same nature, and requires
for its removal the application of the same measures.
Wry-neck (Crepitus capitis) is a disease of the same nature as the preceding, and most frequently arises from the unequal contraction of the muscles of the neck, originating in some one of the causes previously mentioned. The conse-
quence is that the head is permanently inclined towards one
side. Somatic disease arises from disease In the vertebrae or from the contraction of cicatrices after severe wounds and burns of the neck. In the former case the wry-neck can seldom be removed, but in the latter the head is by adding weights to the wound allowed to heal again with the head in its natural
position. Where it depends on contraction of the muscles
the same operation may be had recourse to as is used for the
relief of club-foot and club-hand. It is a curious fact that
the operation for dividing the muscles in wry-neck had been
practised at least as long as the operation for club-foot, and
is generally applicable to the treatment of contractions. When
it is determined to treat wry-neck by mechanical means with-
out operation, the best apparatus is that of Jorg. It consists of a piece of canvas strapped round the head, which
runs down the back of the ear, in the direction of the
muscles of the neck, and which can be tightened by
means of a screw. It acts on the head as the muscles
would act on it.
Dr. Little of London has recently published a work on the
application of the Stromeyerian operation to contractions de-
pending on what is called partial ankylosis. These ankyloses
depend upon some organic or functional lesion of tendon or
muscle, arising from one of the following causes: from
sloughing or adhesion. 2. From spasmodic contraction. 3.
From organic contraction through paralysis of antagonist
muscles. 4. From operation owing to long continued rest
of the limb. When this kind of ankylosis has existed for
a great length of time, or occurs in young persons, a division
of the contracted muscle, and careful extension of the limb
afterwards, is very often followed by a complete restoration
of the function of the ankylosed joint.
These operations which previously were supposed above-named
give rise to the irregular action of the eye called squinting,
and the operation of Stromeyer has been found perfectly
successful in this deformity. [Squinting. F. C.]

(1. Illustrated Dictionary and Coopers Surgical Dictionary; Cooper, First Lines of Surgery; Articles Ankylosis and Club-Foot, Cyclopaedia of Surgery.)
CONULARIA, a fossil genus of mollusca, generally ranked with Cephalopoda, but which appears to us allied to the Phascolopoda. (Conulariata.)
CONULUS, a generic name for Echinida, to which also
the term Galerites is applied.
CONVALLARIES, a genus of Liliaceae, 7 plants, found
in the mountains of the Pyrenees: simple leaves.
CONVENTION TREATIES. These are treaties entered
into between different states, under which they each bind
themselves to observe certain stipulations contained in the
article. In 1844 two acts were passed (6 & 7 Vict. c. 76 and
c. 78) for giving effect to conventions between her Majesty
and the King of the French and the United States of North
America for the apprehension of certain offenders.
The act relating to France (c. 75) legalizes the convention
entered into with the government of that country for the
apprehension of certain offenders who have escaped from
England. On requisition duly made by the French ambas-
sador, a warrant will be issued for the apprehension of fugi-
tives accused of having committed the crimes of murder (as
defined in the law of France), forgery, fraud in the
bankruptcy of fraudulent bankrupts; and any justice before whom they
may be brought is authorised to commit them to gaol until
delivered up pursuant to the ambassador's requisition. Copies
of the depostions on which the original warrant was issued,
duly certified as true copies, are to be received as evidence.
But no justice is to issue a warrant for the apprehension of
any French fugitive unless the party applying is the bearer
of a warrant or document, issued by a judge or competent autho-
riy in France, authenticated in such a manner as would justify
the arrest of the supposed offender in France upon the same
charge. The secretary of state will order the person com-
mitted to be delivered up to the person or persons authorised
to receive him. If the prisoner committed shall not be con-
delivered out of her Majesty's dominions within two months
from the time of his commitment, any of her Majesty's judges, on
application made to them, and after notice of such application
has been sent to the secretary of state (or to the acting
governor in a colony), may, in such a person to be delivered,
unless good cause shall be shown to the contrary. The act
is to extend to all her Majesty's present or future possessions,
and to continue in force during the continuance of the con-
vention.
The act relating to America (c. 78) is similar in its
nature and purposes to the one relating to France; but the crimes
specified include, in addition, piracy, arson, and robbery, and
do not include fraudulent bankruptcy.
In the year 1437, 1343, he was again divided of a fraudulent French bank
who had escaped to England, and the French government
required that he should be given up under the Convention
Trey's. He was arrested and taken to prison; but before the surrender could take place he applied for a writ of habeas corpus, on the ground that fraudulent bankruptcy was an offence unknown to the law of England, and that therefore it was contended there was no arrest here, or arrest in custody on such a charge. The warrant of commitment did not specify that the prisoner should be given up on requisition duly made according to the act, but the words were, 'until he shall be delivered by due course of law.' In consequence of the defective and ambiguous direction in the Indictment Treaty in this particular case the prisoner was discharged.

At the close of 1843, seven persons accused of murder, robbery, and piracy fled for security from Florida, in the United States, to Nassau, one of the Bahama Islands. They were followed in this flight by the agents authorised by the government to demand that the fugitives should be given up under the Convention Act. The governor, Mr. George Cockburn, issued his warrant accordingly to the chief justice of the colony, authorising and directing him to take measures for the fulfilment of the act. In anticipation of the application of the marshal, the chief justice had a warrant prepared for apprehending the fugitives, expecting that the evidence tendered would be such as could be judicially warranted; but the chief justice hastened to tender in form of a junior justice, without the evidence upon which they were framed. The act requires that copies of the depositions upon which the original warrant was granted, certified, &c., should be produced to the government before the warrant can be held available. The chief justice, with his associate judges, were under the necessity of refusing the warrant applied for, chiefly at the following grounds:—An indictment per se can never be received as evidence: it is not enough for us to know that the act of 1820 was a warrant; it is necessary to make them prove the grounds upon which they thought guilt. What may constitute the crime of murder in Florida may be very far from doing so according to the British laws; or even the laws of the Northern States of America. By issuing a warrant, the traditional act of the part of the judges, we might be doing so on evidence which would not justify their apprehension by the British law, and should thereby be proceeding in direct violation of the act." (Parl. Pape, Coxon, 1843, 1844, S. 14.)

CONVERSION. (Troxer, P. C.)

CONYZA, a genus of plants belonging to the natural order Compositae, to the suborder Tubiflorae, the tribe Compositae, the subtribe Bacardiinae, the division Compsis, and the subdivision Compsidae. It has an herbaceous, glabrous involucre, the flowers of the ray tubular, 4-toothed, pediliferous, those of the disk tubular, 5-toothed, hermaphrodite, the anthers caducous, the stigmatic base, the pappus of the receptacle naked. The species are herbaceous and shrubby, annual or biennial, some of them perennial, American. C. acquosus, Fleas-bane, Ploughman's Spikenard, has the male of the involucre all linear, the leaves ovate-lanceolate, dasy, dentate, the lower leaves narrowed into a footstalk, the ultimate segments of the involucral bracts being common plant on calcareous soils in Great Britain and throughout Europe. It possesses a volatile oil with a peculiar scent, and is used for the purpose of driving away fleas and gnat. It seems to have had this reputation from an early period, as its name in many languages have reference to its quality. Its Latin name is pulicaria; French, Herbes aux pucres; English, Fleas-bane. This species has been referred by De Candolle, in his 'Prodrumes,' who is followed by B. L. Smith, in his Manual, to the genus Inula, under the name of 1 Conyza. C. cunctansis has ovate or oval-oblong leaves acuminate at both ends, coarsely serrated and downy; the heads corymb, each containing 40-50 florets; the scales of the involucre lanceolate, linear, acute, the outer somewhat spreading, silky, and obovate-linear. It is a common plant among rabbits and in dry uncultivated ground in the East Indies. It is a familiar species of the genus Conyza.

C. genistella has very small leaves reduced to sharpish somewhat ternate scales; 1-2 heads in interrupted spikes, the involuce tubinate, with the scales all acuminate. This plant is a native of Peru and Brazil. It is the Baccharis genistella. It possesses a large and aromatic, and an aromatic oil, and is not in its medicinal characters the common wormwood. It is employed in the Brazils in intermittent fevers, and may be used in all those cases where the Artemisia is indicated.

COO. It is particularly beneficial in the chronic diseases of horses, which are very fond of this plant. It may be employed in the form of an extract or decoction. C. marylandica has sessile, broad-lanceolate, acute, serrated leaves; the corysts terminal and fimbritate. It is a native of North America. It was brought to this country by Mr. C. Lewis, who gave it out the odour of camphor. This property is also possessed by C. camporhosa. (London, Encyclopaedia of Plants; Koch, Flora Germannica; Lindley, Illustration of British Quadrupeds.)

COOLER. The Spanish word Alcoraza, which is referred to Coolers, P. C., signifies an earthenware vessel or pitcher, porous and unglazed, in which water is cooled by evaporation. (Evans, P. C. S.)

COOLEY, C. B., the Irish architect, born in 1740, erected what is not only one of the most elegant public buildings in Dublin, but of its kind anywhere, the Royal Exchange in that city. This structure was begun by him in 1769, and although of but moderate size in a style at once noble and ornate; on the exterior, a Corinthian order is continued in columns and pilasters, between which there is only a single range of upper windows, the lower part of the intercolumnia being filled in with solid rusticated wall, a circumstance which contributed materially to characterize公园 and less remarkable for, both elegance and commodiousness of plan, it being a rotunda inscribed within a square,—the circular part formed by a peristyle of twelve columns of the composite order.

COOPER. The invention of the writing-book, or more properly, the application of the primitive writing to paper, was anything but a difficult mode of proceeding. In the sixteenth century, Cooley done nothing else, this work alone would entitle him to a place among his contemporaries for originality and refined taste in design. He also erected the prison called Newgate (1775), in the same city, and commenced the noble pile of the 'Four Courts,' which was begun by him in 1732, but he did not live to complete it, little more than the west wing being erected at the time of his death in 1784; after which the edifice was carried on by Gandon (Gandon, P. C. S.), with some variations from the original design.

COOPER, SAMUEL, a very distinguished English miniature painter of the seventeenth century, was born in London in 1609, and was brought up together with his brother Alexander by his uncle John Hoskins, likewise a miniature painter, and must have received from his uncle, who perceived that the works of his nephew were preferred to his own, and he accordingly took him into partnership with him, which partnership however he almost immediately dissolved again, finding the marked preference which was invariably displayed for Cooper to be intolerable. Cooper was without a rival in the time of the Commonwealth, and during the reign of Charles II. He painted the portrait of Cromwell, which has been considered Vertue, but the head only was finished. The original is still in existence, but it has changed hands various times, and is at present, we believe, in one of the Royal collections. Walpole speaks in the highest terms of its merit; he says that if it were not for the English language, he would not hesitate to place the latter would lose by the comparison: he says, 'it would be an amusing trial to balance Cooper's Oliver and Van- dyck's Lord Strafford.' Another of Cooper's masterpieces was a head of a person named Swingfield, which he took with him to the court of France, where it procured him the highest patronage; he remained some years in France and Holland. He was also much patronised by the court of Charles II., whose miniature he painted, as well as that of his queen: he painted also the portrait of the Earl of Cleveland, Duke of Albemarle, Archbishop Sheldon, the Chancellor Shaftesbury, and many others. Walpole possessed a drawing by Cooper of Pope's father lying dead in his bed; Cooper's wife was the sister of Pope's mother. Cooper died in London, in 1672, in his sixty-third year, at the old St. Pancras church, where a beautiful marble monument was raised to his memory, on which was inscribed a long and highly commemorative epitaph. In Latine, commencing—Manus eorum prout parvum, ut nullam memores regis; and in English, 'The memory of her worth and of the ornament,' &c. He was an excellent musician, being an admirable performer on the lute, and he was also well versed in several foreign languages. His widow was pensioned by the crown. Cooper's excellence did not however extend beyond his portrait-painting, for he did not live to see the time when he was particularly successful in painting hair. The following entry in one of the pocket-books of Charles, the husband of Mary Beale, shows that for a head he enjoyed the highest reputation among his contemporaries—Sunday, May 6th,
1672, Mr. Samne. Cooper, the most famous limer of the world for a face, dyed.

The writer of the 'Essay towards an English school,' (London, 1706) says that Cooper acquired this was that by copying the pictures of Vandyke and imitating his style. 'Our nation, he says, 'may be allowed to boast of him, having far exceeded all that went before him in Eng- lish 'portrait' (miniature), and even equalled the most famous Italians, inasmuch as he could draw Vandyke in little, equalising that master in his beautiful colouring, and agreeable arts of the face, together with that strength, relief, and noble spirit; that soft and tender liveliness of the flesh, and such unexampled perfection of life.' One of the chief motives of his works is their freedom of execution, and their vigorous style, for though executed in water-colours they have the power and effect of oil paintings. Walpole makes a comparison of the works of Cooper and Oliver; he says—'Oliver's works are touched and retouched with such careful fidelity that you cannot help perceiving they are nature in the abstract; Cooper's are so bold that they seem perfect nature only of a less standard. Magnify the former, they are still diminutively conceived; if a glass could expand Cooper's pictures to the size of Vandyke's, they would appear to have been painted for that proportion.'

(An Essay towards an English School of Painters; Walpole's Letters. Painting in England.)

COOPER, BRANSBY VILEY, Surgeon of the Royal Hospital, and also of the Surgeons' Company, was born at the village of Brooke, in Norfolk, where his father, Dr. Cooper, was curate. His mother was a popular authoress in her day, and published several novels and other literary productions. The object of her labours was to elevate and dignify the position of woman in society.

Astley was born on the 23rd of August, 1758, and was the fourth son. As a boy he was remarkable for his liveliness and good humour, and numerous anecdotes of his boyish adventures are remembered in his family, and have been recorded with great minuteness by his nephew Mr. Bransby Cooper, in a recent memoir of his uncle. As a boy he was not remarkable for application to study, but the following incidents in his youth show that he was a born artist. When he was a child of eight years old, he had been taken to the West End of London, and as he was passing by a window, a professional painter being engaged in his work, he had fallen in front of a cart, one wheel of which had passed over his thigh, lacerating it and wounding the femoral artery. No surgeon was near, and the boy in danger of dying from loss of blood, young Astley Cooper bound his handkerchief sufficiently tight over the upper part of the thigh to prevent circulation in the artery, and thus stopped the bleeding till a surgeon arrived.

When in his thirteenth year his father was presented with the mastership of the Royal Hospital, to which place he immediately removed. In August 1774, young Cooper left home for London. His uncle William Cooper, who was then a surgeon at Guy's Hospital, not being able to receive him into his house, he was placed with Mr. Cline, who was at that time surgeon to Thomas's Hospital, one of the great distinguished surgeons of his day. To his connection with Mr. Cline, and the influence of his example, Sir Astley attributed much of his success in after life.

In London he devoted himself with earnestness to his new pursuit. He early perceived the importance of correct anatomical knowledge to the study of surgery, and made such advances by an habitual attendance in the dissecting-room, as to lead others to consult him in their difficulties. He also at this time attended the lectures of John Hunter, and was one of the few who comprehended the real value of this great man's theo- ries and experiments. In 1787 he visited Edinburgh, and on his return made demonstrator of anatomy at St. Thomas's Hospital (a. d. 1791) to his being per- mitted to take part of the lectures on anatomy and surgery which were then delivered, together with Mr. Cline. He was married in the same year, and after the close of the winter session paid a visit to Paris in 1792. He was here on the breaking out of the Revolution on the 10th of August; and, although at that time he sympathised with the revolutionists, he was compelled, on account of Mrs. Cooper's fears and delicate health, to return to England. In the next course of lectures that he lectured on surgery alone, and this was one of the first courses in London that were delivered on this independent of anatomy. It was perfectly successful. He was also this year appointed professor of anatomy at Surgeons' Hall, and was re-appointed in 1794 and 1795.

The Astley Cooperian productions appeared in a volume of papers entitled 'Medical Records and Researches,' which was published in 1798. In these
The principal peculiarity in the manufacture of copper arises from the facility with which it may be flattened with the hammer. The processes of casting and rolling, both of which are extensively practised in the manufacture of copper goods, so closely resemble the like operations upon other metals, that they do not require further notice; but the operations of the hammer are so different from those in the other common metal manufactures. These are well illustrated by Mr. Dodd, in his little work on British Manufactures in Metals (Knight's 'Weekly Volume,' No. xxxvii.), by an account of the process of making a copper vase, represented under Stuart, P.C., p. 392, which consists of a circular domed vessel, with several apertures for valves, gauges, &c., and a spiral coil of copper pipe within the lower part. The top and bottom of this vessel, which are of similar shape, both being convex externally, are formed by heavy or very extensive hammering. He described:—"The copper is in the first place cast into a form resembling that of a double convex lens, or spectacle-glass, thickest in the middle, and diminishing gradually towards the edges. This lens is then subjected to the powerful blows of a tilt-hammer, directed more continuously near the centre than near the edges. 'A little consideration will show,' observes our author, 'that this hammering, while it reduces the thickness of the copper, must make it curl up at the edges, or assume a dished or hollow form: we find that this is the case even when a flat piece of metal is hammered at its centre, and still more does this result ensue when an increased substance is given to the centre.' "The thickness of the centre," he continues, "will be more or less equal to the diminution of the vessel, and the hammering is continued till the thickness of the whole is brought nearly uniform. This is a very important process, since the fitness of the vessel for the operations of the sugar-refinery depends on the soundness and uniformity of the edges. It is never as yet judiciously treated. A blow, either from a Tilt-Hammer or a Wrought-Hammer, will strike the metal in succession, every part of the surface receiving probably as many as ten or twelve blows. 'Any one who examines a large copper vessel will perceive, both in the hammer-marks and in the density and close grain of the surface, evidences of this process. 

By these two processes of hammering, the first to beat the copper into the required shape, and the second to condition and harden the surface when the shaping is completed, many operations which would otherwise be difficult or impossible are performed. A blow given with a heavy hammer on a copper plate will go deep and hollowed in this way, and worth forty guineas if sound, is rendered useless by a flaw in the metal."

The above description will indicate the mode in which many curved articles of copper receive their shape. There is no process less peculiar to the manufacture of copper than hammering, technically called planishing, by which the metal is rendered dense and firm, and its toughness is increased; a process of so pleasing a nature as to impart a singular character to a coppersmith's establishment. This operation, in some degree, is merely to revert to the language of the little work just quoted, 'has something of the picturesque effect presented by an anchor-smithery; for six or eight men, standing in a circle round the piece of copper, and each wielding a heavy hammer, strike the metal in succession, every part of the surface receiving probably as many as ten or twelve blows.' Any one who examines a large copper vessel will perceive, both in the hammer-marks and in the density and close grain of the surface, evidences of this process. By these two processes of hammering, the first to beat the copper into the required shape, and the second to condition and harden the surface when the shaping is completed, many operations which would otherwise be difficult or impossible are performed. A blow given with a heavy hammer on a copper plate will go deep and hollowed in this way, and worth forty guineas if sound, is rendered useless by a flaw in the metal.
'Taken, indeed,' he observes, 'in all its parts, it exhibits the result of almost every operation of his workshop.'

To make this article a piece of sheet copper is taken, rather longer than the intended circumference of the kettle, and annealed beneath or at the end of it. It is then cut into four equal parts, and a second piece of copper, for about an inch at each end, is then brightened by filing, and one end is cut into the depth of about an inch, and at intervals of about an inch, with a pair of shears. Every alternate portion of the cut edge is then turned a little back, so that the cut edge is brought into a cylindrical shape, the uncut end may be laid between the alternate tongues or portions of the cut edge, and embraced, as it were, by them. A little borax and solder is then applied to the joint, which is, after soldering, hammered upon a steel drift, the seam becoming just flush, and is beaten down to the thickness of the adjoining portions of the plate.

A perfect cylinder being thus formed, the next operation is to turn it inwards in a sloping direction for a space of about two inches, to form the base of the kettle, or that portion which extends from the shoulder at the top of the cylindrical side of the vessel to the edge of the opening to which the cover is fitted. This is done by hammering upon an anvil of suitable shape. About an inch of the lower end is then turned inward in the same way, and cut with the shears into tongues, which are bent back alternately in the same manner as those at the end of the plate had been. A piece of sheet copper cut to fit the end of the cylinder, so as to form the bottom of the kettle, is then placed and united in the same process as that described for the first joint. The vessel is then pickled in diluted sulphuric acid, after which it is planished to brightness, the marks of the hammer being rendered imperceptible by the intervention of a piece of old mangle, and then given a thin surface layer of copper and the stake or anvil on which it is laid. 'The lid of the kettle,' Holland states, 'is shaped by stamping it in a die; the handle is cast; and the spout, after being soldered up and rounded a little on a mandril, is finally shaped upon a lead with which it has been filled, and afterwards soldered or riveted into its place.' 'Copper tea-urns and saucepans,' he adds, 'are formed by soldering and hammering in a similar manner, the former being in general finished with a beautiful convex curve, the application of either to Roman virtu, previous to the planishing or burnishing.'

Holland describes five different modes of forming copper piping out of sheet metal, in the first of which the edges of the sheet, which is curved round a mandril, are made to meet without overlapping, and united by hard solder; in the second they overlap, and are united by soft solder; in the third they overlap, and are secured by rivets; in the fourth the edges are folded together, one being bent outwards and the other inwards. These are all accomplished by forcing the bent portion between the outside of the tube and the turn-back edge, the whole being subsequently made close and firm by hammering; while in the fifth, which he styles the patent strip overlap, both edges of the pipe are turned back and correspond with those of the sheet metal, which are turned in like the outer edge of the joint last described. The bending of such pipes into curved forms, as for the spiral coil in the sugar-pan described above, is a curious operation. Any attempt to bend such a tube while empty would be certain to impair its shape, and would probably occasion fracture. To obviate this difficulty the pipe is, before bending, filled with lead, or some soft metallic alloy which will melt at a temperature which will not injure the tube. Being thus filled the joint may be treated with acid, and safely bent into any required form by suitable machinery; and when the desired curvature is gained, sufficient heat is applied to cause the contained metal to melt and flow out of the parts. The use of copper sheathing for ships, an application which occasions a very large demand for this metal, is alluded to under Ship-Building, P. C., pp. 395, 396, and the articles Brass, P. C., p. 353; Bronze, P. C., p. 466; and Bell-Copper, P. C., p. 488.

COPITIS (from κοπίτης, 'to cut'); a genus of plants belonging to the natural order Orchidaceae. It has 5-6-sepals, coloured petaloid, deciduous; the petals small, cumulate; the stamina 20-25; the capsules 6-10, on long stalks, somewhat stipitate, membranous, ovate, oblong, tipped with the style; 4-6-seeded.

C. trifidus, Gold Thread, has ternate leaves, obovate, blunt, entire; the flowers are small, white; 1-2-3-flowered. It is a native of Iceland, Norway, Greenland, Siberia, and Kamchatka, in swampy woods, and also of the cedar-swamps of North America, from Canada to Virginia. It is a small plant with white flowers and a yellow fibrous rhizome about 3 inches long. C. tenuifolius, the Tiscavo-yarne jaune. A decoction of the leaves and stalks is used by the Indians for giving a yellow colour to cloth and skins. The rhizoma are bitter, and when administered as a medicine are said to have the properties of quassia, gentian, and other bitters, but are not astringent.

C. uspenifolia has alternate leaves, the leaflets rather plaited, nuttifid, very acutely serrated, the scape 2-flowered. It is a native of Japan and the north-west coast of America.

Both species are pretty plants, and will thrive in a rich soil. A moist situation agrees with them, or they may be planted in pots among alpine plants. They may be propagated by seeds, or by dividing the roots.

Dictionary Of Medicine; Lindley, Flora Medica.)

COPYHOLDS. The following remarks on copyholds are rendered necessary by the statutes which have been enacted since that article was written. By the 1st section of the 1 Vict. c. 28, the last statute which relates to Wills and devises, a definition is given of the term 'estate,' and by the 5th section of the Statute of Frauds, are repealed; and by the 3rd section of this act of Victoria the power of disposition by will is extended to copyhold freeholds and tenant right estates, and all estates of a customary or copyhold tenure, without the want of a custom to devise a surrender to the use of a will; and to all estates pur ater vie, whether of customary freehold, tenant right, customary or copyhold tenure. The 4th section of this act also makes the real estate of the nature of customary freehold, or tenant right, or customary or copyhold, might by the custom of the manner of the which is held, have been surrendered to the use of a will, and the testator shall not have surrendered the same, no person claiming to be entitled to such real estate in consequence of any surrender made to him, is entitled to admission to payment of all such stamp duties, fees, and sums of money as would have been due in respect of the surrender of such estate, or the presentment, registering, and enrolment of such surrender to the use of his will. And also, that where the testator be the lord of the manor, he is not entitled to admission to any real estate, and upon such admission to surrender the same to the use of his will, shall not have been admitted thereto, or person claiming to be entitled to such real estate in consequence of any surrender made to him, shall be entitled to payment of all such stamp duties, fees, fine, and sums of money as would have been due in respect of the admittance of the testator to such real estate, the surrenderer to the use of his will, the presentment, registering, or enrolment of such surrender to the use of his will, or the privation of the same. By the 5th section of this act, not to be paid in addition to the stamp duties, fees, fine, or sums of money due on the admittance of the person so claiming to be entitled to such real estate.

By the 5th section, when any real estate of the nature of customary freehold, or tenant right, or customary, or copyhold, is disposed of by will, the lord of the manor, or reputed manor, of which such real estate is held, or his steward, or the deputy of such steward, is to cause the will by which such real estate is disposed of to be registered on the Court Rolls; and when any trusts are declared by the will, it is not to be necessary to enter the declaration of such trusts, but it is to be sufficient to state in the entry on the Court Rolls that such real estate is subject to the duties and enforcements of such trusts as are declared by the will. And the lord is, as against the devisee, to have the same remedy for recovering and enforcing such fine, heirrot duties, and services as he is entitled to against the customary heir in case of a decay.
enfranchisement, or the improvement of
land, tenements, and hereditaments, or other general words descriptive of real estate, unless the copyholds had become subject to the use of the will, or the testator had no freehold lands whereas the copyholders, or the above-mentioned changes relating particularly to copyholds, all the other enactments of the act, including that which provides the formalities to be observed in making a will, are applicable to estates of copyhold or customary tenure.

By the 11th section of the 1 & 2 Vict. c. 110, copyholds are made subject to execution by judgment creditors in the same manner as freeholds.

Still greater changes in the nature of estates of copyhold and the tenure of the copyholders are gradually taking place under the provisions of the stat. 4 & 5 Vict. c. 35, the principal objects of which are—1, The commutation of certain manorial rights is respect of lands of copyhold and customary tenure; 2, The improvement of the enfranchisement of such lands; and 3, The improvement of such tenure.

The enactments with respect to the commutation of manorial rights are partly compulsory and partly permissive. All rents, reliefs, and services (except service at the lord's court, fines, heriots, or mortgaged lands), the lord's rights in timber, and in mines and minerals, may be made the subject of compulsory commutation upon an agreement being entered into between the lord and the tenants of any manor at a meeting called in the way prescribed by the act. The same power is given in respect of the lands of the lord or tenants whose interests are not less than three-fourths of value of such manor and lands, and of three-fourths in number of the tenants, it becomes (on receiving the commutation of the commissioners appointed under the act) compulsory on the lord and all the tenants of such manor. Powers are likewise given to any lord, and any one or more of the tenants, to effect by agreement between themselves a commutation, wholly voluntary, of the above-mentioned rights or any other rights of the lord, such as escheat, waifs, fairs, markets, &c. The lord's rights may be commuted either for an annual rent-charg or a small fixed fine not exceeding £, on death or alienation, or for the payment of a fine on death or alienation or on entering into a new agreement on the copyholder to be agreed upon between the parties: such annual rent-charge or such fine, as the case may be, if exceeding the sum of 20/, to be variable according to the price of corn, upon the principle of tithe rent-charges. After the completion of the commutation, the lands are to continue to be held by copy of Court Roll, and to pass by surrender and admittance or other customary mode of conveyance, but the customs of Borough-English, or Gavelkind (except in Kent), or any other customary mode of descent are also one of the leading causes of confusion and inconvenience. However, the new Copyhold Act has introduced numerous inventions which may be classed under the general name of copying-machines, some of which are extensively used in mercantile establishments for producing duplicates of letters, invoices, and other MS. papers.

The most simple and obvious mode of effecting this object is by transferring, by means of a rolling or screw press, a portion of the ink with which a letter is written to the surface of a sheet of blank paper, prepared to receive it by damping. The transfer thus obtained is of the same character as the original letter, and, unless it be taken on paper so thin and transparent that it may be read through it, it must be read backwards. Watt's copying-press, referred to under WATT, was a contrivance for obtaining transfers of this kind upon the paper, the press consisting of two wooden cloths, which absorbed all unnecessary moisture. Elegant screw-presses of iron are manufactured for this purpose, of various designs, some having the power speed solely by the hand of a lever or lever, by a cross or wheel-shaped handle, while others have also a contrivance for increasing the pressure beyond what can be conveniently applied by the simple turning
of the screw. The nature of such contrivances may be conceived from those described under Scaev-Pass, P. C., p. 111. One deposition of such a copying-machine is that by Mr. Ritchie, of Edinburgh, a cut of which is given by Hebert (Engineer's and Mechanic's Encyclopedia, vol. i., p. 400), in which the platten is depressed by a screw, turned by a short transverse handle, until a moderate pressure is given, and the paper, which is held between levers acting upon an eccentric cam, which bears upon a piece of steel attached to the head of the screw, and the screw and platten are further depressed through a very small space, but with immense force. Beazley (Records of Engineering Machinery, in the Encyclopaedia Metropolitana, section 401) describes a very simple and compact copying-machine invented by Mr. Bruenel, in which the pressure is given by means of levers. In some cases, letters intended for transfer- ring are first written or drawn upon an ink made for the purpose; and when common ink is used it may be thickened by adding a little sugar to it. In some cases the transfers are taken from the pages of a MS. book prepared for the purpose, a sheet of dry oil paper being placed over the damp sheet to prevent transmission of the moisture. It is almost needless to observe that transfers may be taken from several written sheets at one operation of the press.

Hebert gives the following description of a simple, and, he says, a very useful machine—"a means to form a section or any hard wood, about eighteen inches long and one inch in diameter, and having cut a longitudinal slit therein nearly the whole length, insert in it and fasten very neatly with glue a slip of strong cloth, about two thicknesses wide and eight inches long, so that the projecting part of the roller will serve as a handle, and may be cut with several edges to obtain a firmer hold. To use this copying-press, lay the sheet of paper on which the letter is written upon the strip of cloth; on that place the thin copying-paper, and upon these lay a thin bain or horse-hair pad; then roll the whole round the roller, and grasping that part where the cloth is with the left hand, turn the roller round with the right, gradually increasing the grasp with the left; the pressure becomes very great, and quite the effect of the letter is conveyed to the paper."

Holland (Manufactures in Metal, Lardner's Cabinet Encyclopaedia, vol. ii. p. 243) mentions a plan suggested by Dr. Franklin, which, although he styles it ineligible in practice, is worth recording as conveying an idea which might be usefully applied. He proposed to write the original letter with a gummy ink, and then to strew it over with flour-emery, which would be retained by the ink, though it would not adhere to any other part of the surface of the paper. The writing was then to be seized face downwards upon a smooth leather plate, and subjected to the action of a powerful rolling-press, which, he conceived, would cause the emery to make an impression of the writing upon the surface of the metal, which might be covered with printing ink, and printed from like an engraved plate.

Mechanical contrivances for enabling a person to write with two pens or pencils at once, on different sheets of paper, on the principle of the Pantograph, P. C., p. 192, have been tried as copying-machines, but they are too complicated for ordinary use. All such machines, and perhaps we might say even the copying-press, are far surpassed in convenience by the manifold writer, an apparatus patented in 1806, by a person named Wedgewood. In this apparatus a sheet of paper is blackened on both sides with printers' ink, and dried for five or six weeks between sheets of blotting-paper, or covered with some other black composition which will come off when pressed hard, but not with a slight degree of pressure. The paper is then to be inserted between the rollers of a platten and turned over, and subjected to the action of a powerful rolling-press, which, he conceived, would cause the emery to make an impression of the writing upon the surface of the metal, which might be covered with printing ink, and printed from like an engraved plate.

COPYRIGHT. The following additions are rendered necessary by acts that have been passed since the article COPIRIGHT, P. C., was written:—

An act to amend the law of copyright, and having for its preamble, 'Whereas it is expedient to amend the law relating to copyrights,' § 3 provides for an agreement to the production of literary works of lasting benefit to the public by the act which now regulates literary property. It repeals the 8 Anne, c. 10; 41 Geo. III. c. 107; 54 Geo. iii. c. 156 (P. C., viii. p. 2); and enacts that in every book published in the United States during the (or any succeeding) period of forty-two years from the date of publication, then for such period of forty-two years; while for books previously published, in which copyright still subsisted at the time of the passing of the act, the copyright should be continued for the full term provided in the cases of books thereafter published, except in cases where the author or his assigns have not paid the copyright tax, or when the copyright has been acquired by a person other than the author, 'who shall have acquired it for other consideration than that of natural love and affection.' In these excepted cases however the author, or his personal representative, and the proprietor or proprietors of copyright may agree, before the expiration of the term of copyright, to accept the benefits of the act; and on a minute of such agreement being entered in a book of registry directed to be kept at Stationers' Hall, the copyright will be continued, for the purposes of the act, in all cases, to the death of the author, or forty-two years from the time of publication, and will be the property of the person or persons specified in the minute. The copyright of a book published after the author's death, or forty-two years from the time of publication, will be the property of the person or persons specified in the minute in which it is first published, and his assigns. With regard to encyclopedias, reviews, magazines, periodical works, or works published in a series of books or parts, or any book in which no single author has assigned his right to the publisher of the work, the right of copyright, to write, on the terms that the copyright shall belong to himself, the copyright shall be in the publisher or projector, after he has paid for it, in the same manner and for the same term as is given to authors of books, except only in the case of essays, articles, and such like works forming part of reviews, magazines, or other periodical works of a like nature, the right of publishing which separately shall revert to the authors at the end of twenty-eight years after publication, for the remainder of the term given by this act; and during these twenty-eight years the publisher or projector shall not have the right to publish any such essay, article, or portion separately, without the consent of the author or his assigns.

The act provides, at the same time, against the suppression of books of impiety and the public, by empowering the judicial committee of the Privy Council, on complaint made to them that the proprietor of the copyright in any book, after the death of his author, refuses to republish or allow the republishing of the book, to require him to publish the book, in such manner and subject to such conditions as the Privy Council may think fit.

The remedies provided by this act for infringement of copyright are, an action for damages (in which the defendant is required, on pleading, to give notice to the plaintiff of the objections to the plaintiff's title on which he means to rely), and a power given to the officers of customs and excise to seize and destroy all foreign reprints of books in which copyright exists, with a penalty on the importer (if he be not the proprietor of the copyright) of 10£., and double the value of every copy of any book imported, on conviction before two justices of the peace; 5£. of the penalty to go to the officer of customs or excise who shall procure the conviction, and the remainder to the crown.

The act provides that a book of registry be kept at Stationers' Hall, where entries may be made of proprietorships of copyright, assignments thereof, licences of the judicial committee, and agreements of the proprietors of copyright, and a fine of 20£. for every false or incorrect entry, or entry not made within three months after the payment of the required tax. The entry of an assignment in the registry book is to be entered with the papers of justifying authority, and a true and accurate fac simile proof of copyright. The making of a false entry in the registry book, or the production in evidence of any paper falsely purporting to be the copy of an entry therein, is made
Persons thinking themselves aggrieved by any entry in the registry book, may apply to a court of law in term time, or a judge in vacation, for an order to vary or exchange such entry; and such court or judge may make an order for varying, expanding, or confirming such entry, with or without costs.

With respect to dramatic literary property and the 3 Wm. IV. c. 10 (P. C. viii. p. 2), the 5 & 6 Vict. c. 45, has extended the term of patent and thereupon wove fabrics consists of pieces to the period provided by that act for the copyright of books, and gives the same protection to the authors of musical pieces and their assigns. The remedies provided by the 5 & 6 Vict. c. 15, in the case of dramatic pieces are confirmed by the 5 & 6 Vict. c. 45. The 5 & 6 Vict. c. 45, also enacts that no assignment of the copyright of any book consisting of a dramatic piece or musical composition shall convey the right of representing or performing such dramatic piece or musical composition, unless as an entry, expressing the intention that such right should pass by the assignment, be made in the registry book at Stationers' Hall.

The protection given to authors by the statute of copyright is coupled with the condition of presenting five copies of every book to certain public libraries. A copy of every work, and of every second or subsequent edition which contains any additions or alterations, bound, sewed, or stitched together, and on the last page a list of the names of the persons engaged in the several processes of printing, if published at the British Museum within one month after its first publication, if it is published within the bills of mortality, or within three months if published in any other part of the United Kingdom, or within twelve months if published in any other part of the world, second or subsequent edition, containing additions and alterations, on the paper of which the largest number of copies shall be printed for sale by the publisher, is to be delivered, if it remains within twelve months after publication, within one month after demand made, at Stationers' Hall, for the Bodleian Library at Oxford, the Public Library at Cambridge, the Library of the Faculty of Advocates at Edinburgh, the Dublin Library, the Library of the Literary and Philosophical Society of Newcastle, the Society for the Diffusion of Useful Knowledge, and theSubscription Library in Sheffield, the value of the copy of each book or edition not delivered, and a sum not exceeding £6, to be recovered by the Librarian, or other officer properly authorised, of the library to which the book should have been delivered, on conviction before two justices of the peace for the county or place where the publisher resides, or by action of debt in any Court of Record in the United Kingdom. Formerly, under the 54 Geo. III. c. 156, an author was obliged to give eleven copies of his work to Stationers' Hall.

The strict powers given by the 5 & 6 Vict. c. 45, have been vigorously exercised by the Custom-house authorities, and found very effectual to prevent the importation into this country of the French, Belgian, German, and American reproductions of our productions, and for the better security by the circulation of these reprints abroad; and a practice so destructive of the fair profits of mental labour can only be effectually repressed by prevailing on foreign countries to extend the rights of their own laws against literary piracy to aliens as well as native authors. Two statutes have been passed in the present reign to enable her Majesty to extend the benefits of our laws of copyright. The first of Geo. III. c. 38, was repealed by the 7 Geo. III. c. 12, the same which was first wove while was substituted in consequence of the alterations in our law of copyright. This act, entitled 'An act to amend the law relating to Copyright,' empowers her Majesty by order in council to extend the exclusive possession of the copyright of books, prints, articles of sculpture, and the sole liberty of representing dramatic and musical pieces, for periods not exceeding those allowed by the statute of copyright for the respective classes of works when first published in this country, in the copyright registration and delivering of one copy at Stationers' Hall; but no such order in council is to have any effect unless it is signed therein, as for guiding the issue, that reciprocal proceeding by which the author has a right to first published in foreign countries to have copyright in the British dominions for books, prints, articles of sculpture, and the sole liberty of representing dramatic and musical pieces, for periods not exceeding those allowed by the statute of copyright for the respective classes of works when first published in this country, to which the order in council refers. The power given by this act has not yet been exercised in the case of any single foreign country.

The chief statutes affecting the copyright in the arts of designing, engraving, and etching prints, are the 8 Geo. III. c. 13, the 7 Geo. III. c. 38, and the 17 Geo. III. c. 58.
CORAL FISHERY.

Coral, (for a zoological account of which see Polypinia, P. C., pp. 386-387, and the other articles there referred to,) is a marine production so nearly resembling the rock in appearance that it has been supposed to belong to the vegetable kingdom, although it is now known to consist of the cells or habitations of minute animals, so built upon one another as to produce a branched tree-like structure, often very beautiful and colorful, and exceedingly unbecoming to see after, especially by the natives of India, for ornamental purposes, coral forms, in those places in which it is found of good quality, an important article of commerce. Coral was known to the ancients under the name corallium, and, as is supposed, by Pliny's directions, they erroneously supposed it to be soft while in the sea, and to harden by contact with the air, or by touching with the hand. (Holland's translation of Pliny's Natural History, book xxi, vol. ii. p. 425.) It is found abundantly in various parts of the Mediterranean Sea, in the Red Sea, the Persian Gulf, and several other places, in which the coral fishery forms the laborious and dangerous occupation of a large class of men. A full account of the coral fishery in the Straits of Messina is given in the fourth volume of Spallanzani's "Travels in the Two Sicilies" (English Translation, 1798, pp. 305-329), from which it appears that the rocks which yield coral are situated in the middle of the strait, and that the parts from which it is taken vary from about 320 to 650 feet below the surface of the water. These are nearly the same in height or length of twelve inches, and require eight or ten years to come to perfection. The fishery is therefore divided into several portions, from each of which the coral is removed, in the course of ten years. The shape of the coral is of smaller size, but it does not appear that it materially increases in length if left longer, although its stems become somewhat thicker. The free access of the rays of the sun through the water appears to be essential to the perfection of the coral, which, we are told, always grows nearly perpendicular to the surface of the rock to which it is attached, whatever the position of the rock itself may be. It is of various colours, from black or brilliant red to a dull white, and is commonly sold in the market by the pound, weighing in weight about eight or ten guineas as per ounce, while other sorts are not worth a shilling a pound. The mode of conducting the fishery in various places is much the same. In that described by Spallanzani, the instrument used consists of two heavy beams of wood, secured together at right angles in the form of a cross, and loaded at their intersection with stones or other weights sufficient to sink them. A quantity of loosely twisted hemp, intermixed with coarse netting, is attached to the under side of the beams, at the ends of the cross, to the middle of which is fixed on one end by which the apparatus is let down from a boat, and guided to the spots where the coral is supposed to be most abundant. The branching form of the coral causes it to become entangled in the network attached to the cross, by which means it is broken off from the rock, and drawn up with the apparatus to the surface of the water. Owing to the great depth at which the fishery is carried on, the submarine movement and drawing up of the cross is a laborious operation, sometimes requiring the united efforts of half a dozen boats; and the men employed are exposed to considerable danger in case of the rope breaking. In Rees's "Cyclopedia," art. "Corals," where copious extracts are given from Spallanzani, there is also a notice of the machines used by the coral-fishers of Marseille, in the fishing-gounds of which is called the "bastion of France," one of which, called in the Provencal language the "salobre," is intended for situations in which the bottom of the sea is rough and uneven. With a few trifling variations however, all the instruments of which we find any account consisted of weighted beams supplied with network, or some substitute for it, to entangle and break off the coral. In some cases a diver descends to guide the ends of the cross into caverns which they could not otherwise enter; and an iron hoop fixed to the beam is occasionally used to break coral from the roof or sides of caverns, a net being attached thereto to secure it is thus broken off.

CORAL RAG, the most curious, or at least most common of the Oxford and Pembroke wrappings. It is a variable and singular rock, most rich in Madreporilias and Echinodermata, in the vicinity of Culne.

CORALLORHIZA, a genus belonging to the natural order Orchidaceae, and to the tribe Orchideae. It has but one species: It has a bunch of tubers arising perennably; the lips with two prominent longitudinal ridges at the base, 3-loded, the lateral lobes small, the middle lobe large, slightly emarginate; the spur short or obsolete; the stigma triangular; the rostellum obsolete, but with a large globose appendage; the anthers terminal, 2-celled, opening by a longitudinal suture; the column elongated; the germen slightly stalked, straight.

C. timata has the spur obsolete or wanting. It has thick fleshy roots with much branched fibres. The flowers are white, and are produced from the base of the plants.
has been equaled by few masters, and by still fewer in their art; he could execute in a single day as much work as would occupy four painters of ordinary efficiency in the same time. One of his best and greatest works, the Feeding of the Five Thousand, in the refectory of the Benedictines, occupied him only forty days. He died in 1649, at an advanced age, and was buried in the church of his friars, when he fell from the scaffolding and was killed.

(Domini, Vita dei Pittori, &c.;] Lanzoni, Storia Pictoria, &c.,]

CORIANDRUM SATIVUM, Medical Properties of. This umbelliferous annual plant is a native of the South of Europe, Tartary, &c., and much is imported from the Levant, though a considerable portion is cultivated in Suffolk and Essex, for the use of confectioners in this country. The officinal quantity of engraving is generally of round, white, not unlike a grain of white pepper, and was used as a means of comparison for the manna with which the Israelites were fed in the wilderness. (See Exodus xvi. 31, and Numbers xii. 8.) The fresh fruit has a disagreeable odour, which disappears on drying, leaving a pleasant and peculiar smell. The taste is warm and aromatic. The potency depends upon the quantity of volatile oil. Ten pounds of fruit yield as much of volatile oil. This oil, which is of a yellowish colour, may be found in the Ptolemaic Pharmacy, and is made in the same way as the other distilled waters or oils, as a carminative. Coriander was thought better to disguise the odour and taste of senna than other aromatic, but in the infusion ginger is now substituted for it. Making the infusion with cold water is preferable to boiling in the pot, and, while this practice is retained, coriander is retained as an ingredient of the Confectio Senanica.

It is necessary to guard against confusing coriander with the seed of the Daphne Mezeronea, called Semen Coccolonii, as the potass is very poisonous. To the former is the name coriander; to the latter, coriander, coriander, or cumin.

CORINNA (Κορίννα), a Greek lyric poetess, was a daughter of Achelodorus or Achelodorus and Procratis, and born at Tanagra in Boeotia. As she resided during some period of her life at Thebes, she is sometimes called a Thebais. She was an admirer of theNeander, and, according to Plutarch, she wrote under this name alone. She lived about a.c. 500, as we must infer from the persons with whom she was connected, and was a woman of unusual beauty. She is said to have been a disciple of Pindar, and eventually to have found herself instructed Pindar in his youth; but afterwards to have contended with him in poetical contests, and to have gained five victories over him. She appears at any rate to have exercised a very great influence upon the development of Pindar's youthful genius, and to have raised it to such a height that he has blamed Myrtea for venturing to enter into competition with him. Her poems were collected and divided (probably by the grammarians) into five books, and in addition to this collection we have mention of epigrams and lyric nomes. But not of her entire works. She was, we imagine, the author of very few fragments are extant, which scarcely enable us to form an idea of their merit. Her great reputation however is attested by the statues which were erected to her in several towns of Greece, and by the prominent place which the Alexandrine critics assigned to her among the lyric poetesses. She wrote in the ζειλα dialect, which however was interspersed with many Boeotian peculiarities. Her poems moreover appear to have been principally intended for Boeotians; for they abounded in allusions to Boeotian localities. From the fragments extant we must infer that the subjects of some of her poems were traditions about mythical heroes, and as in addition to this we are told that she wrote elegies, we might suppose that she was a poetess of elegies. But in a Hymn to Hephaestion (p. 29, ed. Gaisford), that these elegies were contained in the fifth book of her poems, and that they were choral odes or hymns in the heroic or epic verse. The fragments of Corinna's poems are collected in F. Ch. Wolf's Poetarum Graecorum antiquiorum Collectio, vol. i. 1804, p. 49, &c.; in A. Schneider's Poetarum Graecorum Fragmenta, &c., Giesen, 1802, 8vo; and best in Th. Bergk's Poete Lyrique Grec, p. 811, &c.; Th. Delitzsch's Christliche Meletemata, vol. ii. p. 1, &c.; Bode, Geschichte der hellenischen Dichtkunst, vol. ii. p. 116, &c.,]

Bode, in his article Corinna, mentions two other lyric poetesses of the name of Corinna, one of the Thespiae or Corinthian, who is mentioned by Strabo (xiv. 11), and another, who is supposed to have been a native of Boeotia. These two are otherwise unknown, and it is generally supposed that Suidas is bumbling in his usual way, and has made three persons out of one.

CORIOLANO, the name of three celebrated engravers, chiefly in wood, in chiaroscuro. The earliest, Coriolano, appears to have been a German and a native of Nuremberg, whose name, Doppelmayr supposed, was Lederer, but having settled in Italy he translated it into Corioloano. He cut, besides many other works, the very clever portraits of the second restoration of Vasari, in 1658. He died, according to Doppelmayr, in Venice, in 1660.

GIAMBATTISTA CORIOLANO, the next in point of time, was born at Bologna, and is supposed to have been the son of Cristoforo, but from his having given himself as a pupil of the Carracci, it is more probable that grandson is a more probable relationship: he died in 1649. He was the pupil of G. L. Valesio, and was painter, and engraver on copper and on wood; but he painted very little, and his cuts in wood are very few: his works consist chiefly of the celebrated etchings and engravings of a person of which Bartch describes 223, among which are several after the Carracci and other celebrated Bolognese painters. The most celebrated of this name was the Cavaliere Bartolommeo Coriolano, who is likewise said to have been the son of Cristoforo, but the statement in this case is still more doubtful than in that of Giambattista, for the earliest date on his works is that of 1627, twenty-seven years after the death of his reputed father, who must have been of a considerable age when he died, as he was employed by Vasari in 1658.

Bartolomeo was made Cavaliere di Loreto by Pope Urban VIII., for some prints after Guido, which he presented to his holiness: from this event he always signed Eque after his name upon his prints. He was one of the best of the Italian wood-engravers, and he has executed some very effective prints in chiaroscuro, after Guido and the Carracci; some with three and some with two tints. The Fall of the Tower, after Girtin, is one of his principal works; it is in four sheets, which together measure 32 inches high by 23 broad. The latest date to which his signature is found is 1647. His daughter, Teresa Maria, passed and engraved a few works.

(Doppelmayr, Historische Nachricht, &c.;] Gandellini, Notizie storiche degli Intagliatori, &c.;] Bartch, Peintre Gra- veur; Brunliot, Dictionnaire des Monographes, &c.,]

CORMONTAINGNE (C. E.) was a French engineer of the eighteenth century, who distinguished himself both by the services which he performed in the field, and by the improvements which he made in the art of fortification. He must have been born about the year 1692, for he died October 20, 1724, and he is said to have been then nearly seventy in age; but it is remarkable that the circumstances of his early life, and even his baptismal name, have not been preserved.

The first notice which we have of him is that he was present at the siege of Fribourg in 1715, and probably he then accompanied General Desprez on his campaign of 1716, for, after the fall of the town, he wrote a Memoir on Fortification to M. le Peltier de Souzi, who at that time held the rank of Intendant General des Fortifications de France. In 1734 he was appointed by the Comte, afterwards the Maréchal Duc de Belliune, to direct the siege of Trabusch; and when the division which performed that service rejoined the main army he accompanied it: the siege of Philiburger being then undertaken, Cormontaigne was employed to superintend the operations; and it is said that his successful attacks on two of the works were the immediate cause that the place was surrendered.

In the year 1744 he conducted, in Flanders, the sieges of Menin, Ypres, La Knoque, and Furnes; and, in Germany, that of Fribourg: Sertie, who was one of the chief among the engineers were very great, the operations were conducted under the directions of Cormontaigne with the utmost regularity; and it is stated, as an example of the precision with which he formed his plans, that all the operations on the ground were exactly conformable to the written instructions which he drew up and to the sketches which accompanied them.

Subsequently to that time he was employed in inspecting the fortifications of Colmar, from the Rhine to the Rhone, and, on this occasion, besides a general tract on the manner of fortifying the frontiers of a state, he wrote particular memoirs on the places of Francke Compté, Alme, and the country between the Moselle and Cailla. He was afterwards employed in Bourges and in superintending the works which were in the mind of the Emperor, to fortify Strasbourg, Metz, Bithéa, and Thionville: at the last of these places he resided, with the rank of Maréchal de Camp, and here his useful life terminated.

3 H 3
CORMONTAINGNE wrote several memoirs relating to fortification and other branches of the military art; and that which is on the subject of the attack of fortresses, is said to have been composed, during the siege at which he served, from notes written in the trenches and on the breaches, even under the fire of the enemy. None of his writings were published during his life, except one which, without his knowledge, was printed in 1741, under the title "Architecture Militaire," and, after his death, all his papers were deposited in the Bureau de la Guerre, where they remained above thirty years. Extracts from them were, however, published, and these served as text-books for the lectures given at the Ecole du Génie during the years 1809 and 1810. The manuscripts were at length obtained by M. Fournery of the government-offices, and were published at Paris by M. Bayart, capitaine du génie, in three volumes 8vo. The first is entitled "Mémoire pour la Défense des Places (1806);" the second, "Mémorial pour les Fortifications permanentes et passagères (1809)." An edition of the first of these works had been published by Boussard at Berlin in 1808.

Cormontaigne did not profess to invent a system of fortification; but, by certain variations in the constructions, and by additional works, he obviated many defects which are conceived to exist in the systems of Vauban: a brief notice of his improvements, and a plan of this method, is given in Fortification, p. 376, 377.

It is observed that Cormontaigne's "Mémoriaux" are less discourses than diagrams, and that his drawings are more correct than his style, which has few pretensions to elegance. He was a great admirer of the ancients, and had an ardent desire to penetrate into every subject relating to his profession.

(Boussard's account of Cormontaigne in the Preface to the Mémorial for the Assiégé des Places; Biographie Universelle.)

CORN-LAWS. [CORN-TRADE, P. C.; WHEAT, P. C.]

CORN-RENT is a money-rent varying in amount according to the fluctuations of the price of corn. In some countries rent is paid to the produce of the land, and not of the land itself; before the end of the United Kingdom does this primitive custom exist. Some landlords in Ireland, indeed, for the accommodation of their tenants, agree to accept corn in payment of their rent, at the price of the nearest market, and ship it to England for sale; but the rent is calculated in money. (See Appendix F to First Report of Poor Laws (Ireland) Commissioners, 1835, p. 221.)

A corn-rent is founded upon the principle that a farm being assumed, if the produce of the land is an average quantity of produce, the value of such proportion of such produce as may be agreed upon shall be paid to the landlord as rent. But as the prices of all produce are liable to considerable variation, and as the profits arising from the land must generally be measured from the prices current, it is evident that, if held, it is supposed to be equitable to the farmer that the money value of that portion of the produce which he pays as rent should be calculated so as to vary with prices, instead of being determined by any arbitrary or unvarying standard. And it is undeniable that with long leases a corn-rent is a security against the growth of any serious disproportion between the rent originally agreed upon and the actual value of the produce of the land. If the farmer, under the security of a long lease, lay out capital upon the land and thus increase the quantity of produce, he derives the entire benefit arising from increased production, as the quantity to be paid as rent has already been agreed upon; and he is secured against loss occasioned by a fall in prices, as the amount of his rent is governed by prices.

For the purpose of ascertaining a corn-rent the average price of wheat, or of wheat and other grain, is taken—sometimes for the last year, and sometimes for a certain number of years. If the price for more than one year be taken, the results of the several years may be stated as:—When prices are low from a limited demand for produce, his rent is reduced; and when they are low from increased production, his rent is still reduced, although he has more produce than usual to sell. When prices are high, his rent is increased, he has more rent to pay, but the remunerative prices enable him to pay it easily; but when an advance of prices is caused by scarcity, his rent is raised, while the high prices may be caused by an overproduction, and it must be diminished had he to sell. Thus in three cases out of four a corn-rent is favourable to the farmer; and even in the fourth case he is secured from loss by its favourable operation in other years. In some leases also a further advantage is given to him by fixing a maximum price; and thus if prices should happen to be above the average, the landlord receives the whole profit from the difference. Under this system of annual average, so advantageous to the farmer, there is a certain degree of unfairness to the landlord, which is sometimes corrected by an arrangement whereby the rent is calculated from the average of the price of corn in the several years of the lease, and corn-rents are sometimes regulated by the scale of average prices published annually for the purposes of the Tithe Commutation Act. In Wiltshire some farms are let in this manner, but are subject to the rate of interest upon the money rent. The rent of great farms from dairy farms cannot be regulated by the ordinary system of corn-averages; but in some of the dairy-farms of Cheshire the rent is determined by the average price of wheat and of cheese. In many parts of the south of Scotland corn-rents are paid according to the amount of corn, as determined in each county by a jury summoned by the sheriff for that purpose.

The principle of a corn-rent is by no means of recent origin; for by an act 18 Elizabeth, § 5, it was required that one-third of all corn used for the maintenance of the garrison of Oxford and Cambridge, and by the colleges of Winchester and Eton, one-third part, at least, of the old rent shall be reserved and paid in good wheat at 6s. 6d. the quarter or under, and good malt at 5s. the quarter or under: or shall be paid in the one case with the wheat, and in the other with the malt, at the nearest market. (Journal of the Royal Agricultural Society, vol. v. p. 84, 177; see also Index to Report on Agricultural Distress, 1856.)

CORN-TRADE, ANCIENT. The production of corn, one of the chief necessities of life, and its commercial exchange, have been a subject of the first importance in all ages. It is proposed here to state briefly the general nature of the trade in corn among two of the states of antiquity to whose habits we are indebted for many of our modern institutions. It is, however, the business of antiquity. There are few important political questions at the present day to which we cannot find something similar in former times; and the hounds of antient legislation may still be instructive to modern statesmen.

Attician Corn-Trade.—The small and comparatively barren territory of Attica did not produce sufficient corn for the consumption of the inhabitants. Corn was brought into the Piraeus, the port of Athens, from the countries bordering on the sea, such as Asia, Africa, and Euboea, and from Sicily. Demosthenes asserted (n.c. 365) that the Athenians imported more grain than any other people (Against Leptines, c. 9). But the trade in corn between Greece and the Black Sea was of some magnitude at a much earlier period, as is shown from the coins of the produce of certain cities. The passage was easy to the invasion of Greece, saw the corn-ships that were sailing from the Black Sea and through the Dardanelles and carrying corn to Peloponnesus and Eginia. (Herodotus vii. 147.) Some parts of the country on the coast of the Black Sea now export grain, and probably have exported grain ever since the time of Xerxes.

The importation of grain into Attica was a matter that was protected and regulated by the state; and instances are mentioned of armed ships conveying the corn-vessels from the Black Sea to the Piraeus. The exportation of corn from Attica was forbidden; and only one-third of the foreign corn that was imported into the Piraeus could be re-exported to other countries: a law as to transportation was enforced which overtopped the harbour. The law interfered with the trade in corn in other ways also, with the intention apparently of keeping prices low; but with what success it is easy to conjecture. Engrossing or the buying-up of corn was a serious offense; a man could not purchase more than fifty loads (called drachmen). The amount of these loads cannot be exactly ascertained, nor is it material; the principle is clearly shown by the limitation. The penalty for violating this law was death. Beeck (Public Economy of Athens, Eng. trans.) states (p. 47) that the attic drachmen of corn were small, and boarding of corn, engaging was very much restricted; it was not permitted to buy at one time more than fifty such loads as a man could carry. According to this a man might have seen established in the oversight, and the means of producing corn to be proportioned to the demand, the meaning of the passage of Lysias is that a man must not buy up corn so as to have on hand more than fifty loads at a
This interpretation is consistent with the Greek, and the other is not; and it is not open to the same kind of objection that Boeckh's interpretation is.

The absurdity of the Athenian legislation on the trade in corn is evident from the case of Lyons against the corn-dealers (κατά τοῦς Σιουκούλους). The corn-dealers were generally aliens, and their business made them objects of popular detestation: it was alleged that they bought up corn, and refused to sell it again for the cost of production. The sellers were thus compelled to pay them their own price. Yet it is stated by Lyttia that the law was, that a dealer must sell his corn only at a cobus dearer (the medimnus?) than he bought it. Thus the law attempted to fix the maximum profit of the dealers; but they evaded the law by paying the same price, and, by selling it a drachma (six oboli) higher on the same day: the meaning of the orator here is not quite clear. The orator says that the hope of great gain made the dealers run the risk of the extreme penalty of the law. He urges the court which was then sitting for the trial of some of the corn-dealers whom he was prosecuting, to enforce the penalty against them, and so make them mend their manners; and he represents both the consumers and the importers of corn as suffering from the combinations of the dealers. A more signal instance of absurdity and commercial ignorance is not extant than this oration.

To carry the laws as to the sale of corn into effect, the Athenians had to pass a law to make it a punishable matter of conscience to ship the corn that was imported, inspected flour and bread, and saw that they were sold of the weight and at the price fixed by law.

Various enactments were made with a view of securing some control over the dealers, such as that no money should be lent on a rent which did not bring back to Athens a return cargo of provisions, among which corn was mentioned; and that no person living in Attica should import corn to any place except the city of Athens. The interests of individuals, and ultimately the real interests of the community, were thus set in opposition to the supposed interests of the state, and evasions of the laws were often spoken of. Individuals attempted what they will always do, to sell their grain at the dearest market. (Xenophon, Hellenica, iii. 1. 19.)

There were public corn-warehouses at Athens, in which corn was lodged that had been purchased at the expense of the state, and sometimes, as it appears, by private contributions. These were officers appointed to purchase the corn (αγορασταὶ, αγοραστοί), and persons to give or measure it out (ἀλληταῖ). Corn so purchased was probably sold to the people at a low price, and sometimes also there were gratuitous distributions of it, as at Rome; and occasionally, as at Rome and Athens, the poorer or rich persons, and distributed among the people gratis. This subject has been investigated by Boeckh, Public Economy of Athens, translated by G. C. Lewis, 2nd edition, 1810. The articles of Sartorius, the successor of Boeckh, are very valuable. In all this there is said there. The subject is curious, but unfortunately we must collect our information mainly from detached passages of the Athenian orators, who deal largely in falsehood and exaggeration, and it is not possible to arrive at certainty on some points.

Roman Corn-Trade. — What we know of the antient corn-trade of Italy mainly relates to the city of Rome. From an early period it belonged to the administration to see that the city was duly supplied with grain. The immediate neighborhood of Rome did not supply the wants of the city, and grain was imported into Rome from the country of the Volsci and from Cumae soon after the establishment of the eastern government. (Livy, b. 8.) An importation of corn from Sicily is mentioned by Livy (b. 41) under the year a.c. 446. As the Romans extended their empire, and provincial governments were formed, such as those of Sicily and Sardinia, supplies of grain were got from foreign parts. After the capture of Sicily, the proprietors were compelled to keep their lands on condition of furnishing a tenth of the produce to the Romans, according to the system which had been established by King Hiero. Sardinia, after the conquest, paid the same. (Livy, xxxvii. 2.) The mode of proceeding, as to the tenors for the supply of grain, was that the emperor fixed the quantity of land he intended to sow, and an entry was made of it. The Roman State took the tenth of the produce in kind, which the cultivator was bound to convey to some particular individual, or to a certain quantity, or to a certain price. The wheat produced by the tenants was entered in the public books, and it was all conveyed to Rome or to the armies which were serving in parts remote from Rome; this at least appears to have been the general rule.

Sometimes two-tenths of the produce were claimed by the Roman State (Livy, b. 32), but in this case the second tenth was paid for out of the Roman money. There was a system by which a certain portion of the grain from foreign states and princes were sometimes made to the Romans. (Plutarch, C. Gracchus, c. 2.) Thus it appears that the State undertook to provide the chief supply of corn: it was often sold by the Roman government, and was sometimes distributed gratis among the poor, a practice which became common under the late Republic. Besides these distributions of corn at the public expense, wealthy Romans who sought popularity made like distributions of corn among the poorer citizens, as M. Crassus the Rich did in his consulship. (Plutarch, Crassus, c. 2, 12.)

It does not appear, then, that the chief supply of corn for the city of Rome during the Republic was furnished in the regular way of trade. It was the business of the State to keep the proper supply of corn for the city in the public warehouses; but the supply was not always equal to the demand, and it also often happened that many people could not afford to pay the price. Scarcity was not uncommon both under the Republic and the Empire.

In Livy (iv. 12) we have a notice of the creation of a Praefectus Annonae, or Superintendent of Provision, L. Minucius, n.c. 440, in a season of scarcity. He executed his office in the most conscientious manner, and he made clear what they had in their possession, and set it to; and he endeavored to raise a popular clamour against the corn-dealers, if Frumentarii here means private dealers. Cn. Pompeius Magnus was intrusted with the superintendence of Provision for five years. (Cicero, Pro Cluent., iv. 11.)

The importance of the corn-trade of Italy to the Roman people is exhibited by a speech of Cato the Elder in the time of the Punic war. (Pompeii Magnus was intrusted with the superintendence of Provision for five years. (Cicero, Pro Cluent., iv. 11.)

Under the early Republic many parts of Italy were well cultivated, and Rome, as already observed, was supplied with grain from various parts of the Peninsula. But the civil wars which devastated Italy near the close of the Republic were injurious to agriculture. Murder and proscription thinned the numbers of the people, and life and property were insecure. The great supply of corn from Egypt, the property of those who were cut off by violence, fell into the hands of others, and chiefly of the soldiers. These and other causes made Italy less productive about the time of the Christian era than it had been some centuries earlier. Even under the peaceable administration of Augustus, 60,000,000 modii of wheat were annually imported into Italy and Rome from Egypt and the Roman province of Africa. The modius is estimated at 1 gal. 7 6/7 pints, English measure. But the importation did not prevent scarcity: there was a great famine at Rome in the latter part of the administration of Augustus. (Dion Cassius, l. 26; Vell. Paterc. ii. 104; Suetonius, Augustus, c. 42.) The general administration of the province of Egypt was exercised by the censors. (Annal. vi. 6.) He endeavored to secure a proper supply of corn by intrusting to the Publicani the management of the tenants of grain from the provinces; but there was a great famine in his time, and the high price of grain almost caused an insurrection. The emperor showed that he had not neglected this important part of the administration: he published a list of the provinces from which corn was brought, and he proved that the importation was larger than in the time of Augustus. (Tacit. Annal. vi. 13.) Again, under the administration of the Emperor Claudius, a famine in Rome occurred. (Tacit. Annal. xii. 43.) Tacitus observes that during the scarcity Claudius was assailed with menaces while he was seated on the tribunal in the forum, and he only escaped the aid of his soldiers. He adds that there were only fifteen days' provisions in the city; and formerly Italy used to export supplies for the legions to distant provinces; nor is Italy now barren, but men prefer cultivating Egypt and Africa, in order to prevent the existence of famine among the people of the empire, and the dangers of the sea. Claudius subsequently paid great attention to the supply of Rome with corn. Under Nero, the successor of Claudius, there was a famine at Rome. (Suetonius, Nero, c. 45.)

The comparison of antient and modern prices of grain is a difficult subject, and the results hitherto obtained are not satisfactory. It is also necessary to be careful in considering the circumstances when any prices are mentioned. P. Scipio at the interpolated occasion (c. 213) sold 17 to 18 quintals of wheat produced by the tenants was entered in the public books, and it was all conveyed to Rome or to the armies which were serving in parts remote from Rome; this at least appears to have been the general rule. Sometimes two-tenths of the produce were claimed by the Roman State (Livy, b. 32), but in this case the second tenth was paid for out of the Roman money. There was a system by which a certain portion of the grain from foreign states and princes were sometimes made to the Romans. (Plutarch, C. Gracchus, c. 2.) Thus it appears that the State undertook to provide the chief supply of corn: it was often sold by the Roman government, and was sometimes distributed gratis among the poor, a practice which became common under the late Republic. Besides these distributions of corn at the public expense, wealthy Romans who sought popularity made like distributions of corn among the poorer citizens, as M. Crassus the Rich did in his consulship. (Plutarch, Crassus, c. 2, 12.)

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sale is mentioned at the rate of two asses the modius. But on these, as on many other occasions, these prices were not the market-prices at which wheat would have sold, but they were the lower prices at which the State sold the grain in order to relieve the citizens. Rome, both under the Republic and Empire, was supplied chiefly from corn-grains of high price. It is possible that a supply might have readily been procured from foreign parts if there had been a body of consumers in Rome to pay for it. But the export of corn was not a profitable trade; it was, as above explained, a system by which the Romans drew from their provinces a contribution of corn for the consumption of the capital, and it was not regulated by the steady demand of an insatiable class who could pay for it. The reign of Titus, Nero, or Domitian, has been marked by a period of scarcity; the prices were fixed by the emperor, and the grant of corn in Rome, and he promised to give the merchants a bounty of two sestertii on the modius. This seems to mean that the emperor fixed the price for all grain, including whatever private merchants might have; but to make them amend for any loss, he paid them part of their prices out of the treasury. After the fire at Rome, in the time of Nero, Tacitus speaks of the price of corn being lowered to three sestertii the modius on the condition of their not importing any grain from foreign parts. A constitution of Valentinian and Valens (De Canone Frumenti Urbis Romae, Cod. xii. tit. 33) declares that merchants (nautici) were to make a declaration of the grain which they imported before the governors (of provinces) and the magistrates, and that they had only good corn to import; and it was the business of the authorities to see that the grain was good.

The provisionning of Constantine, Alexander, and probably other great titles, under the later Empire, was subject to regulations similar to those of Rome, and there were public granaries in those cities.

It is almost impossible to collect from the scattered notices in the Roman writers a just notion of the nature of the trade in grain. So far as concerns Rome, we can hardly suppose that a larger trade in corn was carried on there. The chief supply of grain was provided by the state. That which is best left to private enterprise was undertaken by the government. It is true that the condition of Rome was peculiar among the provinces of the Empire, the number of paupers, who required to be fed by occasional allowances of corn. The effect, however, of the State purchasing for the people was not a certain supply, but occasional scarcity. Whether a State undertakes to buy for the people what they may want for their consumption, or regulates the trade by interfering with the supply, is immaterial as to the result. In either case the people may expect to be starved whenever corn is scarce. The Roman system was to import all that could be sold, but it did not let to private enterprise. There was no exclusive right of importation in order to favour the Italian farmers; nor can it be said that the Italian farmers suffered because foreign grain was brought into Rome and other parts of Italy; he could employ much of his land better than in growing corn for Rome and sending it there. Corn came from countries which were better adapted to corn-growing than many parts of Italy; and besides this, the transport of grain from many foreign parts to Rome, such as Sicily and Africa, would be as cheap as the transport of grain from the interior of Italy, and much cheaper than the transport by land. The English foreign corn-trade is regulated with the avowed purpose of giving the English wheat-grower a high or what is called a monopoly price, with the pecuniary resources of those who have to buy corn. By interfering with the free trade in grain, the English system keeps the price unsettled, and exposes the people in times of scarcity to the danger of famine; for when a bad harvest occurs in England, the deficiency must be made up from abroad, and the price must be paid for it, whatever that price may be, which must always be paid for an article that is suddenly in demand, and is not an article of regular supply. The two systems were equally bad, but bad in a different way. The English system was worse than ours; it was purely mercantile, and ill-regulated trade, and it was closely connected with the vices of the political constitution. The English system is founded partly on ignorance, and partly on the wish of the landed interest to keep up the price of land, and at the same time of corn; it is the system of political power, to keep up their rents, which are derived from the lands which their tenants cultivate.

The essay of Dureau de la Malle, 'De l'Economie Politique des Romains,' and the treatise of Vincentius Contenau, 'De l'Economie Politique des Romains,' are important works on the subject of the grain-trade of the ancients, which have been mentioned above.
C. man, Male Cornel, Cornelian Cherry, has smoothish branches; leaves oval, accumulate, rather pendent on both sides; flowers rising before the leaves, in clusters on short stalks, inclining in the fruit, the fruit elliptic, it is native throughout the continent of Europe, but is not found in Great Britain. It has yellow flowers, which are succeeded by an elliptical fruit of a bright shining scarlet color, the fruit ripens in August and September; it was formerly cultivated for the sake of its fruit, but it is very inferior to many others that can be more easily produced, so that it is not now often used. The fruit is called Cercis by the Turks. This is a good and very durable. The root of Cornelian good plants for shrubbery, and many of them will grow under the drip of trees, and in spots where other plants will not thrive. They may be propagated by cuttings, layers, or suckers.

LINUM, Flora Medicina; Belington, Manual of British Botany.)

CORONER. The 58 Geo. III. c. 95, which made provision for conducting the election of coroners similar to those for the election of knights of the shire, was repealed in 1844 by 7 & 8 Vict. c. 92, which substituted other regulations on the ground that the former mode of election was inconvenient and attended with great and unnecessary expense. This act applies only to county coroners, and the coroners of the City of London, who hold the office under the Inns of Court. To hold and the Verge of the Queen's Palace, and Admiralty coroners, are specially exempted. Counties may be divided by the justices into two or more districts for the purposes of the act, and alterations may be made in existing divisions. The justices are to issue a warrant to the clerk of the peace to petition her Majesty, and notice is to be given to each coroner by the clerk of the peace of the time when the justices will take such petition into consideration. Any coroner of the county may present a petition to her majesty touching the proposed division or alteration of districts. Her Majesty, with the advice of the privy council, may order that such county shall be divided into so many districts as may be considered convenient, and determine at what place within each district an election shall be held, and the coroners shall hold the election. The justices are to direct the clerk of the peace to make out a list of the several parishes, townships, or hundreds in each of the coroner's districts into which the county is divided, specifying the place within each district at which the coroner for election is to be held, the place or places at which the poll is to be taken, and the parishes or places attached to each polling-place. The justices may then assign one district to each coroner; and whenever a coroner shall fail to appoint himself in manner prescribed by the act, the coroner must reside in the district for which he is elected, or in some place wholly or partly surrounded by such district, or not more than two miles beyond its outer boundary; the election must be made in the district, and the poll must be taken at the place or places therein. Any person qualified who shall reside in such districts: no voter can poll out of the district where he property lies. Within not less than seven or not more than fourteen days after the sheriff shall have received the writ De Coronatoris Eligendo, he is required to hold in the district for which a vacancy has occurred a special county court for the election; and if a poll be demanded, it may be kept open for two days, eight hours each day, from eight o'clock in the morning. The sheriff is to erect polling-booths; poll-clerks are to be sworn; and an inspector of poll-clerks is to be appointed on the nomination of each of the candidates. Electors may be required by or on behalf of any candidate to make oath respecting their qualification. The result of the poll is to be declared by the sheriff. The coroner, although elected for a district, is to be considered as a coroner for the whole county; but he is only to hold inquests within his own district, except in case of the illness or unavoidable absence of the coroner for another district; and his inquest must certify the cause of his holding such inquest.

County coroners were entitled to a fee of 20L., under 25 Geo. III. c. 39, and now, by 1 Vict. c. 68, to an addition of 9L. 6s. 8d., and by 11 Vict. c. 95, to 12L. 6s. 8d. for inquests. The fees are paid to the persons acting professionally in any case in which they shall have sat as coroner.

The act 1 Vict. c. 98, authorises the justices of the peace in England and Wales, at their quarter-sessions, and the county councils of each county, after the coroner's death, to appoint to hold, at their quarterly meetings, to make a schedule of the fees, allowances, and disbursements which the coroner is authorised to pay (except the fees payable to medical witnesses, under 6 & 7 Will. IV. c. 80), on holding any inquest. This schedule is to be made up by dividing the county, and the expenses to be paid to the constable for summoning witnesses, &c. There is usually a small sum allowed to each jurymen, generally 1s. 6d. in counties and 1s. in boroughs. The following are extracts from the schedule of fees settled by the magistrates of the county of Warwick, which are to be fixed by the coroner according to his discretion, but not to exceed the sums stated:

To the Keeper of any Inn or other public-house for the use of a room for a dead body until the Inquest is held.

To the Keeper of any Inn or other public-house for the use of a room for holding an Inquest.

To a Witness residing in the parish where the Inquest is held, for loss of time in attending to give evidence.

To a Witness who does not reside in the parish, is allowed per mile.

To every Witness of the three professions of law, physic, and divinity, for each day,

To each Jurymen residing in the parish where an Inquest is held.

To each Jurymen not residing in the parish where the Inquest is held.

To any person for taking a dead body out of the water, extinguishing fires in the case of a person burning, or removing a dead body when found to some convenient place till an inquest can be held, and giving notice to the proper authorities.

To a Chemist, Engineer, or other scientific person per day.

For interring the body of a Fætus de se, including horse and cart, and all other trouble (exclusive of burial fees, if any).

For digging the grave for interring the body of a Fœtus de se.

To bearers of the body of a Fœtus de se.

Coffin for a Fætus de se.

Under 7 & 8 Vict. c. 92, jurors and witnesses who neglect to attend an inquest may be fined any sum not exceeding 40L. The power of punishing witnesses who refuse to give evidence, and the contempt of court, for contempt of court, or for excluding persons from his court, are incidents of his office.

By 1 Vict. c. 68, the fees of medical witnesses are to be paid at once by the coroner, instead of by an order on the churchwardens, as directed by 6 & 7 Wm. IV. c. 80. For their services when sitting for the sheriff, jurors were not allowed any fees before the passing 7 & 8 Vict., but this statute secures to them the same amount of fees as the sheriff would be entitled to.

The average cost of the coroner's court for the borough of Birmingham, averaged 899L. for the five years ending 1st of December, 1844; coroner's fees, 11. 6s. 8d., annually averaged 337L. 4s.; and the expense of 1415 inquests averaged 3s. 2d. 8d. each. The disbursements, independent of coroner's fees, averaged 561L. 8s. 2d. a year. In 1844 the average expenses of each inquest held in the borough of Nottingham was 19s. 2d.; in the borough of Norwich, 14s. 3d.; in the county of Middlesex, 14s. 2d., including promotion of coroner's fees, 11. 6s. 8d. The average expenses of each inquest in the county of Bristol the average expense of each inquest was 11. 1s. 2d., exclusive of the fees to medical witnesses.

CORONILLA, a genus of plants belonging to the natural order Leguminosae. It has a campanulate short 4-toothed calyx, with the superior teeth approximated and partially united; the claws of the petals distinctly longer than the calyx; the keel acute; the stamina diadelphous; the legume tapering, slender, finally separating into oblong 1-seeded sections; the seeds from by a milky sap. The species are mostly herbaceous plants, with unequally pinnated leaves; the peduncles sessile, bearing an umbel of stalked flowers.

C. Euphorbia, Scorpion-Senna, is a shrubby glaucous plant, with small stipules; 5-obovate leaves; 5-flowered pendent flowers, in two or three rows, with the calyx and petals united; the pedicels sessile, bearing an umbel of stalked flowers. It has yellow white flowers. Its leaves act as a cathartic, resembling the leaves of sena,
but are less active. It is a pretty shrub, and well adapted for the front of a shrubbery. It thrives in almost any soil, and
blooms nearly all the year round.

C."Tussilaginea." is native Great stamens of the species has the temperate parts of the earth in the four quarters of the globe.

C. clavulata, White Climbing Fumitory, has a fibrous root; pinnate leaves, with acumenate bracts, the pinnar-
ter., football ending in tendrils. It has small pale yellow or
white flowers. It has a slender climbing stem, 1.4 feet long. It is found in bushy places in hilly districts of Great Britain and throughout Europe.

C. huteri, Yellow Fumitory, has a fibrous root, trilobate leaves, minute obtuse glandular leaves; shining seeds, glo-

nulato-rupges, with a pentandrous dicotyledon. This plant is native of the South of Europe, in the fissures of rocks and old

walls. It is now naturalized in Great Britain, and forms a picturesque object on the old walls of ruins, as at Castletie in

Derbyshire, and Fountaine's Abbey, Yorkshire. It is a very common plant in gardens.

C. solida has a tuberous solid root, with binate cut

leaves, the lowest petiole a leafless scale, the bracts palmate. It is found in Great Britain, but has been undoubtedly

introduced.

C. Fabeae has a nearly simple erect stem, scaly under

the lower leaf; the leaves stalked binate; the bracts acute, acute, longer than the pedicels. It is a native of Asia and

occurs in mountainous places in Sweden. It is a native of many parts of the continent of Europe. This species, as well as

C. tuberosa, a native of the South of Europe, has a tuberous root. The root of both the species is very bitter and ruder

secretions, and may be eaten as a purgative. On the Continent these roots are used under the name of Radix Aristolochie, and are

employed as external applications to indolent tumours.

Many of the species are cultivated in Great Britain, and,
having escaped from gardens, are occasionally found wild;
but only C. clavulata is a native; C. huteri is naturalized.

In cultivation they require a light rich soil. They are well

adapted for flower-borders and rock-work. The perennial

species may be propagated by dividing the roots, the usual

by seeds, which should be sown where they are intended to

remain. They will grow well under trees, if the soil be not

very dry.

(Don, Gardener's Dictionary; Lindley, Flora Medicus;

Loudon, Encyclopaedia of Plants; Lindley, Flora Medice;

Gardener's Dictionary; Loudon, Encyclopaedia of Plants; Lindley, Flora Medicus.)

COR "COMPENDIO."

CORRECTING PLATE. [SAILING, P. C.]

CORRIGI/OLA (diminutive of corrigia, a shoe-string), a

genus of plants belonging to the natural order Paronychioce.

It has 5 sepals slightly corolling at the base; 5 petals equaling

the sepals; 5 stamens; 5 sessile stigmas; a 1-seeded indehiscent fruit; the seed suspended by its cord, which arises from the base of the capsule; the petal, as the

sepal, inserted upon an obscurely perigynous ring at the bottom of the ovary. The species are procumbent glaucous herbs,

with alternate stipulate leaves. C. foliaris, Strap-wort, has the stem leafy on the part only which bears the flowers. It is the only British species of the genus. It is found on sandy shores in England, but it is not an abundant plant. There are three or four other species de-
scribed, natives of America and Africa.

(Babington, Manual of British Botany.)

CORT, CORNELIUS, a designer and very celebrated engraver, born at Horn in Holland in 1566. He worked in his native country for some time, then went later, about 1566, to Italy, where in Venice he was received by Titian into his house, and engraving several of his pictures for him in, at that time, an unusually large size; they are now preserved in the Vatican, however, seemingly in Rome, and established a school of engraving there, in which Agostino Caracci is said to have studied, which is doubtfull, as Agostino was only twenty years of age when Cort died, if 1578, as is believed, from the letters on an old portrait, was the year of his death. Nor is there any mention that Agostino studied in Rome in his youth, nor are any of his own prints dated earlier than 1582, four years after the death of Cort.

That Agostino studied the prints of Cort is more than proba-
bile; his works are much in the same style. Cort's prints are large and his outline correct; they display gr mastery of

the groover, but a want of perception of the more delicate qualities, such as colour and relative distance; he was also deficient in discriminating the more delicate indications and varieties of expression. His works, for their size and style, and considering the comparative shortness of his life, forty-two years, are very numerous; they exceed one hundred and fifty. He made the first engraving after the Transfiguration by Raphael; he en-

graved also the Battle of the Elephants, and the Battle of Con-
stantine, after Raphael. He executed also several prints after

Federigo Zuccaro, and others after Taddeo Zuccaro, G. Muziano, Polidoro da Caravaggio, Correggio, Michelangelo, Sabbatini, and many other celebrated masters, Italian and Foreign.

GANDELLINI, Notizie storiche degli Intagliatori, &c.; Heineken, Dictionnaire des artistes, &c.)

CORYDALIS, a genus of plants belonging to the natural order Cacumenae, or Smilacaceae, as it is called by some, or absent; 4 petals, the upper one spurred at the base; the

stamens diadophilus; the pod 2-valved, many seeded, com-

pressed. The species are mostly small glaucous herbs, with
ternate or pinnated leaves, and surform tuberous or fibrous roots.

In upwards of forty species of this genus have been described.

C. glabrum, one of the temperate parts of the earth in the four quarters of the globe.

C. clavulata, White Climbing Fumitory, has a fibrous root; pinnate leaves, with acumenate bracts, the pinnar-
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remain. They will grow well under trees, if the soil be not

very dry.

(Don, Gardener's Dictionary; Lindley, Flora Medicus;

Loudon, Encyclopaedia of Plants; Babington, Manual of

British Botany.)

COR YMBERTHERE, one of the primary subdivisions is

the system of Jussieu, of the natural order Compositae:

comprehends most of the Tubuliflorae of De Candolle. It is

characterised by the absence of albumen, an erect seed, a

epiphyllum invested in a few scales, which is often the ray, if present, ligulate. This division comprises by far the largest

number of the genera of the large order Compositae. The

species of Corymbiferae produce more active secretions, and have been dated more extensively by man than those of the other subdivisions of the order. They generally represent the

Chicoreae [Cichoreae, P. C. S.] in hot climates, and this

will perhaps account for their more active properties. In

Great Britain the Corymbiferae are more numerous than

either the Cynaraceae or Cichoreace. The number of species in Babington's ' Manual of British Botany' is—

Corymbiferae . 62

Cichoreae . 61

Cynaraceae . 186

Composite . 189

De Candolle estimates that the species of the Compositae form a tenth part of the flowering plants in the world, and this is about the proportion in which they occur in Great

Britain. The following is a synopsis of the British genera of

Corymbiferae:—

Tribe I. Eupatoriae.

Section I. Eupatorae.

Eupatorium, 1 species

Section II. Thalictræae.

Petasites, 1 species

Thalictrum, 1

Tribe II. Arctomeriæ.

Section I. Asterolæae.

Aster, 1 species

Erigeron, 3

Becky, 3

Solidago, 1

Chrysoconis, 1
CORYNEPHORUS, a genus of British grasses, belonging to the tribe Aveneae, with the following character:—Awn club-shaped, straight, jointed in the middle, the upper portion clavate, a tuft of hairs at the joint, panicle lax, glumes 3-flowered. There is but one species, C. concavus, which has a rather denser and more paniculate panicle than Corynephorus, and is longer than the flower, the awn coming from near the base of the palea, the leaves secatous. It is a native of the sandy coasts of Norfolk and Suffolk and Jersey.

(Babington, Botanical Monograph.)

COSCINOPORA, a genus of fossil corals, proposed by Goldfuss. C. infundibuliformis occurs in the chalk of Ireland.

COSMAS INDICOPLEUSTES. This is the name given to the author of a Greek work who lived in the sixth century of our era, under the Emperor Julian, who gives an account of the work in his 'Bibliotheca.' (Cod. 36), says that the title is Xπομανον Βιβλος ευμαιρον εις τον Βασιλευον, 'A Book of the Christians, an Exposition on the Octateuch.' This is the literal version of the title; but it is observed that the title does not agree with the contents, which are not an exposition on the first eight books of the Holy Scriptures; and accordingly the title is explained by critics to mean 'a faith in eight books.' For though there are twelve books, Photius speaks of it as a holy book dedicated to any person, while the first six are dedicated to Pamphilius, the seventh to Anastasius, and the eighth to Peter.

The work as it exists in the MSS., is entitled Χπομανον Βιβλος ευμαιρον εις τον Βασιλευον, 'Christian Exposition of the Whole World.' Photius does not mention the writer's name; and it has been conjectured that the name Cosmas Indicopleustes, or Indopleustes, has been given to the unknown author, from the title of his book, the Arabian (Kosmós), and the fact of his having travelled to India. He was a Christian, and accordingly it has been conjectured that he was originally a merchant.

The object of Cosmas was to reconcile the natural phenomena of the universe with the accounts in the Bible. He says that the habitable earth is flat and rectangular, the length being twice the breadth, and that it is surrounded by the ocean, which flows into the earth by four passages, the Mediterranean Sea, the Caspian Gulf, and the Persian Gulf. The opinion that the Caspian was situated, as Van Leeuwen had stated, with the ocean, was firmly established before the time of Cosmas, though Herodotus, 450 years before the Christian era, had declared that the Caspian was a lake. The rest of his cosmography is of a piece with that which has been stated.

In the second book the author speaks of the monument of Adulo, which he had seen, and which he has transcribed into his work. (ADULUS, P. C.) In the eleventh book he gives a description of Taprobane, or Ceylon, as the old Ceylon, and the practice of the Indians, and of the famous Keraus, or Ceylon, and the practice of the Indians, and of the famous Keraus, and lastly, he describes the countries of India. The work of Cosmas is of some value, owing to the passages that he cites from authors who are now lost. The Christian Topography is printed in B. Montfaucon's Collec. Nova Patrum, Paris, 1707, fol. The description of countries of India was also given by E. Thenevet, with a French translation, in the first volume of the Relations des divers Voyages curieux, Paris, 1666, fol.


COSTUS. (PITCHER, P. C.)

COSWAY, RICHARD, R.A., was born in 1740, at Tiverton in Devonshire, where his family, originally Flemish, had been long settled, and his father was master of the public school. He was sent to a school kept by Mr. A. R. O. R. with Hudson, and afterwards to Shipley's drawing-school in the Strand, Smith, in his Life of Nollekens, gives a different account. He speaks of him as Shipley's servant, who waited on the pupils and carried their lessons, and describes his connexion with Cosway's connections. However, at this time Cosway was very diligent: he obtained in a few years, between the fourteenth and twenty-fourth years of his age, five premiums from the Society of Arts. His chief excellence was in miniatures, and he had very great ability, and in which, professionally, he was successful to the utmost degree. He was patronized by all the rank and wealth of his time: the Prince of Wales, afterwards George IV., was among his friends and patrons. He made a large and valuable collection of miniatures, but he was a sumptuous and hospitable in his habits, and his expenditure probably kept pace with his income.

He was elected a member of the Royal Academy at the same time with Nollekens and Barry, in 1771, according to
About this time he was married to Maria Hadfield, though of English parentage, a native of Loughran, where her father had been the rector of that place, and much esteemed by English visitors. The late Charles Townley, collector of the Towney marbles, gave the bride away. Her story is remarkable: she was the fifth child of her parents, but the four elder children had all died in a remarkably sudden manner. When infants, five of the seven conversed together. Soon after the birth of Maria however the mystery was explained. One day a favourite maid-servant went into the nursery, and taking up the child and dangling it, said, 'Pretty little creature! I have sent for a paper about you.' This extraordinary speech, which was overheard by another servant, caused the arrest and examination of the girl, who confessed that she had herself destroyed the other four children out of love, 'for of such was the kingdom of heaven.' The deluded creature was imprisoned for 14 years in a convent to be educated, where she was taught music and drawing; arts which she eventually pursued with such success as to excite universal admiration, in Italy and England. She died in 1809 at the house of her employers. With Cosway she became a very distinguished exhibitor at the Royal Academy, and her musical parties, in which she was the chief performer, at her house, formerly Astley's, in Pall-Mall, and afterwards at 20, Stratford Place, Oxford Street, were so celebrated, that the chief artists and most distinguished guests were numerous, and of all ranks and callings that had any pretensions to the elegant; the writer of the last new poem; the speaker of the last best speech in the Commons; some rising star, real or imaginary, in art; the man who made the last miraculous escape from shipwreck, or who had walked into the remotest latitude: in short, all the lions of London were there, to see and be seen. Lady Lyttleton, the Honourable Mrs. Dammer, the Countess of Aylesbury, Lady Cowper, Lady of the Marriage, and her intimate friends, General Paoli, Lord Sandsy, Lord Erskine, and the Prince of Wales, were not unfrequent visitors; and when she desired to have something worthy of public notice, the foreign ambassadors were ready to swell the number of those who listened to the music of the charming Mrs. Cosway.'

The house in which these parties were held was furnished in the most costly and gorgeous style imaginable: almost everywhere the combination of woods, marbles, and unique works of art; the sumptuousness of the most elaborate workmanship, adorned with natural and artificial curiosities from the four quarters of the globe. In his dress also Cosway was proportionately magnificent, a severe artist, and all this magnificence and splendour was the fruit of his industry. His wife was equally industrious, and painted many portraits and other works of a poetic and imaginative nature, but Cosway would not allow her to paint portraits professionally. There are several prints after her works by Bartolozzi, V. Green, and others.

Cosway died in 1821, aged eighty, and his widow retired to Lodii, established a ladies' college there, and became widely known and respected. She had spent some years at Lodii previously, during the war, for the benefit of her health, and she acquired a strong attachment for the beautiful Silverian houses, and unique mansions, his taste and their 'Cottage' also, as an occasional retreat. With the name, something also has been assumed of a mode of building intended to answer to it —one of homely and rustic character—rejecting architectural rules, yet requiring a studious observance of appropriate expression and picturesque physiognomy. The cottage style is therefore considered by some as a hybrid branch of the art, or as hardly belonging to it at all, it being subject to no other laws than mere fancy and caprice. Gwill dismisses it as 'a farce of the Encyclopedists.' He denies that it is a nondescript sort of building, and a branch of practice requiring a minimum of mind on the part of the architect. Yet it certainly requires much more than the minimum of taste, or even a knowledge of the names of Sir M. A. Sheehy and Sterne. To stipulate, for instance, a few of his best works, as a full-length of the queen of George III holding the princess royal on her lap, engraved by W. W. Ryland; Mrs. Child, of Outersey Park; the beautiful daughter of Wilton the sculptor; afterwards the wife of Sir Robert Chambers; his own wife; or genius to the comedian; and Polly Jones, a woman of pleasure. Many of his portraits have been engraved by Bartolozzi, Green, MacArrell, and others. He died, in consequence of taking snuff—lost for the stone, in 1770, before he had completed his 45th year: the circumstantial account of his death, and the full-length of Mary Mount, afterwards Mrs. Lloyd, R.A., in a letter to Fuseli when at Rome, will be found in the Biographical and Anecdotes of Painting, &c., Edwards, Anecdotes of Painting; &c., Smith, Nollekens and his Times.)

COTMAN, JOHN SELL, an artist whose masterly etchings of British and foreign scenes, and other antiquities, have obtained for him the honourable distinction of the English Piranesi, was born at Norwich, about the year 1780, and educated at the free school of that city, on quitting which he immediately took to his pencil as his future profession. He was the son of a tailor, and was first apprenticed to a colour painter, in which he displayed a vigour and boldness very unusual at that period; but though he did not entirely abandon that branch of art, he afterwards applied himself more particularly to etchings. He was one of the most distinguished of the students of this art, and engravings were made for that purpose by himself. His first publication of the kind was his 'Miscellaneous Etchings of Architectural Antiquities in Yorkshire,' &c., in 28 plates, folio, 1812; immediately succeeded by the 'Architectural Antiquities of Norfolk,' fol. 1812-1817; and he at the same time brought out the 'Sepulchral Brasses in Norfolk,' 84 plates, large 4to., 1813-1816. In 1817 he went to France, where he spent some time in collecting the materials for his next, and the greatest work on the subject that has been executed, the 'Architectural Antiquities of Britain,' &c. This work was interrupted by the Revolution in France, and the artist returned to England, when he published a 'History of the Royal Architectural Antiquities of England, &c.' In this he exhibited his researches in the art of building and antiques, and the following year he was appointed architect to the Hastings Royal Antiquities; (Lindley, Lineament Transactions, XIII.)
eyes for all the happy accidents of light and shade, and contrasts of masses and lines,—matters not to be learnt mechanically, like the proportions of the orders, nor to be learnt at all by formal precepts. Not only a different, but almost an opposite, mode of treatment from that required for what is called regularity. Under the name of regularity, unless it be properly understood, its meaning is changed; or results in a form which is not a mere exhibition, but an aesthetic development.

The cottage style, on the contrary, utterly rejects the Greek or Roman, or any other classical, mode of ornamentation; and, in its treatment of it, the architect ought to be guided by the same rules which direct the landscape-gardener in laying out grounds:—like the latter, he has a certain type to keep in view, but at the same time is expected to refine upon it; for the fidelity of a style is measured by the extent to which it can be adapted to the circumstances of the case. The cottage, being (if correctly treated) a diminutive, rather than a large and robust, form of building, would be downright absurdity, and to be in keeping with such a residence, a dullgh in front of it might be substituted for a parterre. So far is uncouthness from being a flaw in a cottage, that comparatively small tenderness is allowable, the degree of it being regulated by circumstances, and the character of it being in accordance with the particular architectural style professed to be followed; for various modes of domestic architecture may be employed for buildings coming under the denomination of the cottage class, although the most obvious and natural one is that derived from English houses of the fifteenth and sixteenth centuries, many of which now exhibit a degree of picturesque rudeness which did not originally belong to them, having been converted into farm-houses and smaller tenements.Farther, it is not possible, in such a building, to adopt any one idea pervading it, is far from either producing artistic variety or manifesting any imagination.

Where no direct instructions can be laid down, general directions and hints must suffice, especially where the subject has been so little treated. The cottage is necessarily in some degree by the actual purpose of the buildings: for a bailiff's residence, or gate-keeper's lodge, the genuine cottage character may be adhered to more strictly; study of design being chiefly bestowed on rendering it a picturesque; and so far an ornamental object, though it may not happen to be at all an ornamented one. A cottage within the vicinity of the house, for the purpose of a dairy or something of that sort, will properly admit of being more fanciful in design, and even of a more graceful character. In a cottage intended for the proprietor's residence, whether a permanent or merely occasional one, the expression above all to be aimed at is that of homeliness, including comfort, and a look of homeliness as essential to it. To this quality no less than to picturesque effect, irregularity of plan contributes not a little, because it indicates that internal convenience has been chiefly attended to, and that the diversity of shape of the exterior is the result of accident; not, indeed, of mere purposeless chance, but of circumstances. Hence, the grouping and co-operation of different parts of the building is a matter of as much importance as the arrangement of the interior, whether this be in a true cottage style, or in an interior connected with a coach-house, stables, and the like, and with verandas, in a manner to give effect to the variations of the climate, and to relieve the monotony of the interior.

One condition of a cottage style is moderation of scale,—that is, rooms of comparatively small dimensions and low proportions, and only a single chamber-floor; or, if another be required, it ought to have its window in gables, or in lucarnes on the roof. Such a house of scale does prevent the handsome and pleasing effect of being of one story; for, unless properly to appear to spread out to its actual dimensions, by additions having been made from time to time, a process which structures of the kind readily admit of. The mere size of the house, single story, always having a different thing from greatness; and both that and stateliness are quite out of the question for cottage architecture, whereas the villa may, although upon a limited scale, without impropriety, affect stateliness and dignity of character. Though a
the stamens 10, inserted on the corolla; 5 hypogynous scales; 5 carpels. The species are succulent shrubs, mostly natives of the Cape of Good Hope.

*C. umbilicus*, Navel-Wort, has the lower leaves peltate, concave, orbicular; the flowers are of a bright yellow colour, and the stem is 6-12 inches high. It is found on rocks or walls in the West of Portugal. It is also a native of Portugal.

*C. lateri* has the lower leaves somewhat peltate, upper leaves erect, the bracts toothed, the flowers of a bright yellow. It has been found wild in England, but is probably not a native.

Many of the species of this genus have been separated under the generic name *C. umbilicus*, which is the specific name of the species closely resembling those of Cotyledon. In the cultivation of the species of both genera, they should be placed in pots well drained, with a soil of sandy loam or brick rubbish. They may be propagated by cuttings, which should be laid to dry for a few days after they have been cut off, before they are planted, as they are apt to rot at the wound if otherwise treated. The best situation for these plants is the slopes of a greenhouse.

(Don, Gardener's Dictionary; Isbottton, Manual of British Botany.)

COUNCIL OF THE CHURCH, an assembly of prelates who meet, being duly convoked by the legitimate authority, for the purpose of defining questions of doctrine, or making regulations or canons in matters of discipline. There are various sorts of councils: 1st, General or Oecumenic councils, which are considered as a representative and legislative body of the whole church, of which all the bishops are summoned. A list of these councils will be given hereafter.

In the early ages of the church the general councils were convoked by the Roman emperor; they have been since convoked by the pope, at least for the Western or Roman church. The authority of the general council is considered as binding on the whole church only in matters of faith, when the council establishes a dogma which it enjoins all the faithful to believe, under pain of anathema and heresy. In matters of faith and discipline, which concern the general council, the bishops all to be in- fusible; some say however only after its canons have been confirmed by the pope. All bishops have a right of attending and voting in the general council; the abbot and generals of monastic orders have also been admitted to vote in most councils by consent of the council. Priests and monks have also attended the councils as theologians and advisors, with a consultative but not a deliberative vote. In the Western church, the pope, or his legate for him, presides in the council. For the purpose of legitimacy, it is required that the bishops should be called to it, whether they attend or not, except those who are declared by the church to be schismatic or heretical, and all deliberations should be free and unconstrained.

National councils, consisting of the bishops of a whole kingdom or state, which can be convoked by the respective sovereign; but their authority is not considered universal over the whole church.

Provincial councils are convoked by the respective metropolitans, with the consent of the sovereign. A bishop may also convvoke a diocesan council, with the consent of his superior. (Benedict XIV. De Synodo Diocesana.)

The Church of Rome reckons several councils, though not ecclesiastical, parochial to that of Nicaea, the earliest of which seems to be held at Jerusalem about the year 50 of our era, and which was attended by the apostles Peter, John, James, Paul, and Barnabas, and which is mentioned in the xivth chapter of the Apostles' Creed.

**Series of General or Oecumenic Councils.**

Nice, the Council of [P. C.], was convoked by Constantine, A. D. 328, condemned Arius, and framed the Confession of Faith, or Symbol of Nice.

Gregory, Council of, convoked by the Emperor Theodosius I., A. D. 382, confirmed the canons of the council of Nice, and established the dogma of the divinity of the Holy Ghost against the attacks of Macedonius. The council consisted of 150 eastern bishops who raised questions that the Bishop of Constantinople should take rank next to the Bishop of Rome. The canons of this council were acknowledged by Damasus, bishop of Rome, and the other western prelates.

Episcopal, Council of, convoked by Theodosius II., A. D. 431, consisted of about 200 bishops, and was attended by the legates of Celestius, bishop of Rome. It condemned Nestorius. [Nestorians, P. C.]

Calcedon, Council of, convoked by the Emperor Marcian, A. D. 448, consisted of 630 bishops, and the legs of compensations were determined in the spurious council of Ephebus of A. D. 449, which had made more the doctrine of Eutyches and of Dioscorus concerning the two natures in Jesus Christ. [Eutychians, P. C.]

Constantinople, Second Council of, convoked by Justinian, A. D. 529, established the consent of the emperor in all the canons, and the rules of discipline. The canons of this council were confirmed by the second general council, convoked by the Emperor Constans, son of Irene, A. D. 787, consisted of above 350 bishops, and was attended by the legates of Pope Adrian I. It condemned the Iconoclasts, and sanctioned the worship of images in the churches. The authority of the above seven councils is acknowledged by the Greek as well as by the Latin churches.

Constantinople, Fourth Council of, convoked by the Emperor Basilus, A. D. 889, and attended by the legates of Pope Adrian II., condemned the schism of Photius, and restored Ignatius, bishop of Antioch. It was the last ecumenical council to be convoked before the establishment of the constitution of the Metropolitans, or of the Monophysites, an offshoot of the Eutychians.

Nice, Second Council of, convoked by the Emperor Constantine, son of Irene, A. D. 787, consisted of above 350 bishops, and was attended by the legates of Pope Adrian I. It condemned the Iconoclasts, and sanctioned the worship of images in the churches.

The Plea of the Emperor by the Three Councils of Rome, convoked by the Emperor Basil I., A. D. 912, and attended by the legates of Pope Adrian II., condemned the anathema of Photius, and restored Ignatius, bishop of Antioch. It was the last general council to be convoked before the establishment of the constitution of the Metropolitans, or of the Monophysites, an offshoot of the Eutychians.

Lateran, First Council of, styled the Ninth General, was convoked by Pope Callixtus II., in 1123, and consisted only of the Western or Latin bishops; the Greek church having chosen the council to be of which all the bishops were summoned. It made several canons of discipline against simony, clerical concubinage, and the alienation of church property: it placed the incumbents of parishes under the superintendence of the respective bishops, and bestowed indulgences on those who took the cross for the Church of Cathari, Pasturini, Albigenses, and those who afforded them protection. It stated, that though the church abhors the shedding of blood, it does not refuse the countenance and support of the temporal laws of Christian princes, because fear of political punishment is a necessary means in producing spiritual reformation. The church therefore allows the faithful to take up arms against the anathematized heretics, Cotterux, Brunban, and others, who were carrying desolation everywhere, and places those who had the power of making war under its protection and its benediction. Cotterux, &c. appear to have been a kind of lawless partisans in the pay of turbulent barons, who were mixed up with the sectarian heads of the times, especially in France. Jews and Saracens were forbidden by the council to possess Christian slaves.

Lateran, Fourth Council of, convoked in 1213 by Pope Innocent III., met in November, 1215, and was attended by the Patriarchs of Constantinople and of Jerusalem, Constanti- nople being transmitted by the Pope, and the legates of 400 bishops. It was opened by the pope in person. It sanctioned seventy canons, or decrees, which had been framed by the pope, especially on matters of discipline, and its regulations of the Church, established by canons and decrees, are, to this day, the same in the use of benefices, the election of bishops and abbots, &c. It enforced auricular confession, at least once a year, on all the faithful who have reached the age of discretion, forbidding the con- fessor to reveal any part of the confession, under pain of excommunication for so doing. It enjoined that, to every cathedral or collegiate church, there shall be appointed a teacher of grammar and other arts, for the poor of the laity as well as of the clergy, who shall be taught gratis. In the same council, the Pope, also a professor of theology, to teach and explain to the priests and other churchmen the Holy Scriptures and the care of souls. The council likewise promulgated an exposition or profession of faith, in which the doctrine of transub- stantiation was expressly included. The council mathematicalized all heresies contrary to any part of the said profession;
and decreed that heretics, after being condemned by the church, shall be given over to the secular powers, which are invested to drive away from their territories all such heretics; and if the temporal lord neglect to do so, he shall be excommunica- tion by the bishop; and if, within a year, he does not remove the heretics, the pope, who will release his vassals from their oath of allegiance, and will give the land of the refractory feudatory into the hands of an orthodox feudatory, saving the rights of the superior or proprietor, and all the revenues of faith, to be used for the execution of this ordinance. The Gallican theologians however reject this canon, as an abuse of power on the part of the council, or rather of the pope who had framed the canon.

(Richard, Analyse des Conciles; Concile Quatrième de Lateran.

The second session of the council took place in February, 1432. In the interval between the first and second sessions it became known at Basle that Pope Eugenius intended to dissolve the council as likely to prove troublesome to him if allowed to sit much longer, and that he had actually framed a bull for its dissolution. In consequence the council issued a decree declaring that it held its power immediately from Jesus Christ, the Head of the Church; and that every person, even the pope, was bound to obey its decisions and the canons it made for the temporal as well as the spiritual state; and likewise for the reformation of the church. Meantime the pope had issued his bull of dissolution. Cardinal Julian then wrote two forcible letters to Eugenius, maintaining the rights of the council, and asserting that according to the canons of the council of Constance, by which it had held the papal dignity, as successor to Martin V., who had been elected by that council after it had deposed Pope John XXIII. and the other claimants to the papal crown, the pope had no power of dissolving a general council once lawfully convoked and assembled, until that council had performed the task for which it had been convoked. The fathers sent likewise a synodal answer, of the same meaning, to the papal bull, in which they asserted that the pope, although the ministerial head of the church, was not invested by the whole mystical body of the church, as that mystical body, even exclusively of the pope, cannot err in matters of faith, being under the inspiration of the Holy Ghost; whilst the pope, although the head of the church, was a mere person, as other members of the body of the church represented in the general council had deposed popes who had erred in matters of faith, but no pope had ever assumed to condemn or excommunicate the whole body of the church.

In the third session, April, 1432, the council summoned Eugenius to revoke the bull of dissolution; and to attend the council in person in three months' time, or to send persons with full powers to represent him. In the fourth session, June, same year, a sauf condit was given to the Bohemian deputies who proposed to appear before the council to arrange matters for the religious peace of their country. Pope Eugenius being reported ill at the time, the council decreed that in case of his death, the council should proceed to the election of his successor any where else in the body of the council. Any other election was declared beforehand to be null and void.

In the fifth session, August of the same year, three judges were appointed to examine questions of faith. The Bishop of Taranto, sent by Eugenius as his legate, delivered a high flown speech, exalting the papal authority as the only fit judge of the place and time for the holding of councils, and he stated that as the pope could not then leave Italy, he offered to receive the assembly in whatever country, as a council, as he had to fix upon. The council replied that to dissolve or remove a council lawfully assembled would be to renew schism in the church, and would be contrary to charity and the inspiration of the Holy Ghost.

In the sixth session, September, the council decreed that as Pope Eugenius did not make his appearance, he should be declared 'contumax' after being cited three times at the gate of the church.

In the seventh session, November, the decree of the fourth session was confirmed, forbidding the cardinals to hold a concile, in case of the pope's demise, without permission from the council.

In the eighth session, December, a further delay of two months was granted to Eugenius to revoke his bull of dissolution, after which the council would proceed canonically against him. It was also decreed that any other council convoked by him, whether, would be called a schismatic council, and the fathers might fix upon. The council replied that to dissolve or remove a council lawfully assembled would be to renew schism in the church, and would be contrary to charity and the inspiration of the Holy Ghost.

In the ninth session, March, 1433, the Emperor Sigis- mund having by letters patent taken the council and all its members under his especial protection, the council on its part declared that it would protect Sigismund from any arbitrary act of the pope against him.

The council was proceeding to declare Eugenius 'contumax,' but the emperor and
Cardinal Julian interposed, and offered to write to the pope, upon which the council adjourned its proceedings.

Eleventh session, April 3d, 1439. The council decreed that in the event of the Greek Council being neglected, the council should assemble; a general council, every ten years, as ordained in the ninth session of the council of Constance, the right of convocation should devolve upon the bishops without the pope's permission. The fathers likewise conferred upon the council, by which a general council, once assembled, could not be adjourned, transferred or prorogued by the pope without the consent of two-thirds of the members. Meantime Eugenius had sent two legates to the council, with full powers; but the council could not admit them, as the pope had not revoked his bull of dissolution.

Twelfth session, July. The council summoned Pope Eugenius to revoke within two months' time his declaration of transferring the council to another place. It also passed several regulations of discipline, against simony, &c. Eugenius on his part abrogated by a bull the decrees of the council against himself, and declared the council to have been in error when it asserted its superiority above the pope. Thirteenth session, September. At the request of the Duke of Bavaria another month was allowed to Eugenius before the fathers passed judgment upon him.

Fourteenth session, November. The Emperor Sigismund was present; the council decreed that he were, but not Eugenius, to revoke all his acts against the council.

Fifteenth session. Eugenius, having at length listened to the mediation of France, Burgundy, and other powers, revoked the bulls which he had launched against the council, and in some measure, according to the understanding of that assembly, in which he declared that although he had dissolved the council of Basle lawfully assembled, yet, in order to avoid dissension, he now declared that the council had been lawfully continued since its first beginning, and that he approved of all its decisions, and declared the bull of dissolution to be null and void. He then appointed four cardinals to preside in the council together with Cardinal Julian.

Sixteenth session, February 1439. The letters of Eugenius written to the council and the Elect, Sigismund. The papal legates were introduced and incorporated with the council.

Seventeenth session, April. The legates were made to swear to support the dignity of the council, and to observe its decrees as well as those of the Council of Constance, and that their authority should be dependent on that of the council and not coactive with or compulsory upon the Council.

Eighteenth session, June. The council confirmed the decrees of the previous session of the Council of Constance. John, Patriarch of Antioch, read a thesis in favour of the superiority of the general council above the pope.

Nineteenth session, September. Conferences with the ambassadors of the Emperor and the council of Constance, concerning the projected union of the Eastern and Western churches. Legates appointed by the council to proceed to Constantiopole. The council decreed that in every university there shall be professors of Hebrew, Arabic, Greek, and Christian.

Twentieth session, January, 1438. Decrees of reform of church discipline, penalties against concubinaries priests, &c.

Twenty-first session, June. Decree against the 'annates,' or first fruits, and other payments, which were extracted by the court of Rome. Three years of undisturbed possession of a benefice, obtained by legitimate title, to be considered as affording a prescriptive title to the possessor. Several decrees on public worship and other matters. Pope Eugenius renounced the bull against the Emperor, laying his hands on the council, urging that the council ought at least to make compensation for the support of the Holy See. Cardinal Julian's reply to the pope's remonstrances.

Twenty-second session, October. Condemnation of a book written by an Austrian friar, who had ascribed some attributes to the human nature of Christ which properly belong to his divine nature.

Twenty-third session, March, 1436. Decrees concerning the heresies and schisms of the papal curia. He shewed the number of cardinals reduced to twenty-four, &c. All reserved benefices, mandates, and other grants applied by the pope to their own profit, declared null and void.

Twenty-fourth session, April. The legates of Eugenius appointed to move upon the union; to assemble a new council, 'in order to meet the Eastern emperor and his retinue and prelates, for the purpose of affecting the reconciliation of the two churches.' A congregation was held in consequence, which was attended by 557 prelates, two-thirds of whom voted for the union of the two churches, and if not, they proposed Avignon or some town of Savoy. John de gratias, who was sent to Eugenius to entreat him to crown the labours of the present council by the reunion of the Eastern with the Western churches, and inviting him to come in person and explain the reasons of the minorities in the council, was for holding a new council in some town of Italy, and many months elapsed in fruitless negotiations upon this subject.

Twenty-fifth session, May, 1437. The council decreed that the summons for council for the union of the two churches should sit either at Basle or at Avignon. Most of the fathers did not wish to go to Italy, where they would have been too much in the power of the pope. A division then occurred in the assembly; a minority joined the Papal legates, and put the decree by which they assumed the authority and name of a council, and transferred the council to Ferrara. Eugenius hasted to issue a bull which confirmed this decision, and immediately caused a squadron of galleys to be equipped at Venice, to proceed to Constantinople with three Papal legates, for the purpose of bringing the emperor and the Eastern prelates to Ferrara. The council of Basle, that is to say the majority of that assembly, which had kept together, sent likewise galleys. But for the first time the council of Basle sent a legate to receive the emperor on his landing, and, by explaining to him the union of the two churches, induced them to come to Basle. The fathers however hesitated and lost time. Up to this period the council of Basle is considered by most Catholic theologians to have been truly ecumenical and legitimate, as Pope Eugenius had solemnly acknowledged it as such since November, 1437, and had since acted in union with it by means of his legates. Some ultramontane divines however, and Holstenius among the rest, controvert the authority of the council altogether. Pope Nicholas V., who succeeded Eugenius, in his letters to the council of Basle, had declared, he 'in his own name and that of the Eastern Church,' which was tantamount to a dissolution of the council, and had since acted in union with it by means of his legates. The Ultramontane divines divide however, without prejudice to the right and pre-eminence of the Holy See.

The council of Basle, in its Twenty-sixth session, July 1437, again returned the Council of Constance to a council, held before it, and Eugenius answered by a bull for the dissolution of the council, appointing the meeting of a new council, to which he invited all Christian prelates, and forbidding under heavy canonical penalties the concurrence of anymore synods at Avignon. The meeting of the council was thirty days which was such a summons in wounding up the negotiations with the Bohemian deputies. King Charles VII. of France forbade his bishops to repair to Ferrara. In their 27th session, September, the fathers at Basle declared null and void the creation of two cardinals recently made by Eugenius.

In the 28th session, October, the period assigned to Eugenius for his appearance being expired, the fathers declared him 'contumax' and resolved to proceed canonically against him. Eugenius at the same time issued a bull, transferring the Council to Ferrara. In his letters to his legates in Germany he speaks of the Council of Basle as a legitimate assembly until the order for transferring it to Ferrara.

In the same month in the Council of Ferrara, the Emperor entered the bull of transfer to Ferrara, and assigned their reasons for it.

In January, 1438, one Cardinal Nicholas, Eugenius's legate, opened the new Council at Ferrara. Cardinal Julian, who still remained at Basle, quitted that town with four legates, and joined the Council of Ferrara. The Council of Basle was declared henceforth null, and all its future acts were declared void. Several theologians date from this epoch the termination of the legitimacy of the Council of Basle. That assembly continued to hold its sessions for an unusual time, and the schism in the church was the result. The Council of Basle deposed Eugenius in 1439, and elected Anacandus VIII. of Savoy, by the name of Felix V. These measures however were disannulled by the general council of the Church in 1449; France and Germany disapproved of them. Most of the bishops withdrew from Basle, and their places were filled up by archdeacones, friars, pro-
vates, and doctors, and other churchmen not of episcopal rank.

From that period it is impossible to consider the Council of Basle any longer as ecumenic. The last session of this self-styled Council of Basle was held in May, 1443, when it decreed that within three years a council, or rather a continuation of the council, should be held at Lyon. It however met ultimately at Lausanne, in 1449, then the centre of the two factions of the Council of Basle, and made peace with Nicholas V.

In the collection of the Acts of General Councils, haphazardly published in Greek and Latin, by order of Pope Paul V., 'Concilia conciliorum nova et ampliora', a complete general council existed only at Florence, Rome, 1698, the Council of Basle is altogether omitted, but that of Constance is inserted. The following writers have treated especially of the Council of Basle:—Eneas Sylvius Piccolomini (afterwards Leo X.), 16th century; Francesco Merle, 15th century; and Cardinal Guerrier, 17th century, a secretary to the council, in his 'Opera', which also contain the two celebrated epistles of Cardinal Julian to Pope Eugenius, maintaining the paramount authority of the council; le Père Alexandre, a Dominican, 'Discussions de Concilia Senesi et Basilien', in the eighth volume of his 'Historia Ecclesiastica', Paris, 1714, and Venice, 1749; Richer, 'Responsio Synodaliss data Basilii, Oratorius D. Eugenii F. P. IV., in Congregatione Generali III., Non. September, 1432: De Auctitate cujuslibet Concilii generalis suprema Pape, Conciliis, Pretioso Pontificis, et Ecclesiastica studio, Coloniae, 1613; Le Patent, 'Histoire de la Guerre des Hussites et du Concile de Basle', which refers chiefly to the transactions of the Bohemian schismatics and their negotiations with the Council of Basle, where points of rite and discipline, Richard, 'Analyse des Conciles'.

Ferrara, Council of, was attended by Pope Eugenius, the Emperor John Manuel Paleologus, the Patriarch of Constantinople, Mark, archbishop of Ephesus, and about twenty more Eastern bishops, and the Latin prelates turned first upon the dogma of the proceeding of the Holy Ghost: and the word 'bileque' said to have been added by the Latins.

The discussions transferred to Florence, and the discussions were continued. The two parties effected a reconciliation, excepting Mark of Ephesus, upon the dogma of the Holy Ghost, that of purgatory, and the supremacy of the pope, which the Greeks acknowledged, 'saving the privileges and rights of the patriarchs of the East.' The act of union was signed by the vicars of the patriarchs of Alexandria, Antioch, and Jerusalem, and by several metropolitans, but it was soon disavowed by the great body of the Eastern church.

'Generali Concilii', Venice, 1681, by Cardinal Zigone D. Merli, contains, besides, much of interest in connection with this council. The same may be said of the following:

Lateran, the Fifth Council of, was convoked by Pope Julius II., in 1512, to oppose the acts of the pretended Council of Pisa, when a certain number of bishops hostile to Julius had assembled under the influence of the king of France, then at variance with the pope. After declaring all the acts of Pisa null and void, and summoning the French prelates to appear at the Lateran, the notary, Leo X., continued the council, and Louis XII., giving up the 'Conciliatum' of Pisa, sent in his adhesion to the Council of the Lateran. The French prelates however did not attend, under various excuses. The council continued assembles till March, 1517. It chiefly concerned itself with matters of discipline. Among others, it established a general ecclesiastical censorship on all printed books, under pain of excommunication. 'Censorship of the Press, P. C. S.' It confirmed the concordat of 1513 between the Holy See and France, by which the French clergy, subject to the sees and benefits of France, and annulled the previous pragmatic sanction promulgated by King Charles V., conformably to the decrees of the councils of Constance and Basle. The concordat took effect on the 20th of April, 1529. The miniature shows the submission to the king, subject to the papal sanction and ordination.

Trent, the Council of, is the last ecumenic council of the Latin church, and is acknowledged as such by the Roman Catholic world, although some of its decrees in matters of discipline are not sanctioned by the laws of many states.'
A bridge which is capable of being turned on horizontal joints at one of its extremities (DRAWBRIDGE, P. C.) usually has its weight relieved, or almost wholly removed, by a counterpoise, which is placed on the other side of the bridge, except the resistance arising from friction to overcome. The counterpoise is at one extremity of a chain, which passes over a pulley at the top of a pillar, and is attached at the other end to the point of the bridge.

Now, since a drawbridge, in being raised or lowered, exerts on the suspending chains a strain which increases as the bridge declines more from a vertical position, it is necessary, in order that this strain may be always in equilibrio with the constant weight of the bridge, to place a counterpoise, that latter amounting to a surface whose figure is determined consistently with that condition. The rules for the resolution of forces give expressions for the strain to which the two parts of the chain are subject, and the directions of their lengths; and, making these equal to one another, there is obtained an equation which may be shown to be that of an epitrochoid: such, consequently, is the figure which should be given to the surface on which the counterpoise is to slide. It should be observed that, in the investigation, the effective weight of the drawbridge is not its absolute weight (acting at the centre of gravity); but is equal to this latter weight diminished in the inverse ratio of the distances of the fulcrum, or joint, from the centre of gravity and from the point at which the counterpoise is attached to the bridge, generally the opposite extremity of the latter.

If the pulley over which the chain passes is close to the elevated extremity of the bridge when the latter is in a vertical position, or if the chains are attached to the diagonal of a square of which the length of the bridge is one side: then, a circle whose centre corresponds to the joint of the drawbridge, and whose radius is the whole length of the chain, being supposed to revolve on the circumference of a fixed circle of equal radius; a point supposed to be on the produced radius of the revolving circle, or epicycle, at a distance from its centre equal to the difference between twice the length of the radius, or chain, and the length of the bridge will, by revolving with the epicycle, describe the required curve.

The great telescope recently executed by Lord Rosse, at Parsonstown, Ireland, turns upon a joint at its lower extremity; and, being intended to decline from a vertical position both towards the north and the south, it is provided with two counterpoises, in order to facilitate its elevation or depression. One of these weights is on a chain which is attached, at one extremity, to a point near the object end of the telescope, and, at the other, to a fixed point at the top of the wall; this point being so situated that, in elevating the telescope, the weight descends, and descends, by its gravity, a circular arc coinciding nearly with the proper epitrochoid. The other weight is on a lever projecting from the lower extremity of the telescope, when the latter is in a vertical position; and, consequently, it acts with the greatest power: its action diminishes, by the lever being elevated or depressed, as the telescope declines from the vertical towards the north or south.

COUNTY COURT. [COUNTS, P. C.] COUNTY RATE. County rates are taxes levied for the purpose of defraying the expenses to which counties are liable. They are levied under the authority of acts of parliament, or on the principle that as duties are imposed upon a county there must be a power to raise the money for the costs incurred in the performance of such duties.

The ancient purposes of the county rate were to provide for the standing charges of the county council, incidental to the county police, and the civil and military government of the county; for the payment of common judicial fines; for the maintenance of places of defence (sometimes having power to be by a separate tax common to counties and to other districts, called brakone), and occasionally high roads, rivers, and watercourses, and for the maintenance of the public highways. On these, or these purposes, some occasional and some permanent, were made from time to time by statutes. The king's aids, taxes, and subsidies were usually first imposed on the county, and certain powers had been conceived. But the first statute defining any of its present purposes (though appealed as to the mode it prescribes for imposing the tax) was passed in the 22nd Hen. VIII. From that time up to the present new purposes have constantly been added, and new and distinct rates were constantly created for purposes of comparatively little importance, and to raise sums of money quite inadequate to the purposes for which they were intended: but the support is raised on Local Taxation, by the Poor Law Commissioners.)

The assessment and collection of separate county rates was not only very inconvenient and troublesome, but so expensive and out of proportion to the small amount required, that the attempt was a failure and the system proceeded. For remedying this evil the 13 Geo. II. c. 29, was passed, whereby justices of the peace at general or quarter sessions were enabled to make a general rate to answer the purpose of the district rates previously levied under various acts of parliament, for the gaols, asylums, poorhouses, and houses of correction, such rate to be assessed upon every town, parish, and place within the county, to be collected by the churchwardens and overseers, along with the county rate. By that act a direct tax was imposed on every county to the sum of one hundred pounds, by them to be levied at the assessment of one shilling in the pound on each occupier, and again by them to whomsoever the justices should direct. The county rate for lunatic asylums is however, by statute, a special rate, and so is likewise the county rate for almshouses, asylums, and poorhouses, &c. ; but the provisions of the statutes under which those rates are levied are disregarded, and the justices pay the expenses out of the general county rate. This is the case also with the rate for the county gaols or poorhouses. In which case the district rate is abolished, though it is directed to be a special rate. There are some other special rates which are required to be separate rates, one of which is the rate for reimbursing to the county the costs incurred in the burial of dead human bodies found on the highway or in any public place. The latter rate was a direct tax to this rate would perhaps amount to a farthing, and the expense is of course defrayed out of the general county rate.

In places where there is no poor rate the county rate was directed by 13 Geo. II. c. 29, to be levied by the petty constable or other peace officer of the place in the same manner as poor rates are levied, and paid over to him or to the high constable of the hundred. The counties of York, Derby, Durham, Lancaster, Chester, Westmoreland, Cumberland, and Cumberland, were excepted from the operation of the act with the restriction that the county rate should be levied along with the poor rate, and it was left discretionary with the justices of those counties at quarter-sessions to direct the county rate to be levied either by the churchwardens and overseers along with the poor rate, or by the petty constable by an assessment after the manner of the poor rate. The rates so levied are applicable to the repair of bridges, gaols, prisons, or houses of correction, on presentation made by the grand jury at the assizes to the county court, or by the justices, and the act gave to the churchwardens and overseers a right of appeal against the rate on any particular parish to the justices at the next sessions. It also contained provisions enabling the justices to direct that new county or poor rates should, by a previous resolution of the county court, be levied for purposes of building, repairing, or refitting the county gaols, asylums, poorhouses, &c. It was not the object of this act to impose any new rates, nor to vary the obligation to pay, but merely to facilitate the collection of the amounts previously leviable: it therefore contained an exception of places not theretofore liable to the payment of all or any of the county rates referred to in the act, and also a provision that the rate should be assessed in every parish or place in such proportions as any of the rates by the former acts therein referred to had been usually assessed. But this last provision is now to be interpreted with reference to the next-mentioned act as applying only to the fair and equal proportionate rates.

By the 56 Geo. III. c. 51, further improvements were made in the assessments to county rates. The justices of the county were authorized to make assessments for the payment of the fair and equal county rate when circumstances required, for all the purposes to which the county stock or rate was then or should thereafter be made liable by law, extending to all parts of the county except liberties or franchises having a separate jurisdiction. The act contained numerous provisions giving powers for enforcing payment of the rate; for ascertaining the value of property for the purpose of assessment; for regulating the rate of appeal given by the former act; or acting in the event of a default of assessment. A division was made into districts in the several counties where the rates had been regulated by local acts to make use of that act; extending the provisions of the act to places having commissions of the peace within themselves, &c. By the 56 Geo. III. c. 49, extra parochial and other taxes, though leviable on the assessment made subject to county rates, and certain powers were given for the ascertainment of boundaries between counties, ridings, &c.
and other places of separate jurisdiction, for the purpose of assessing and levying county rates.

By the Geo. III. c. 94, the provisions contained in the 5 Geo. III. c. 49, as to appeals, were repealed, and other regulations established in that respect; and it was provided that where there were no high constables, the constables of the parish or place might levy the rates on the warrant of the justices.

By 58 Geo. III. c. 70, all such parts of former statutes as provided that rewards should be paid out of the public revenue to prosecutors upon conviction for various crimes, were repealed. and it was enacted that in future the county rates were to be charged with the allowances to prosecutors in such prosecutions. By subsequent statutes the costs in the prosecution of certain misdemeanours are paid out of the county rates. By 7 Geo. IV. c. 1, the principle of compensation for losses of and to private, proprieions of tithes, coal-mines, and saluable underwoods: the term 'lands' includes improvements of lands, by roads, bridges, docks, canals, and other works and erections not included under the term 'houses.' Under 'houses' it is to be comprehended all permanent erections for the shelter of man, beast, or property. Mines, other than coal-mines, are exempted, and the exemption extends to limestone and other stone quarries, or to other matter that is obtained by quarrying.

The county rate is to be assessed upon property, more equally and equally according to the full and fair annual value of the messuages, lands, tenements, and hereditaments, liable, or which might be liable, to be rated to the relief of the poor. The sum assessed, in every county, is due (in a year and a half, and is not to exceed one-fifteenth) of the levy for the poor, out of which fund it is paid, and in 1843 the proportion was between one-sixth and one-seventh. About five-eighths of the assessment is paid by land, and three-eighths by houses, mills, masons, canals, &c.

The act 55 Geo. III. c. 51, already mentioned, has not been found very successful in correcting unfair valuations, as the overseers on whom the re-valuation depends have an interest as owners or occupiers in a low rateable value. It is very possible the contribution to the Land Tax serves as a scale for the proportionate contribution. In these cases the proportion has been unchanged since the year 1792, notwithstanding the subsequent alterations of the proportion of property which the valuation to the Property Tax made in the years 1814-1815 determines the scale of contribution. In other counties some ancient scale, of which the origin is unknown to the respective clerks of the peace, determines the proportion. In other counties the nominal valuation to poor-rate is, in some cases, determined by the application of the powers of 55 Geo. III. c. 51, and in some counties in or very early after the year 1789, and in other counties at various periods between that date and the present time, some of the basis of the contribution to the county rate. All these various practices are alike complained of as unequal in the counties in which they are adopted. (Report on Local Taxation.) In the session of 1846 a bill was brought in to amend the law relating to the assessing, levying, and collecting of county rates. It proposed that the justices at general or quarter sessions should appoint a committee to consist of not more than eleven nor less than five justices, whose duty it should be to prepare a fair and equal county rate, with power to alter it. And it from time to time as circumstances might require. This bill has not yet passed (July, 1846).

The proportion in the pound to the county rate valuation in England and Wales and for several of the counties is as follows:

1795, 1825, Rate per £.

<table>
<thead>
<tr>
<th>Bridges</th>
<th>42,237</th>
<th>74,501</th>
<th>75</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gaols, Houses of Correction, &amp;c.</td>
<td>92,319</td>
<td>177,345</td>
<td>92</td>
</tr>
<tr>
<td>Overseers of the Poor, &amp;c.</td>
<td>45,785</td>
<td>87,170</td>
<td>174</td>
</tr>
<tr>
<td>Vagrants</td>
<td>16,807</td>
<td>28,793</td>
<td>70</td>
</tr>
<tr>
<td>Prosecutions</td>
<td>34,218</td>
<td>157,119</td>
<td>599</td>
</tr>
<tr>
<td>Levies and Militia</td>
<td>16,921</td>
<td>3,116</td>
<td>09</td>
</tr>
<tr>
<td>Constables</td>
<td>659</td>
<td>36,688</td>
<td>437</td>
</tr>
<tr>
<td>Professional</td>
<td>8,950</td>
<td>31,108</td>
<td>248</td>
</tr>
<tr>
<td>Coroner</td>
<td>8,551</td>
<td>13,754</td>
<td>8</td>
</tr>
<tr>
<td>Salaries</td>
<td>16,815</td>
<td>51,401</td>
<td>215</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>17,456</td>
<td>39,931</td>
<td>88</td>
</tr>
<tr>
<td>Miscellaneous, Printing, &amp;c.</td>
<td>15,890</td>
<td>59,081</td>
<td>315,805</td>
</tr>
</tbody>
</table>

The expenditure disbursed in 1834 under the different heads of expenditure for which provision is made by the county rates is as follows:

| Bridges, Buildings and Repairs, &c. | £37,539 |
| Gaols, Houses of Correction, &c. and Maintaining Horses | 229,787 |
| Shire-Halls and Courts of Justice, Building, Repairing, &c. | 13,951 |
| Levies and Militia | 19,377 |
| Prosecutions | 131,416 |
| Clerks of the Peace | 31,880 |
| Conveyance of Prisoners before Trial | 31,030 |
| Conveyance of Tithes | 10,678 |
| Vagrants, Apprehending and Conveying | 7,681 |
| Constables, Highways and Bridges | 14,007 |
| Conveyance of Convicts | 6,074 |
| Debt, Payment of Principal and Interest | 78,082 |
| Miscellaneous | 55,112 |
| **Total** | **698,747** |

The expenditure in the following years was as under:

<table>
<thead>
<tr>
<th>Year</th>
<th>£</th>
</tr>
</thead>
<tbody>
<tr>
<td>1835</td>
<td>985,592</td>
</tr>
<tr>
<td>1836</td>
<td>1,062,840</td>
</tr>
<tr>
<td>1837</td>
<td>1,530,718</td>
</tr>
<tr>
<td>1838</td>
<td>1,950,515</td>
</tr>
<tr>
<td>1839</td>
<td>785,592</td>
</tr>
<tr>
<td>1840</td>
<td>70,571</td>
</tr>
</tbody>
</table>

In the last three years the county police expenditure, which in 1843 amounted to 243,732l., is included.

From 1830 to 1837 the proportion of the several heads of expenditure was 69 per cent. of the total expenditure:—Bridges, 9.3 per cent.; Gaols, 9.7; Prisoners’ Maintenance, 25.8; Prosecutions, 19.9; Constables and Vagrants, 4.3 per cent.

The county rate is to be assessed upon property, more equally and equally according to the full and fair annual value of the messuages, lands, tenements, and hereditaments, liable, or which might be liable, to be rated to the relief of the poor.

The act 55 Geo. III. c. 51, already mentioned, has not been found very successful in correcting unfair valuations, as the overseers on whom the re-valuation depends have an interest as owners or occupiers in a low rateable value. It is very possible the contribution to the Land Tax serves as a scale for the proportionate contribution. In these cases the proportion has been unchanged since the year 1792, notwithstanding the subsequent alterations of the proportion of property which the valuation to the Property Tax made in the years 1814-1815 determines the scale of contribution. In other counties some ancient scale, of which the origin is unknown to the respective clerks of the peace, determines the proportion. In other counties the nominal valuation to poor-rate is, in some cases, determined by the application of the powers of 55 Geo. III. c. 51, and in some counties in or very early after the year 1789, and in other counties at various periods between that date and the present time, some of the basis of the contribution to the county rate. All these various practices are alike complained of as unequal in the counties in which they are adopted. (Report on Local Taxation.) In the session of 1846 a bill was brought in to amend the law relating to the assessing, levying, and collecting of county rates. It proposed that the justices at general or quarter sessions should appoint a committee to consist of not more than eleven nor less than five justices, whose duty it should be to prepare a fair and equal county rate, with power to alter it. And it from time to time as circumstances might require. This bill has not yet passed (July, 1846).

The proportion in the pound to the county rate valuation in England and Wales and for several of the counties is as follows:

| England, 3d.; Wales, 3d.; Northumberland, 1d.; Bedford, 3d.; Westmoreland, 2d.; Middlesex, 3d.; Lancaster, 1d.; Anglesey, 3d.; Pembroke, 1d. | 13,648 |

WHIPPLING, in 1838, in a letter which bears the impressed sense, the name given to various contrivances for effecting the longitudinal connection of shafts; though, in a more general sense, it may be extended to embrace the arrangements by which parts of a mine may be connected so as to be worked at pleasure, or by which a machine may be disengaged from, or re-engaged with, a revolving wheel or shaft, through which it receives motion from a steam-engine, water-wheel, or other prime mover.

When it is required to communicate motion to a considerable distance from the source of power, as in the distribution of power to the various apartments of a cotton-mill, by gearing such as that represented under WHIPPLING, P. C., p. 114, it is frequently necessary to consider the manner in which the motion is distributed in several places, not only owing to the
impossibility of making them accurately of the required length, but also because, if they were so made, their expansion and contraction would occasion much inconvenience. It is further desirable, in many cases, to have the option of detaching one portion of a shaft from the moving power without stopping the adjacent portion.

In such cases, each distinct shaft, or portion of shaft, may be perfectly supported by bearings of its own, near each end; or, under certain circumstances, the coupling may be so constructed as to render one of the bearings unnecessary.

In such cases, each shaft which projects beyond the bearing of a square shape, and to unite the adjacent ends by means of a coupling-box, which may be described as a square collar fitting the ends of the shafts, and capable of sliding along them in such a way that they will either embrace the ends of both shafts, in which case they must be turned together like one piece, or that, when it is required to disconnect them, it may be slid fully on to one of the shafts, leaving the other entirely free. Holes are provided in both the coupling-box and the shaft, by which a pin may be inserted to hold the coupling-box in whichever position it may be required to retain. Sometimes, instead of the coupling-box being in the form of a sliding box or collar, it is formed in two halves, which may be separation pins, or in such a manner that, when the pressure upon it is relaxed, it falls out of the way. This is especially the case with some of the newest in square couplings.

Cougings are occasioned without coupling-boxes, by the use of a round or a vertical slotted plate, in which projections of various forms from arms or discs attached to the ends of the shafts, are employed to lock them together, in some cases only while the machinery is in motion; while, in other cases, they are effects of the engaging members, by sliding it back upon the shaft, the connection may be broken at pleasure. Such couplings admit of infinite variety, and may be made to disengage themselves whenever the moving power ceases, by fixing one of the engaging members upon a pivot in such a manner that, when the pressure upon it is relaxed, it falls out of the way. This is especially the case with some of the simplest and newest in square couplings.

Fig. 2 represents one of various forms of the ingenious couplings known as Hook's universal joint, an apparatus by which shafts which do not lie in a right line with each other, or which are liable to change their relative position in various ways, may be made to turn each other. While it may be used as a substitute for a coupling for gevevil gear, this joint or connection will accomplish that neither of those couplings can do. As an illustration of the circumstances under which such a coupling may be employed, we may allude to a scheme patented in 1826, by Mr. James, for propelling railway carriages on steep inclinations by communicate the rotatory motion generated in a locomotive engine to all the wheels of every carriage in the train, through the medium of a system of rods thus connected, and consequently capable of receiving and imparting motion, whether the train were in a straight line or on a curve so great as to cause the side of one carriage to form an angle of 30° with that of the adjoining one. The details of this specimen of ingenious contrivances is here proposed to simply as affording a striking illustration of the powers of the universe in its coupling, are given in Heber's 'Engineer's and Mechanic's Encyclopaedia,' vol. ii. pp. 468, 469.
of the machinery to overcome in starting, or under the effect of accidental resistance, its friction will be sufficient, under ordinary circumstances, to cause it and the drum to turn toge-
ther, whether they are one piece.
In another contrivance of the same character the connection is effected by pushing a solid conical wheel or drum, mounted upon one shaft, into a hollow cone attached to an adjoining shaft, in doing which the friction, and consequently the wear, are lessened in proportion to the advance of the solid into the hollow cone. Friction wheels, with their peripheries formed of the end of the grain of wood, which may be compared to a collection of indefinitely small teeth, pressed together, and working with considerable friction, but without wear, are occasionally used. A coupling which starts the machinery gradually by friction may be formed by a fixed clutch or bayonet coupling in such a way that, when once the connection of the machinery shall be rigid, and no longer dependant upon mere friction.
Very full details upon the subject of this article are given in the excellent Practical Essays on Mill-Work and other Machinery, by Robertson Buchanan, with additions by Tred-
gold and George Rennie, Svo., Lond., 1841, pp. 292-306, where allusion is made to couplings which dissociate themselves under the influence of any undue strain upon the machinery, and for a place probably diminishing the engagement of the coupling wheel, by introducing a spoke in the larger wheel of the pair, the teeth of which are more likely to break than those of the pinion. The subject is also treated at some length in Barlow's Treatise on Manufactures and Machinery, sect. 46-51.

COURT BARS.

MAZON, P. C.

COURT, CUSTOMARY.

C. P. C. S.

COURT ROLLS.

(C. H. T. P. C. S. C.)

COURTOIS, JACQUES, a celebrated battle-painter, commonly called le Bourguignon, was born at St. Hippolyte, near Beauzon, in Franche-Comté, in 1621. He was in-
structed in his art by his father, an obscure painter, and having made the acquaintance of a French officer at Milan, whither he had gone very young, he entered the French service, and followed the army for three years, drawing from the life all the most striking incidents and scenes of the camp, the march, and the battle-field, by which means he learned to portray such subjects with extreme boldness and truth. He made afterwards the acquaintance of Guido and Albani at Bologna, and thus had every opportunity of perfecting himself in the technical part of his art. In Rome likewise he made the ac-
quaintance of his great contemporary, Pietro da Cortona, M. A. Carpegna, and others.

After spending some years in the execution of various works in Florence and in Venice, during which time he became a member of that great school of art; and entered as a lay-brother into the order of the Jesuits, for the purpose of estab-
lishment he painted several religious works, besides many battles for strangers and others unconnected with the institution. He was most successful in small works; his style did not require large figures, and he had little ability to paint them. His pictures are not uncommon; there are several in most of the principal galleries of Europe, and they never fail to attract notice, by their surprising spirit of conception and execution; in colouring they are warm and characteristic.

He died of apoplexy, at Rome, in 1670. Courtois appears in Italy to have Italianized his name into Giacomo Cortone, as some of his etchings are so marked, and his name is written by Italian writers: he was also called Epermouse, Boffesino.

His younger brother GUILLAUME COURTOIS, born in 1628, became also a very celebrated painter, but in a different style. He was the pupil of Pietro da Cortona, and the friend of Co
des, who was his early master at Rome, where he died, in consequence of taking some poisoned medicine for the gout, in 1673. His subjects are chiefly from sacred history, painted in Roman churches, but he frequently assisted his brother; one of his own masterpieces is a great battle of Joshua, in the chancel of St. Paul's in London. His style was correct, and perfectly free from manner. Several of his works have been engraved, and he etched a few states himself. His Battle of Joshua was engraved by A. Catesby, in four sheets, and dedicated to Casimir, King of Poland.

(Fasci, Vie de Pittor, &c.; D'Argavile, Abrégé de la Vie des plus fameux Peintres.)

COURT, EECLESIASTICAL.

COURTS, EECLESIASTICAL.

COURTIS, JEAN, a very celebrated French painter, sculptor, and geometer, contemporary with II Rockefeller,

Primaticcio in the sixteenth century. The date neither of his birth nor death is known; but he was born at Sancy near Sens, was the first Frenchman who attained distinction in his art under the dispensation of Cardinal Richelieu; he was also the son of a French general officer, Lieut.-Gen. Rousseau, of Sens, and he was established chiefly as a painter on glass there, but he generally spent a portion of the year at Paris. His most celebrated pictures were painted for the Mnima of Vincennes, and in the Tuileries, for which not without a work of a high order, it is carefully executed, and in parts well drawn though harsh, well forestored, and well though highly covered; it was engraved by Peter de Jode the elder, in twelve sheets: the whole piece is four feet high, by three feet four inches wide, and one of the largest prints in existence.

Many of the old painted windows of the churches of Sens and Paris are of the designs of Cousin. He was also a writer of ability; he was the author of a perspective, and a small work on the proportions of the human body, with illustrative wood-cuts, which went through many editions; the first work was published in 1650, and an edition with a new title in 1625, in two folios, under the following title—Livre de Pourtructure de Maistre Jean Cousin, Peintre et Geometrien tres excellent,' &c.

In sculpture his principal work is the monument of Admiral Chabot, in the church of the Celistes. There are still some remains of his paintings on glass in the church of St. Gervais, which were his principal works of this class at Paris. He was still living in 1680, and much advanced in years.

Cousin, from the circumstance of his having placed a pope in hell, in his picture of the Last Judgment, is supposed by many to have been a Protestant, or of the pretended reformed church, as Felibien expresses himself, but such an unconfirmed report, he continues, with considerable simplicity, is refuted by the life he led, by the regularity of his conduct, and the correctness of his principles.

(Felibien, Enrmines sur les Vies, &c., des Peintres.)

COSTOU, the name of two very distinguished French sculptors, brothers, of Lyon.

GEORGES COURTOIS, born in 1658, and having received some instruction from his father, who was a carver in wood, he went in his thirteenth year to Paris, and became the pupil of his uncle, Antoine Coysyvoz, a distinguished sculptor. When only 20 years of age he obtained the grand Academy of Painting and Sculpture in succession to a pupil of Rome. In Rome Coulouz paid more attention to the modern than to the antient works in sculpture. His favourite masters were Michangelio and Algardi, whom he studied for their opposite qualities, endeavouring to combine in his own work the merits of each; to modify the harsh vigour of Michel-
angelio by the less evident grace of Algardi. He remained in Rome three years, but from his peculiar taste and the charac-
ter of his studies, it was not to be expected that he could have appropriated much of the symmetry and dignity of the antique.

His first great work in Paris was the colossal group represen-
ting the junction of the Seine and Marne, now in the gar-
der of the Tuileries, at Paris; but which is said to have been partly destroyed by the Revolution, and rebuilt in the same garden, of which the best is the Berger Chasseur. He made also the celebrated group of the Tritons of the rustic cascade at Versailles. But his work of highest pretensions is the Descent from the Cross, in the church of Saint-Cloud, near Paris, generally called le Vase de Louis XIII., the figures of Louis XIII. and Louis XIV., which were on each side of it, until 1831, when they were destroyed, were by Guilla-
umme Coystou and Coysyvoz respectively. He executed many other works of equal importance in France and at Paris, for which he was well rewarded by Louis XIV., and a small pension was settled upon him by the city of Lyon: he enjoyed two pen-
sions from the crowns, amounting together to 6000 francs. He went in 1735, having been forty years a member of the French Academy.

GUILLAUME COURTOIS was born in 1678, and was also the pupil of his uncle Coysyvoz. He went likewise to Rome as a}
a pensioner of the French government; it appears how-
ever that he never enjoyed the pension, or it was at least
paid with such irregularity that he was forced to earn his own
maintenance, for which he was chiefly indebted to Le Gros,
who employed him on his bas-relief of St. Louis of Gon-
sage.

After his return to Paris he executed many excellent works,
several of which were for the gardens of Marly, but are now
at the Tuileries; others are at Versailles; the two celebrated
gardens of Versailles were created by him. The sepulchral
monuments of Monte Cavallo, now at the entrance of the
Champs Elysées, were at Marly until 1794. Still
more celebrated works are the statues of the façade of the
Church of St. Genevieve, which were removed when that
building was converted into the Pantheon: they were
executed by a sculptor of the name of Dupré.

(De Fontenot, Dictionnaire des Artistes, &c.; D'Argen-
ville, Vies des célébres Architectes et Sculpteurs; Galignani,
Historie der P. C.)

COUTO, DIODO DE. [BARROS, P. C.]

COWLEY, MRS. HANNAH, whose maiden name
was Parkhouse, was born at Tiverton, in Devonshire, in 1743.
She was known for her eloquent and learned style, and in her
early life was a member of the East India Company's army, by
which she had three children.

Her husband was a man of taste, whom she
concluded in the composition of her works: and the first of her
plays, 'The Runaway,' was commenced half in jest, on her
husband's urging her to express it, in the theatre, a belief
that she could write a drama. Her life was spent in the
dignified quiet of an English lady, mixing little in the
world, and, notwithstanding her dramatic turn, visiting even
the Queen of France. She died at Tiverton on the 21st of March,
1809, having survived her husband about ten years.

'The works of Mrs. Cowley, Dramas, and Poems,' were pub-
lished in a collected edition, 1809-1815, 3 vols. 8vo.

Among them was a poem in two parts, of considerable length,
entitled 'The Maid of Aragon,' 'The Scottish Vill-
age,' and the 'Singe of Acre.' The artificial character of her
to poetic is indicated by the fact that she was the 'Anna
Matilda' who corresponded with Mr. Merry under his newspa-
per signature of 'Della Crusca.' Her two tragedies Illeus
are worthless. Of her nine comedies several are merely
bad. One of them, 'The Belle's Stratagem,' which first appeared
in 1780, still maintains its place as a lively and excellent acting
play: and 'A Bold Stroke for a Husband' is a play of
somewhat similar, has been repeatedly revived both in its original shape
and with alterations.

COXIE, MICHAEL, a very celebrated old Flemish
painter, born at Mechlin, in 1497. He studied first under
Hans Memling at Bruges, and devoted himself in such time to the
study of the works of Raphael at Rome, and even there obtained
distinction as a fresco painter. He returned with an
Italian wife, and with a good stock of Italian art, to his own
country, and he is said to have set up a studio of his own, in which
he was very successful. He was much admired for his
tale, in Paris, and his fortune was very great. They were chiefly altar-pieces, and
many of the best of them were carried to Spain, but he kept
a considerable gallery of some of his choicest productions, in
the Palais Royal, and in the house of which he possessed at Mechlin. He
died at Antwerp in 1592, and was buried in the cathedral church of that place.

Though the works of Coxie had much merit, he is now
broadly considered the author of the history picture of the Lamb,
in the church of St. Baton, at Ghent, by the brothers
Van Eyck, than for his own original productions. It is a

large altar-piece with folding-wings, in two horizontal divi-
sions, an upper and a lower division, each with two wings on
a side; six of these wings are now in the royal gallery of
Berlin, and the other parts are still at Ghent. Coxie's copy of
the two more picture of the alforf piece is also in the Berlin
Gallery; God the Father, and the actual Adoration of the
Lamb; other parts in the Pinkofock of Munich, and in
the royal gallery of the Hagu; in Munich are the large
monument of John the Baptist and the Virgin Mary; at the
Hague are the large altars of the Virgin Mary and the
Virgin Mary and St. Philip of II. of Spain, and finished in 1559, after two years of
interrupted labour, for which he was paid 4000 florins,
about 400l. sterling, or sixteen times as much as the Empire
price. In the copy of the painting this picture, Coxie complained to Philip that he
could not procure a blue good enough to paint the Virgin's
drapery with, upon which Philip wrote to Titian for some
ultramarine, which Coxie received, and he used a quantity of
the value of thirty-two ducats over the single blue mantle
of the Virgin. The copy was painted with extreme care, and
kept somewhat softer than the original; it remained for
a long time in the chapel of the old palace of Madrid, whence
it was removed and sent to Brussels by General Bellet
during the French occupation of Spain. Ceau Berndes
says that Coxie himself took it to Spain.

(Van Manders, Leen der Scherdters; Kestenhau, No.
28-37, 1894; Fouasse, Kunstwesen durch England und Belg.
ien; Knappe, Verzeichnis der Gemälde-Sammlung
Königlichen Museen zu Berlin.)

COYSEVOX, ANTOINE, one of the most distinguished
of the French sculptors, was born at Lyon in 1640: his family
had been gENTRYs for generations, but they were removed
early as his seventeenth year by a statute of the Virgin, and he
went afterwards to Paris to perfect himself under Lérobert.
He was scarcely twenty-seven years of age when he was chosen
by the Cardinal de Furenstein to decorate the palace of St. Germain-
Apostle, in which he was employed for four years.
After the completion of these works he returned to Paris with a
reputation equal to that of any of his Parisian contemporaries,
and he was elected a member of the Academy in 1716.

Among his most celebrated works are the two winged horses in
marble, mounted by Fame and Mercury, placed one on each side of the
to the garden of the Tuileries house the Place de la Concorde.
they were originally in the garden of Marly: the marble is
most elaborately worked, but they show considerable
merit. The horse of Mercury has a bridge, and that of Fame
is also well made. He also made for the garden of Marly the groups of Neptune
and Amphitrite, for Chateau, and the marble statue of the great
Condorcet, which also works for Versailles, including two
sculptures in bronze of the rivers Dordogne and Garonne.
Some of the other finest sculptural monuments in Paris are by Coyse-
vox, those of—Cardinal Mazarin at Quatre Nations, Prince
Ferdinand de Furenstein at St. Germain-des-Prés, Madame
at St. Paul; and the most elaborate of all, that of Colbert at
St. Eustache. Coysevox was also an eminent sculptor of
busts. When he died, in 1739, he was chancellor of the
Royal Academy of Painting and Sculpture.

(De Fontenot, Dictionnaire des Artistes, &c.; D'Argen-
ville, Vies des célébres Architectes et Sculpteurs; Galignani,
History of Paris.)

CRAB, a kind of portable windlass, or machine for raising
water by the barrel placed vertical fore and ares, by winding a rope or
chain round a horizontal barrel.

Some confusion is occasioned by the indefinite manner in
which such terms as windlass, crab, and crane, to which we
frequently apply to similar implements, are used. The
reason is that for the efficient and economical employment of human power
upon the mechanical principles explained under WINDLASS.

Crab, p. c., p. 307. Windlass, P. C., p. 444, is
sometimes used as a general term for all such contrivances,
though the more common word for a similar apparatus is a
simply of a horizontal barrel turned round by means of
handspokes, handspikes, or levers, inserted in holes made near its
extremities. The term capita is usually confined to a similar appar-
S. Windlass and C ALEX, P. C., p. 486, is a name
given to several varieties of windlass, distinguished from the
machine specially so called by being turned, not by handspikes or simple levers, but by the peculiar kind of handle called a whicl. Carabas are windlasses usually, though not always, turned by means of winch-handles, and generally having a proper collar by means of which they are fixed to the framework as described under Wincb and Axle. They are usually mounted in a strong heavy framework of wood or iron, and, when employed for a temporary purpose, but which one involves considerable strain, they are either bolted down to a framework, which were his only seat, and Cleobulus put upon the framework. Carabs are much used in building operations, they being often placed on the ground, and employed to raise weights by means of a rope carried over a pulley fixed to the vertical framework supporting the crane. Carabs were represented under Scaffolding, P. p. 497, fig. 3. In like way they are applied in raising the weights or rollers of pile-driving engines. In the kind of railway scaffold described under Scaffolding, pp. 497, 498, the uppermost carriage supports a crane which is a stone or other weight vertically, by being brought directly over it; and in some cases a crane is employed to exert power horizontally, or nearly so. In all cases it is most important to provide a crane with a ratchet and click, or some similar contrivance, to prevent it from running back when the application of the power is suspended; and as serious accidents have occurred even where such have been employed, owing to some failure in their action, or to the fracture of part of the apparatus, it is well to have two separate detachable parts of a crane connected to him, or to the other should fall. An ingenious contrivance for controlling the motion of a crane by means of a brake, intended especially for crabs employed to regulate the descent of heavy bodies, is described especially in Undercranes. 224.

Carabs are sometimes termed portable cranes, but the term crane is properly confined to a different class of machines, though used for a similar purpose. [Crane, P.C.S.]

CRAG, 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 Cainozoie, suggested in this work. The crag of Norfolk and Suffolk is partly a calcareous mass rich in delicate corals; part is a subcalcareous sand and pebbles, with much aggregated deposit of sand, shells, pebbles, and bones. To these divisions, whose origin is due to different local conditions, and successive times, Mr. Charlesworth has assigned the titles of Coralline Crag, Red Crag, and Mammaliferous Crag.

In Mr. Lyell's classification they rank as Pleistocene deposits.

CRANACH, Lucas, one of the most celebrated of the old German painters, was born at Cranach, near Bamberg, in the year 1472.

In colour and texture the style of Cranach was called after the place of his birth, sometimes also Meister Lucas, and Lucas Mahler, or Lake painter, from which appears to have originated the false name of Lucas Müller; his family name was Sundier.

He was born in 1472, and was suspected by his father, and in his twenty-third year (1495) was appointed court painter to the elector of Saxony; he served in this capacity the electors Frederick the Wise, John the Constant, and John Frederick the Magnanimous. In consequence of this appointment, Cranach settled in Wittenberg, the residence of Frederick the Wise, lived there forty-six years, and earned wealth and reputation in abundance; he was owner of several houses there, and was for many years burgomaster of the place. The incidents in his life are not the most brilliant in an artist's life, and there are few worth of note. In 1498 he accompanied the elector Frederick the Wise to Palestine to the Holy Sepulchre, and made drawings of all that was remarkable there. He is said to have painted a series of portraits of his ancestors, and in allusion to Catherine of Henneberg, Frederick expressly ordered him to take great pains with the Henneberg hen, for she had laid the house of Saxony a good egg: Frederick the Strong had obtained the portrait of Catherine with the utmost dissimulation, and appointed Cranach to complete the portrait. Cranach was particularly attached to the elector John Frederick, and when that prince was taken prisoner by Charles V., after the battle of Mühlberg, in 1547, he interceded with the emperor in his behalf, but to little purpose, though he drew a promise from him. Charles was well disposed towards Cranach, and requested him to accompany him to the Netherlands. He had a portrait of himself as a boy, by Cranach, at Mechlin, and he asked the painter when it was painted: Cranach informed him when he was eight years old, and that to attract his attention so as to enable him to paint the portrait, a beautifully painted arrow was stuck in the wall opposite to where the emperor sat. The narration pleased the emperor, and he dismissed him with a present of a silver plate of Hungarian ducats, or florins, which however Cranach took very few; and he persisted in his refusal to accept the emperor's offer. He would not leave his prince the elector John Frederick, with whom he shared his five years' imprisonment at Innsbruck, and upon his release in 1522, his eldest son and Cranach's namesake in his youth, told him how Cranach retired to Weimar, and died there in the following year, which was the eighty-first of his age, according to the inscription to his memory in the church of St. Jakob.

Cranach was one of the principal men of his time and country: he and Luther were intimate friends, and he is said to have brought about the marriage of Luther and Catherine Bora: he appears to have painted Luther's portrait many times, nearly all of which have been engraved, some of them by several engravers. He was acquainted with Melanchthon and Bugenhagen. Cranach had several sons and daughters; Johann, the eldest, studied painting in Italy, and died young at Bologna, in 1538: another son, Lucas Cranach the younger, was born in 1516, and died in 1586 as burgomaster of Wittenberg, and with the reputation of a distinguished painter.

After Cranach's death a medal was struck at Wittenberg to his honour, with his portrait on one side, and the arms of Saxony on the other, and in the middle was a crowned winged serpent upon a gold ground, on the other.

The principal works of Cranach were executed between 1506 and 1540, and they are nearly all still in Germany, particularly in Ulm, but especially in Weimar, his native town. In this city there are twelve, in that of Vienna fourteen, at Munich eight, and at Berlin there are twenty-three attributed to him, but they are mostly of small dimensions. His masterpieces are his altarpieces in various Saxony churches, and one of the principal of these is the large mystical representing the Creation, in the church of Weimar. It is painted on a large panel, with folding wings, which are painted on both sides. The composition is scarcely intelligible, and is selected without taste; but Frederick the Prince, Cranach and Luther which are the best figures in it: it is executed with all the laborious care and exactness of the best German painters of that period, of whom Cranach himself was inferior to Albert Dürer alone in his best period, but Dürer's superiority is confined to design and the Constitution. A description of this altarpiece, more remarkable for its execution, size, and singularity, than any other qualities, was published, with engravings, by H. Meyer, at Weimar, in 1818.

Cranach's portraits excel, in the beauty of his form and unity of effect and composition, in which he was wholly deficient. Cranach was one of the most distinguished painters of his time; and in execution he was one of the most laborious artists that have ever lived. He was a good portrait painter, and by excellence an ecclesiastic and illuminator of manuscripts: there are several manuscript volumes containing drawings in miniature by Cranach in the library of the University of Jena. Cranach is said to have also engraved both in copper and wood, and many works are attributed to him, but with very little certainty; there are however many prints in both styles after his works, but few of them probably were executed by himself.

There are many German notices of Cranach, more or less detailed, early and recent, and there are at least three distinct lives of him. The first was written by Professor Christ, and published in Dr. Acta erudita cum curis de Franconia, Nürnberg, 1726; a second was published in 1761, at Hamburg, by E. Reimer, with a continuation by E. Kern, entitled Leben und die Werke Lucas Cranachs; the last is the very full life by J. Heller, Lucas Cranachs Leben und Werke, Bamberg, 1821; and Schadow's ' Wittenbergs Denkmäler der Bildner, Baukunst, und Malerei,' &c., Wittenberg, 1826, contains biographical notices of Cranach. Concerning the engravings and wood-cuts attributed to Cranach, see Bartsch, 'Peintre-Graveur.'

CRANE, a machine employed for raising weights vertically by means of a rope or chain, fixed to a windlass, but carried over a pulley or wheels attached to the extremity of a projecting arm or jib, from the supposed resemblance of which to the neck of a crane the machine is said to derive its name.

The common warehouse crane, which is usually formed of iron, may be compared to an inverted L, the vertical portion
of which is so mounted as to form a pivot or axis upon which the whole may be swung round, so that the horizontal arm, which is strengthened by diagonal struts, may either project from the face of the building to which it is attached, so that a rope dropped from its extremity will reach a weight which has been brought within a few feet of the wall in a cart or large, or may be drawn round with its load, after it has been wound upon the required height, until the load is landed upon one of the floors of the warehouse, through an opening in the side wall. Such a crane may be mounted near the top of the building, and employed for landing goods upon any floor which has an opening immediately under it, and when out of use it may be so turned that the horizontal arm lies parallel with and close to the wall. The rope or chain of such a crane is conducted along the horizontal arm, round one or more pulleys or sheaves, into the warehouse, where it is connected with a kind of winding or crank, which is usually provided with two sets of gearing, for working at different velocities, so that in raising light goods a much greater speed may be given to the chain with the same motion of the winch-handles than when the load is very heavy. A provision is sometimes added to allow the chain, with its grapples or hooks, to descend very quickly when unloaded, without detracting it from the handles, or leaving it to descend and unwind itself from the windlass merely by its own weight. Where it is allowed to descend by means of the brace, or fley should, in all cases, be added to regulate and control its descent.

Wharf-crane are frequently of somewhat different construction, owing to the circumstance that they usually stand alone, that is to say, that they are self-supported, instead of being attached to and supported by a wall, or a post secured to a wall.

The annexed cut represents such a crane of approved construction. In this figure a is a vertical pillar of iron or wood, the lower end of which is firmly secured to a foundation of masonry, while the upper end terminates in a pointed or conical pin, upon which, as a pivot, the revolving part of the crane rests and turns; b, b is the jib, which is fixed in an oblique direction, and projects, though unequally, on each side of the pillar; c, e are wrought-iron rods descending from the jib b to support a massive collar d, which is so constructed as to turn smoothly and steadily round the base of the pillar; and e, s are struts or braces shutting upon the collar d, and supporting the ends of the jib. Below the jib and its struts may be made double, and connected by blocks and transverse rods, the ends of which are shown by small circles in the cut. f is a massive framework attached to the revolving part of the crane, and giving support to the windlass y, which may be operated by a handle or by foot. g is the large toothed wheel, which is turned by a small pinion on the axis of the winch-handle h. From the barrel the chain or rope is conducted over the wheels or pulleys i, i, mounted at the ends of the jib, between the two parallel pieces of which it consists, and under the movable pulley or runner j, which carries the hook or grapple to which the load is to be attached. The end of the chain is then carried up and secured firmly to the jib. By this arrangement the power is increased in proportion to the difference between the diameters of the wheel and pinion by which the chain-barrel is worked, and is further doubled by the adoption of the runner (Fusius, F. C., p. 118) or moveable pulley to which the hook is attached. Where so great a power is required the runner may be dispensed with, and the hook may be attached to the end of the chain, in which case the load will be raised in half the time, but, supporting the power applied to the windlass to be the same, the weight to be lifted cannot exceed one-half of what may be raised with the runner.

This permission is only given as a general rule; in some cases the horizontal caged wheel, fixed firmly upon the pillar a, and k k is engaged with it, and worked, through the medium of bevel gear not shown in the cut, by turning the winch l. By this contrivance the crane may be turned round so as to bring the hook over any desired part of the warehouse, or, in other cases, the turning of the windlass is effected not by winch-handles, but by a tread-wheel worked by men, or even by horses or ovens. In others the waste or surplus power of a steam-engine is made available for the purpose. Barlow (Practise on Manufactures and Machinery, in the Encyclopaedia Metropolitana, sections 396, 397) describes two methods of working cranes by this or other mechanical power: one being by the compression of air into a strong vessel; and the other by cells or cylinders containing water, or vessel or reservoirs of water, as in Bramah's plan for working cranes by hydrostatic pressure, which is described in the same work, the power may be transmitted to a considerable distance, and connected with or without the assistance of a counterweight, or the turning of a cock. Among other modes of working cranes, one which claims more of its singularity rather than for any decided merit or advantage, was patented by Mr. L. Wright, and brought into operation at the West India Docks, in which the power applied by winch-handles in turning an axis, is converted into a series of levers, which, acting in succession upon friction-rollers projecting laterally from the rim of a large wheel mounted on the axis of the chain-barrel, forces it round very slowly, but with great power. Representations of this and also of Reva's patent crane, in which the same, by the intervention of ratchet-wheels, turned round by the alternating motion of a single lever of considerable length, are given in Hebert's Engineer's and Mechanic's Encyclopedia, "Cranes." In Jamieson's "Dictionary of Mechanical Science," art. 'Cranes,' is a full account and detailed representation of Watt's jib-crane, a machine peculiarly adapted for building purposes, owing to its portability, power, and perfect control not only over every point lying in a circular line of which the crane occupies any part, but also over every point included within that circle. In this crane the central pillar, when the machinery is required to be portable, is held fast by guy-ropes, and the jib, instead of lying across its upper extremity, is moved outwards in a motion resembling that of a windlass, yet its lower end abutting upon a collar at the base of the pillar, while the upper end is supported by tackle connected with the top of the pillar, which tackle, being worked by a separate winch, affords the means of changing the angle formed by the jib with the pillar at pleasure, and consequent to the offset of bringing the load nearer to or removing it farther from the centre of motion, as circumstances may require. Some portable cranes are made to balance, by means of counterweights, or as to need guy-ropes, which may be mounted upon a base furnished with wheels or rollers. Some cranes also are furnished with an apparatus for weighing as well as lifting their load. Several of these varieties of the ordinary crane are described by Jamieson, who also, under 'Cellar-crane,' remarks upon the simplicity of the contrivance, wherein cases through a cellar opening, by means of a windlass attached to a portable framework.

The beautifully simple and efficient apparatus described by some writers as the Chinese crane, a contrivance which might be advantageously substituted for many complicated, cumbersome, and expensive machines employed for raising weights, is described under WIND and AXLE, P. C., p. 436. Other machines employed for similar purposes are noticed under C.R.A., P. C. 6.

CRANK, in machinery, is a bend in an axle by which a reciprocating motion in a rod is made to produce a revolving motion of the axle and of a wheel which may be connected with it.

The formation of a crank is well known, and it is evident that while the plane of the crank makes any angle with the rod, a movement of the latter in, or nearly in, the direction...
of its length will cause the axle and, with it, the wheel to turn round: when the plane of the crank is coincident with the rod the latter can, of course, have no power to produce rotation; but the momentum which the crank and axle may have previously acquired in turning, immediately carries the plane of the latter forward as the crank continues its circular motion, because the plane of the crank contrary to the direction of the former movement continues the circular motion of the crank and axle.

Mr. Trengred has computed a table in which are shown the forces which the lever exerts upon the wheel, the lengths of the lever and the radius of the crank, and also the strains on the axle at the different angles which the plane of the crank may make with that in which it coincides with the direction of the rod; and it is in order to equalize, as far as possible, the motions produced by these various forces that a fly-wheel is generally employed with the crank.

The sun and planet wheel which was devised by Mr. Watt for the purpose of converting a reciprocating into a circular motion is an apparatus consisting of a toothed wheel, which is fixed to the axle, and one which is attached to the lower end of the reciprocating rod. The latter wheel does not turn on its centre, but, as the rod moves upward and downward, the teeth, driving those of the other wheel, cause the latter and with it the axle, to revolve. This compound motion, though still in use when a considerable velocity of rotation is required, since it causes the axle and wheel to make two revolutions in the time that one only would be produced by a crank and wheel, is now superseded, in steam-engines, by the lathe-

[Serum-Vaccinia, P. c., p. 506.]

CRAT.EYA, a genus of plants belonging to the natural order Capparidaceae. It has 4 sepals; 4 unisexual petals lanceolate, not closing over the stamens during fertilization; 8-28 stamens, inserted to the corona or hemispherical; the berry, stalked between ovate and globose, pulpy within; a thin pericarp. The species are unarmed shrubs or trees with trifoliate leaves and terminal cymes or monads of large flowers.

C. gymnochroa, Garlic Pear, has 20-24 stamens inserted on the cylindrical receptacle, longer than the petals; the berry ovate; the leaflets ovate, acute; the petals lanceolate. It is a native of many places and thickets near the sea-side in Jamaica. The whole plant is poisonous, and causes a violent diarrhoea. The bark of the root is said to hister like cannabirides.

C. Taipa, the Tapia or Common Garlic Pear, has 8-16 stamens, declinate, about three times as long as the petals; the stipe of the ovary as long as the stamens; the stigma sessile, capitulate; the fruit globose. This plant is a tree about twenty feet high. Its fruit is the size of a small orange. It is brought both from the West India Islands and from South America. The fruit has the smell of garlic, and communicated its characteristic property to the aqueous decoction which is named tonic, and has been employed in the cure of intermittent fevers.

C. muscorum, the Bliva or Mahora, is a small tree bearing a red or yellowish berry with a hard shell, and to the inside of which contain, besides the seeds, a large quantity of a tenacious, transparent gluten, which on drying becomes very hard, but continues transparent; when fresh it may be drawn out into threads of one or two yards in length, and so fine as scarcely to be perceptible to the naked eye, before it brakes. This plant is now however transferred to the family Auran
diaces, under the generic name Egle. It is the Feronia pellicida of some authors. It is found in all parts of the East Indies. The fruit is nutriment of the experiment, very delicacy
tious to the taste. It is recommended by European physicians in the East as a valuable remedy in habitual constipation, and it is said never to fail to produce its aperient effects. The root, bark, and leaves are also used in fevers by the Malayans phyto-

[Landley, Flora Medica; Don, Gardiner's Dictionary.]

CRAYER, CASPAR DE, one of the most distinguished Flemish historical painters, was born at Antwerp in 1585, and died at Ghent in 1654. He was a pupil of J. van den Hoecke and of E. de Vos, and of J. van der Meulen. He first distinguished himself at Brussels, where he painted several great altar-pieces, but he settled eventually at Ghent, where his greatest works are still preserved in the museum and in various churches: many of his works however are also preserved in Germany and the Netherlands. He died at Ghent in 1669.

The works of Crayer, in their style, subjects, and dimensions, are generally of the highest pretensions, and they are in a great degree successful, but yet are frequently unusual and grand. Besides other great works, he painted at Ghent twenty-one large altar-pieces for the principal churches of that city, some of which, for their fulness and dignity of sub
dject, correct and vigorous design, and the judicious bestowal of extra care in the execution of their more important parts, command our highest admiration, notwithstanding a very general coldness of execution pervades them throughout. Even the great evasive taste of Rubens was vividly impressed with the great merits of Crayer: upon seeing one of his pic
tures in the refectory of the abbey of Altheghem, he is said to have exclaimed, 'Crayer! Crayer! no one will ever sur
pass you.'

There are fourteen of his works in the museum of Ghent, comprising some of his principal pictures, as—St. Rosalia crowned by the infant Christ; the Martyrdom of St. Blaise, a last work, painted for the Convent of St. Blaise, the pictures painted for the triumphal arches erected at Ghent upon the occasion of the formal entry of Prince Ferdinand, Infant of Spain, into Ghent, in 1622. One is Francis I. sur
rendering his sword to Lannoy after the battle of Pavia in 1525; another, the descent of Charles V. upon the coast of Africa in his expedition against Tunisia, ten years afterwards: the figures of these works are colossal, and they are slight in their execution, but at the same time remarkably vigorous and correct. There are found also in the museum the pictures of the Virgin and Child enthroned amongst angels and sur
rounded by saints, in the gallery of Munich, about 19 feet by 12, and by no means one of the best of his works, cost, with the copy that was substituted in its place, 28,000 rix dollars.

CREDI, LORENZO DI, was born in 1454, and died at Venice in 1516, and was the son of the well-remembered artist of the same name. He was born at Venice, and makes the following just observations upon it in his 'Journey to Flanders and Holland':—'Though it cannot be said to be defective in drawing or colouring, yet it is far from being a striking picture. DI, one of the best between his figures and the ground; the outline is everywhere seen, which takes away the softness and richness of effect; the men are insipid characters, and the women want beauty.—' The dead and cold effect of this picture, as well as many others of the Venetian masters, is due to the fact that the artist took no great advantage there. It was painted in 1454, and the lower figures are portraits of Crayer and his family.

(Desampa, La Vie des Peintres Flansando, &c.)
are now lost, but there are still a few Holy Families by him in Florence and in other parts of Italy. Credit when old, having become wealthy by his labours, retired into Santa Maria Nuova at Florence, and died there, according to Vasari, in 1530, aged twenty-eight. He was shown to be incorrect, whatever the age may be, for he was still living in 1536, but ill and bedridden. If therefore he was only seventy-eight years of age when he died, he cannot have been born earlier than 1458, and was consequently only thirty-two years old when he brought the building from Venice, which is highly improbable, as he had some time managed the affairs of that sculptor at Florence, and was recommended by him as fit to complete the statue of Colonnei. He must have died therefore at a much more advanced age than seventy-eight, supposing 1530 to have been the year of his death. Gianantonio Sogliani, who lived with Credi forty-two years, was his most distinguished scholar, and in some respects improved the style of his master: in tone both were the imitators of Da Vinci. (Vasari, Vite de' Pittori, &c.; Gaye, Carteggio d'Arfisti.)

CREDIT, in commerce and in political economy, signifies the trusting or lending of one man's property to another. The man who trusts or lends is said to give credit, and he who is trusted is said to obtain it. The one is called a creditor, and the other a debtor.

Credit is given either in goods or in money. By the former mode goods are supplied to a purchaser, for which the payment is made at some future time, and the person who supplies them indemnifies himself for the delay by an increased price. By the latter mode, money is advanced, upon security or otherwise, and interest is charged upon the debt. In England, it is commonly expressed by the term C.I.; in France, some other modes are used, in conjunction with each other, in the large transactions of commerce. A manufacturer, for example, sells to a merchant, for exportation, goods to the value of a thousand pounds. The merchant however is unable to pay for them until he has received remittances from abroad; and the manufacturer, aware of his solvency, is contented to receive in payment a bill of exchange, due at some future time. [Ex-Change, Bill of, F. C.] But in the mean time he is himself in possession of the money on his banker's books instead of having for the payment of the bill when it shall become due, he gets it discounted by a banker or other capitalist. Thus having given credit to one person in goods, he obtains credit from another in money. In this and other ways capital is circulated and applied to the various purposes for which it is required. But without entering further upon the practical methods by which the mercantile system of credit is conducted, it is proposed to inquire into its causes and to its economical uses and results.

There can be no system of credit until there has been a considerable accumulation of capital; for when capital first begins to be accumulated, those who possess it apply it directly to their own labour. They have no superfluity which they can afford to lend to others. Thus capital is generally engaged in some business in which their savings can be profitably employed. As a country increases in wealth, many persons acquire capital which they cannot employ in their own business, or can only employ by offering inducements to purchase in the shape of deferred payments. Others, again, inherit capital from which they wish to derive an income without the trouble of personally superintending its application. It is from these classes of persons the lenders of capital arise; and they have no difficulty in finding borrowers, as it is needless to Classes of persons who then to find men who have need of capital, and who have no difficulty in finding borrowers, as it is needless to Classes of persons who then to find men who have need of capital, and who share with a capitalist the profits of their own industry, on condition that he intrusts them to such funds as they require for making it productive. Thus as soon as a sufficient capital exists it will find its way, and an industry of very great extent will continue to grow with the increase of capital, unless it be checked by a general insecurity of property, by imperfect legal securities for the payment of debts, or by a want of confidence in the integrity of the character to which it is liable to revert. As one of the forms in which capital is distributed, a system of credit is of the highest value; but if relied on as an independent equivalent of capital, it is delusive and fraudulent.

As yet that description of credit which consists in deferred payments for goods has only been generally adverted to; but the precise use of credit as an agent in the production of wealth is that it gives circulation to capital, and renders it available wherever it can be most profitably employed. It does for capital what division of employment does for labour. Without it the capitalist would employ all his wealth in the most utilitarian and productive distribution. Credit, in fact, may be understood by regarding it as one of the many forms in which the division of employments facilitates the production of wealth. Without the aid of capital, the labour of man is comparatively inefficient; but with capital the whole of the industry of the country, engaged in the productive employment of labour, promotes the most essential of all divisions of industry—that which uses and makes effective the ingenuity of men in those pursuits for which they are adapted. [Division or Employment, F. C. S.]

To employ capital productively is a business requiring great knowledge, skill, and industry; and is rendered more effective by the division of superintendence, as manual labour is facilitated by a judicious distribution of employments among several hands. Every man who borrows money for the legitimate purposes of industry, and applies it with judgment, is really the agent of the capitalist, in executing duties which the capitalist himself would be unable to perform. A man's capital would be comparatively useless without an active superintendence, and a union of skill and industry in a particular business. These qualities are placed at his disposal by the capitalist, who, on the system of credit, is in fact exaction by a share in the profits arising from the use of his capital. He cannot therefore trust persons improvidently, these useful results will not follow; but it is his peculiar province, as it is his interest, to exercise caution and judgment in the investment of his own money. 

The borrower, on the other hand, will be, in itself, a substitute for capital. A man without any capital of his own may carry on business by the aid of credit; but he is merely using the capital of another. No man can lend his money, and still use it himself. It is not ambiguous—nor can it serve two purposes at once. If a man does not use his own capital, he may lend it to another use; but it is impossible that he can both use it himself and allow another to use it at the same time. He cannot use it in person and by proxy.

Stated in this manner, the truth of these principles is obvious; yet so great is the influence of credit in stimulating enterprise, that it is constantly mistaken for a distinct productive agent. Thus it is said, for example, that whenever credit is freely granted, there is a great increase of the result; and it is undeniable that facilities in obtaining credit and prosperity are ordinary concomitants; but they are both equally the results of an abundance of capital seeking employment, under circumstances favourable for its production and results.
we cannot close this article without a special notice of its peculiar character and effects. This system of credit is generally resorted to by tradesmen to increase their business; and it is undeniable that deferred payments offer a strong temptation to credit, and are apt to lead to it. But, generally speaking, the cost of possession appears small in remote perspective. When a customer buys an article for which he is not to pay for twelve months, he becomes indebted for its value, and he has also, in fact, borrowed that amount of the tradesman, to whom he pays but a fraction of the article's price; 2ndly, the profit upon the sale; and, 3rdly, the year's interest upon the amount advanced. The tradesman, if he have capital, and can rely upon ultimate payment, is very glad to have the article paid for in this way, but he will charge a high rate of interest for deferred payments. If he have not a sufficient capital, he must borrow money from others to enable him to give credit; and, of course, he will charge to his customers a higher interest than he has paid himself. In either case, the customer assumes a considerable risk, for the debts contracted in this manner are devoid of all security. The goods supplied and consumed; and if the parties fall in payment, there can be no restitution or compensation. When the system is fully established, many persons avail themselves of it dishonestly; others are improvident, and, without intentional fraud, exceed their means, and become insolvent; and various accidental circumstances may prevent the tradesman from recovering his debts. His risk, therefore, is exceedingly great. He may employ some one duty as out of his power, and the interest and all his losses. He consequently charges not only a reasonable interest for the risk which he runs in each case, but also an insurance against all the losses which he may incur in his business instrument, could he choose to run; a high rate of interest for his loan, and a portion of the unpaid debts of other people. Nor can any check be placed upon the creditor, as in other forms of credit. No particular sum is advanced with a stipulated interest; but a great amount is due, in which the rate of interest is concealed. It may be exorbitant, and out of all proportion to the value of the article supplied and the accommodation given; but it is not separable from the delusive price. This circumstance is such, that the creditor, being induced to raise prices injuriously to the consumer; an evil which even extends itself, in a great measure, to purchases paid for in ready money.

It is the abuse, however, or the excessive use of this form of credit, which is mischievous. If properly used, and within reasonable limits, it is as useful as credit in any other form. A few examples will suffice to illustrate this position. The receipts of different consumers are irregular; their consumption fluctuates, and the equality of the goods may be about the same; but in point of time, they cannot be accurately balanced and adjusted one to the other. This system of credit enables them to provide for themselves and their families without privation, and at the cost of no one else. It prevents the accumulation of stocks and raises prices injuriously to the consumer; an evil which even extends itself, in a great measure, to purchases paid for in ready money.

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The shell is of great use to the inhabitants; the smaller oblong ones are formed into spoons and ladles, the larger ones form drinking cups, basins, and bowls for every variety of domestic purposes. They are also made into necklaces and are used for boiling wine in.

The Caribs generally carve the outside of these vessels with a variety of grotesque figures. The pulp is sometimes eaten by the natives, but it is not much sought after. A syrup is prepared from it in the West Indies and this has a great medicinal value. The pulp is also used as a poultice in cases of abscess or bruises. The leaves and branches and pulp of the fruit are eaten by cattle in times of scarcity.

The wood of the tree is tough and flexible, and well adapted for the making of pitch-pine. The wood has been used by other species, natives of the West Indies and South America, having the same general characters as the above.

The species of Crescentia will grow in a mixture of loam, peat, and sand, and woody cuttings will grow when placed in sand in heat under glass. They do not however blossom in this country, as they require first to arrive at the full size.

(Don, Gardener's Dictionary; London, Encyclopedia of Flora in the English Language; Lining, Flora Medica.)

CRESPI, GIUSEPPE MARIA (Cavaliere), a painter and engraver of Bologna, distinguished in his time, was born at Bologna in 1665. He was the scholar of Canuti and of Cignani, and was called Lo Specchio, from the amount of his talent. He was also remarkable for his perseverance in copying the works of the Carracci, Correggio, and Barrocio, and some of his copies are said to have been sold at Bologna as originals. He studied later the effect of Guercino and the cromatics of da Cortona and Guercino everywhere, and was one of the most careless and capricious of painters, though all his works exhibit great mastery; and he had a surprising facility of execution: indeed he is in this respect probably unequalled. He was however so careless, that he used any oils or colours indiscriminately, without investigating their properties, and in many of his works he has left the bare ground of the canvas to perform the office of a tint in the picture. Mengs terms him the destroyer of the Bolognese school. His great facility and equal success induced the painters of his time to endeavour to obtain celebrity by similar means.

There are twelve of his works in the gallery of Dresden, including the Seven Sacraments painted for Cardinal Ottoboni; and an Eco Homo, which, with all its faults, is a most masterly performance. In colour it is rather green, but in drawing and in character it is excellent, and in boldness and security of touch surprising; it appears to have been painted in one heat, and that a short one, though it contains elements of the size of life—Christ and two soldiers. Crespi died in 1747.

His two sons, Luigi and Antonio, followed their father's profession, but not his style. Luigi Crespi, or Don Luigi Canonica, for that is his style, is well known for his writings on the subject of the 'Bottega Pittorica, or 'Bologna Paintress,' of Count Malvasia. The count's work is in two volumes, and Crespi published a third, with the same title, in 1769. In it he has written a Life of his father, and an apology for his faults. He died in 1779.

(Cruciophora; Lenzii, Storia Pittorica, &c.; Bartech, Peintre-Graveur.)

CRICACANTHUS, a genus of fossil fishes, from the middle of the Cenomanian (Agassiz.)

CRICOPORA, a genus of corals formed by Blainville out of a subdivision of the Milleporidæ, including some fossil species, which chiefly occur in the oolithic formations. C. straminea is found near Scarborough; C. capitosus near Bath.


CRINUM, a genus of plants belonging to the natural order Amaryllidæae. It has a tubular long perianth, with a spreading reflexed, or equal limb, with a shorter ovule inserted into the orifice of the tube; the ovule being easily separable from the fls. placenta; the capsule membranous, bursting irregularly; the seeds globose, with a fleshy testa, giving them the appearance of small tubes. The species are native to the plains, and many of them form the greatest ornaments of our gardens.

C. Aestheticum, Poison Bulb (Radix toxicaria, Rumph.), has a cylindrical bulb above ground; the leaves lanceolate, smooth at the edge, longer than the scale, flowers on stalked umbels, the segments long, linear, reflexed; the style inferior; the style the same as the stamens, declinate; the fruit reniform, subglobose. The bulbs of this plant are powerfully emetic, and are used in Hindustan for the purpose of producing vomiting after poison has been taken, especially that of the Amaryllidæae. It being one of the few medicinal plants that have a blue root.

C. amabile has a very large bulb with a long red neck, the leaves broad, glaucous, smooth at the edge; the umbels many-flowered; the tube shorter than the limb. This plant is a native of Asia Minor, and is now common in our greenhouses. Many of the species have been lately introduced. They grow best in a rich loam mixed with a little rotten dung. They should be potted in large pots, where they will flower abundantly. They may be propagated by suckers from the roots, which, when raised, may be rooted. Should the plant show any indisposition to put suckers out, it should be cut down near to the root, when it will put out plenty.

(‘Lindley, Flora Medica; London, Encyclopedia of Plants; Herbier, Amaryllidaceae.)

CRIOCERATITES. The diacoidally spiral Ammonitides, whose whorls do not touch each other, receive this generic title. The species occur in the oolithic and lower cretaceous rocks.

CRIOCERIS. [Erepsa, P. C. S.] CRITHMUM. [Samphire, P. C. S.]

CROCUS SAVITVUS—Medical Properties of. The saffron crocus is a native of Asia Minor, but extensively cultivated in the more southern countries of Europe. That which is obtained in England, chiefly from Suffolk, is from the C. autumnalis, and is scarcely now to be met with, being nearly quite supplanted by the saffron imported from Spain. The official part is the stigma of the flower, with a small portion of the perianth, collected when it is in a state of maturity, called the name of Famosella, and the less of this there is, the finer is the saffron. The stigma consists of three narrow club-shaped, somewhat petaloid portions, about one or two inches in length, of a brown or orange-yellow colour, with a tlamicant, pleasant, but somewhat stupefying odour, and andish aromatic taste. The plant flowers in September and October, and once a day (some say twice) the stigmata are carefully plucked out of the open flowers, and dried on paper or siles, either in the sun, in a room, or by kilns, under the weather in which the plant is used for drying for the sun. The attention necessary for procuring it in perfection may be estimated from the circumstance that nearly 40,000 flowers are required to yield one pound of saffron.

The statement that 107,020 or still more 203,520 flowers are required is a gross exaggeration. The good saffron occurs only in the static called Sephr; which is termed cask saffron is entirely composed of the flowers of a compound plant called Carthamus tinctorius, or safflower. Other aphasis are not required to be preserved for this use, except oiling old saffron, to give it the appearance of fresh. Portions of smoked flesh are easily detected by not yielding colour like saffron. The chemical analysis by chemists agrees as to constituents, but differs as to the respective amounts. This difference arising from the quality of the specimens examined.

Vogel and Bouillon

Le Strange.

Volatole oil

Wax

Polychroid

Gum

Soluble albumen

Woody fibre

Water

Balsamic matter, soluble in alcohol

100

7-5

0-5

60-5

8-5

10-0

10-0

2-0

95-8

The volatile oil is yellow, and heavier than water, and possesses a bitter, acrid, burning taste, and is partially soluble in water. By keeping it undergoes some change, for it becomes white, and is then lighter than water. To it is chiefly owing the medicinal properties of saffron, while the yellow substance owing to the polychroid, which seems to be a combination of a volatile oil and a red bitter substance.

Saffron formerly enjoyed a high reputation, both as a perfum, and as a medicine, for the treatment of stomachic, and the odour has powerfully affected some very susceptible individuals is undeniable; but so little regard is now paid to it, that it is employed chiefly as a colouring ingredient, or adjunct to
other more powerful agents. It is still a popular remedy during the eruptive stage of exanthematos diseases, a remnant of the old doctrine of colours; and to the same notion is to be referred the practice of giving it to canary birds when attacked by pseudocercariae (Becceghin), who judiciously recommends iron to be put into the water at such times.

(Becceghin, On Cage Birds, p. 223.)

CROSS BILL. [FELIDAE, P. C.]

CROSS-RIBBAIN [FELIDAE, P. C.]

CROSS SISTER. In state prosecutions in England the solicitor to the treasury acts as solicitor for the crown in preparing the prosecution. In Ireland there are officers called Crown solicitors, for the purpose of conducting all prosecutions from which a curious history might be framed by any one possessed of sufficient industry and minute attention to pursue the subject. There have been so many etymologies of the name "Crown," and they are all so purely hypothetical, that it would be a useless effort to attempt a comparatire judgment on them.

Unfortunately, the history and institutions of the Culdees have been the subject of dispute between the supporters of the Episcopal and those of the Presbyterian church polity; the one maintaining that this primitive body were a mere collection of monastic institutions connected with the Catholic hierarchy, while it is endeavoured to be proved, on the other side, that they were the precursors of the Protestant Presbyterians, and that their church polity, destined to predominate in the Christian world, was derived from the fountain-head of Christian truth, and communicated to modern times through the Lollards, before the Culdees were entirely extinguished. This subject has been much disputed by the Waldenses. The Culdees undoubtedly formed a part, if not the whole of that early Catholic church, which had established a different epoch for the celebration of Easter from the Catholic churches of the Continent and the rest of the world, and made an object of much dispute between the Scottish and English ecclesiastics.

The ground on which the former maintained their own peculiar usages was, that they had been derived directly from the apostles, by whom, and not by the ecclesiastical representatives of St. Peter, the church in Ireland had been planted. The practice of the Culdees seems to have so far coincided with the later monastic institutions, that they lived in retirement, practised abstinence, and made devotion and the administration of the sacraments the principal function of the monastic life. So far were they however from adopting a rule of celibacy, that marriage was practised and reckoned honourable among them. It is difficult to discover their precise polity. It has been found that they ordained bishops; but it further appears that the persons bearing that name, instead of having been elected by authority over another class as Presbyters, were themselves under the authority of the president, or head of the establishment, as representing the community. The Culdees had chapels to serve the people in the form of colleges, where they kept small libraries of MSS. and gave instruction to youth. Their principal establishments, besides that of Iona, were at Abernethy in Perthshire, the island of St. Seri in Lochleven, Dunkeld, St. Andrews, and elsewhere. The English, however, although apparently without success, to identify these establishments with the episcopal dioceses, and to prove that each college or monastery, with its head and ordinary members, was virtually the dean and chapter of the diocese of the archiepiscopal see of St. Andrews appears to have owed its early predominance to the Culdees, who seem to have had considerable possessions in the neighbourhood. The great abbey of Arbroath is believed to have had a similar origin, so is that of Melrose. Besides the dispute as to the holding of Easter, and the difference of opinion on the marriage of ecclesiastical persons, the Culdees had many subjects of dispute with the Roman hierarchy, from whose customs they were separated, and the sects of the Waldenses and various others. They were at last obliged to give way before the waxing influence of the Church of Rome. St. Bernard describes the people as beasts and barbarians, who neither pay tithes nor taxes. The Culdees who rejected local marriage, they do not go to confusion: no one can be found who applies for the prescription of penance, nor any one who will prescribe it. The erection of the several bishoprics, under the patronage and countenance of the kings of Scotland, raised up powerful enemies to the Culdees who were within the respective territories allotted to them as dioceses; and the order was thus gradually incorporated with the Roman Catholic church.

(Culdees, the name of a religious order in Scotland, Ireland, and the north of England, whose origin may be traced from the middle of the sixth century. The information regarding their origin is derived from the chronicles of their founder Columba. Their gradual absorption, by the spread of the Romish hierarchy in Scotland, is a subject for which the chartularies and other muniments of the episcopal see of Scotland afford abundant materials, from which a curious history might be framed by any one possessed of sufficient industry and minute attention to pursue the subject. There have been so many etymologies for the name "Culdees," and they are all so purely hypothetical, that it would be a useless effort to attempt a comparative judgment on them. Unfortunately, the history and institutions of the Culdees have been the subject of dispute between the supporters of the Episcopal and those of the Presbyterian church polity; the one maintaining that this primitive body were a mere collection of monastic institutions connected with the Catholic hierarchy, while it is endeavoured to be proved, on the other side, that they were the precursors of the Protestant Presbyterians, and that their church polity, destined to predominate in the Christian world, was derived from the fountain-head of Christian truth, and communicated to modern times through the Lollards, before the Culdees were entirely extinguished. This subject has been much disputed by the Waldenses. The Culdees undoubtedly formed a part, if not the whole of that early Catholic church, which had established a different epoch for the celebration of Easter from the Catholic churches of the Continent and the rest of the world, and made an object of much dispute between the Scottish and English ecclesiastics.

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CUCUMITES, a genus of fossil plants, from Sheppury. (Bowerbank.)

CULDEES, the name of a religious order in Scotland, Ireland, and of their Settlements in Scotland, England, and Ireland.)

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CUMBRIAN ROCKS. Professor Sedgwick has given this term to the lowest series of slaty rocks which appear in the ranges of Skiddaw and Grasmoo Fell in Cumberland. They lie below the green slaty rocks of Scafell and the Old Man, which the same writer regards as coeval with the strata of the upper series. Geologists have given the term the meaning they wish.

CUNEGO, DOME/NICO, a distinguished Italian engraver, and one of the best of the eighteenth century, was born at Verona in 1727. He commenced to study as a painter under Francesco Ferrari, but he found engraving more congenial to his taste, and, after having worked a little, adopted it as his profession. He was particularly well qualified in one respect, as he was a correct draftsman, and was accordingly enabled himself to make, from the pictures he engraved, drawings from which he worked. He settled in Rome in 1761, where his first works were a series of Roman ruins after Clerisseau, for the Count Girolamo dal Pozzo. In 1773 Gavin Hamilton published his 'Seholia Italice,' of which the best and the greater part of the plates were engraved by Cunego. He engraved twenty-two, including the three creations—of the water, of the sun, and the moon, and of Adam, from the frescoes of Michael Angelo on the ceiling of the Sistine Chapel; La Fornarina of Raphael, from the Barberini portrait; and Galates, from the fresco of Raphael in the Farnesina. The others are from Giorghione, Titian, the Carracci, Domenichino, Guildo, and other celebrated painters.

Engraving came into its own with Cunego, as it was called before that time. In 1763 Cunego was invited to Berlin to superintend an Engraving Institute (Kupferstich-Institute), which was established by a merchant by the name of Pascal; but after a trial of four years the undertaking was abandoned, and Cunego returned in 1769 to Rome. He however executed a great number of fine portraits, during his stay in Rome, including some mezzotint and line portraits of Frederick II., and the royal family of Prussia, after E. F. Cunningham, a Scotch painter, then in repose at Berlin. Cunego engraved eleven mythological subjects after Gavin Hamilton, besides numerous other works, religious and patriotic, and various masters. He also engraved an outline of the great fresco of the Last Judgment, by Michael Angelo, in the Sistine Chapel. He died at Rome in 1794. Cunego's execution, as far as respects the original drawings, was not bad, his draughtsmanship was light, elegant, and correct; and he is considered by some critics to have been the best historical engraver in Italy of his immediate time; he was however latterly surpassed by his junior and rival Volpato. His two sons, Alois and Giuseppe, likewise practised engraving with success.

(Gandelini, Notizie Istoriche degli Intagliatori, &c.; Huber, Manuel des Artistes, &c.; Goethe, Winckelmann und sein Jahrhundert; Tizocci, Dizionario degli Architetti, &c.)

JOHN, the Earl of Nithsdale, was born at Dublin as a wine merchant, was born there in 1729. An ill-judged passion for the stage tempted him away from home at an early age. His father afterwards became in- solvent; and as a means of support he was sent to Rome to return as a burden on his family. Accordingly he continued, during his short life, to pursue the precarious career of an itinerant player. For a good many of his later years he was chiefly employed at Edinburgh and in the north of England, where his personal character was highly respected. He was the author of a farce now quite unknown, and of several small volumes of poetry, chiefly pastoral, whose sweetness has obtained for some of them a corner in popular collections, and entitles their author to a place in the list of minor English and various masters. Cunningham, Allan, was born at Blackwood in Dumfriesshire, in 1785, of parents in very humble circumstances, though not of humble descent, as one of his ancestors lost the family patrimony in Ayrshire by taking the side of King James of the Old Cause of the Revolution in 1688. His father, says Allan Cunningham, 'was a man fond of collecting all that was characteristic of his country,' an inquiry which the son appears to have prosecuted, if not with more zeal, at least with more efficiency, than his father. Allan was brought up at the early age of eleven, and was bound to a stonemason. Hogg gives us some account of Allan's appearance and character in early life, in his 'Reminiscences of Former Days;' he describes him at the age of eighteen as 'a dark unambitious youth, with a fine head for a marked man; features, the very model of Burns, and exactly such a man.' Hogg continues, that young as Allan Cunningham then was, he had heard of the name, and he thought he had seen one or two of his juvenile pieces. In 1810 he came to London, and his name first appeared in print at the same time as a contributor in the collection of Crome's 'Remains of Nithsdale and Galloway Scots.' This collection, purporting to be Nithsdale and Galloway poetry, was entirely recast and much of it written by Allan Cunningham, and Hogg states that when he first saw the book, his first impression was that it was the work of Allan Cunningham, especially in the 'Mermaid of Galloway,' from the pervading style of his style, which he had already noticed, and he adds that 'Allan Cunningham was the author of all that was beautiful in the work.' Hogg wrote a review of it, and sent it to Jeffrey, who, a few days later, dispatched a note of correction, in which he noted, saying that he had read over the article, and was convinced of the fraud which had been attempted to be played off on the public, but that he did not think it worthy of exposure.

For some time after his arrival in London, Allan Cunningham maintained himself by reporting for newspapers, and contributing to periodicals, especially the 'London Magazine,' to which he was one of the principal supports. At a later period, the situation which he obtained in Chantrey's studio, as a painter or principal assistant in working the marble, enabled him to prosecute his literary taste without hazard. The following are his chief works: 'Sir Marmaduke Maxwell,' a drama; 'Paul Jones,' and 'Sir Michael Scott,' novels; 'Songs of Scotland, ancient and modern, with Introduction and Notes, Historical and Critical, and Characters of the Lyric Poets,' 4 vols. 8vo. 1826; 'The Lives of the most eminent British Architects, and Architects, in the 'Murray's Family Library,' 6 vols. 12mo. 1829; 'The Lives of the Poets to Major's 'Cabinet Gallery of Pictures,' 1833-34; 'The Maid of Elvra,' a poem; 'Lord Oldland,' a romance; 'The Life of Burns'; and 'The Life of Sir David Wilkie,' 5 vols. 1825-26.

Sir Walter Scott died at Eildon, on the 5th of November, 1842, aged fifty-seven.

To appreciate duly the songs of Allan Cunningham, probably requires a man to be of Scotch origin: he appears to have been valued by his literary contemporaries of Scotland; by Sir Walter Scott, and partly dated by the Etrick Shepherd. Hogg, after recounting his first meeting with him, says, 'I never missed an opportunity of meeting with Allan when it was in my power to do so. I was astonished at the hum- drum uniformity of Dr. Chalmers, the first poet of his age, but his style was so delicate, so fragile, with the luxury of a rich garden, overrun with rampant weeds. He was likewise a great man in expression, and no man could mistake his verses for those of any other man. I remember seeing some imitations of Ossian by him, which I thought exceedingly good; and it struck me that the style of composition was particularly fitted for his vast and fervent imagination.' His 'style of poetry is greatly changed of late for the better. I have never seen any style improved so much in so short a space of time.' The success of Allan Cunningham has at length been fully and justly marked it so decidedly. He is now uniformly lively, serious, descriptive, or pathetic, as he changes his subject; but formerly he jumbled all these together, as in a boiling sauce, from which once he began, it is impossible to cal- culate where or when he was going to end.

Allan has had however his English admirers also; among the foremost of these was Miss Landon, concerning whom and a few others of his associates, some interesting details appear in the Britannia newspaper shortly after his death in November, 1842. Flaxman also, according to Cunningham's own account, must be numbered among his English admirers, as appears from what Cunningham says in his Life of Flaxman. Cunningham, Allan, was born at Blackwood in England and abroad for his 'Lives of the Painters,' &c. than for his poetry. This popular work contains memoirs of Hogarth, Wilson, Reynolds, Gainsborough, West, Barry, Blake, Opie, Morland, Bird, Fuseli, Jameson, Ramsay, Romney, Ramsay, and Templet. Cunningham, Allan, was born at Blackwood, low, Bonington, Cosway, Allan, Northcote, Sir G. Beaumont, Lawrence, Jackson, Liversedge, and James Burnet, painters; of Gibbons, Cibber, Roubilac, Wilton, Banks, Nollekens, and other artists. Cunningham, Allan, was born at Blackwood, near Weychew, Inigo Jones, Wren, Vanbrugh, Gibbs, Kent, Earl of Burlington, and Sir W. Chambers, architects. The work is popular not on account of the execution of the lives, but on account of the subject; to those however really interested in the lives of the great men, the work has a charm not to be destroyed by the variety of the styler of the lives are not impartially written, facts are not investigated, statements are made without any reference to authority, anecdotes are recast to suit the author's taste; and, in fact, the lives are a sort of essay, fluent, and forcible style. The less satisfactory lives are those of Blake, Bird, and so on.
Fuseli, Jumenece, Cowsey, Northbute, Wilton, and Bacon: in some of these there is the occasional appearance of a spirit of malevolence, evident enough to force itself into notice: his style is also frequently contemplative; whether this was his manner, or whether the events he related were only the expression of the manner in which he lived. Even his most lauded life, that of Blake, has given little satisfaction to Blake's friends; the editor of a new edition of Blake's 'Songs of Innocence and of Experience,' in 1839, says, in a preface, 'I have endeavored to do justice to the character and genius of the poet.£. We have not avail'd ourselves of Mr. Allan Cunningham's facts, we have been sedulous to exclude from our pages his tone of feeling, and style of thought, in speaking of Blake. Again, and again, we have been at pains to make clear the connection of the Art of Poetry and Nature, and our fellow-men, are current terms,—whence originating or how disposed of it matters not,—has been established, on the basis of Doubt, by David Hume: and has been carried out into some of the details requisite for making it into a system of Philosophy,' by Thomas Brown and Dundal Stewart. Behold, then, in the 'Lives of British Painters,' the application of the system to art and the souls of artists. He who has thus applied it possesses eminently the qualifying power of transmuting things into words; and into just such words as imply a negation of the things stood for.

Passavant also, in his work on England, Kunstreise durch England, &c., in noticing Allan Cunningham's 'Lives,' observes, 'CUPRESSOCRINITES, CURCULIO,' and displays a propensity for relating all sorts of often demeaning and seldom founded anecdotes, p. 346.

The following few quotations from the work will serve to illustrate the passages here and there given. There is no need to quote all the portion of the passages that might be added. Of West he says, 'He was the first and last President of our Academy who found a selling difficulty'; of Wilton he says, 'As one eye is enough to make a man king among the blind, Wilton triumphed over his fellow's,' &c. Of Bacon he says, 'He was ob- servable, at least in theory; to resolve to do a benevolent act, indicates a man who can take one step, at least, in the road of mercy; and it may be the fault of the reporters that I have heard nothing of those children who have come from the plough, the manufactories, or the shop, to assert the truth of the great principle of nature, that talent, like sunshine, sheds its light on all conditions. Such is the story of most of our first-rate artists. This is true of some, but not of most of our second-rate artists.'

CUPRESSINOTES, a genus of fossil plants, from Sheppemy, containing thirteen species. (Bowerbank.)

CUPRESSOCRINITES, a genus of Cynoideae. (Goldfeder.)

CURCULIO, a genus of insects founded by Linnaeus for such tetraneuron Coleoptera, where clav-shaped antennae inserted on a prolonged rostrum. In the twelfth edition of the 'Systema Naturae,' ninety-five species are enumerated. The progress of entomologists has converted the genus as defined by its founder into a family including several thousand species, though the original name is retained for a few South American beetles, of which Curculio splendida is the type.

Curculio, the genus of Coleoptera at present constituted, has been the subject of special research on the Continent by M. Schoenherr, and in England by Mr. Walton. The former entomologist has published a work, as yet incomplete, entitled Genera Generis, which contains 2,000 species; of which more than 4000, species distributed through 404 genera, have been already described, and as many more remain for description.

For notices of the habits of these insects, see Wavir. P. C. 6. 445.

CURCUMA, a genus of plants belonging to the natural order Zingiberaceae. It has the tube of the corolla gradually enlarged upwards; the limb 2-lipped, each lip 3-parted; the single filament broad; the anther incumbent, with two spurs at the anther-base. The flowers are numerous,arillic. The species are stemless plants with tuberose roots; the flowers are of a dull yellow colour, surrounded by bracteole.

C. Zornanbit, Zedory, has lateral spikes, the tubers palmate, pale straw-coloured; the leaves from 4 to 6 together, with a long somewhat winged petiole, with a dark purple cloud running down the centre; the flowers shorter than the bracts, bright purple, nearly as long as the sepal, the upper half lodged in the vitelles, the lower half in the perianth. This plant is the Zedoaria longa of the shops, and has the same property as the following species. It is a native of the East Indies. It is called 'Kempferia rotunda,' which has no sensible properties resembling the plant in question. The tubers of this plant are aromatic, and are used by the Hindus not only as a stimulating condiment and a medicine, but as a perfume. Its sensible properties are similar to those of ginger, but not so powerful. It is employed in the East in cases of disease, as colic, cramp, torpor, &c., where stimulants are indicated. The Zedoary is used under the same circumstances. The roots of both these plants are imported into Europe, but are not used extensively.

C. Zedoaria, Broad-leaved Turmeric, has the spikes lateral; biennial tubers which are yellow internally; the leaves petioled broad-lanceolate, entire, underneath covered with soft silky pubescence. The tubers, however, are not the same as those of the Zedoary. R. Fée has confounded this plant with Kempferia rotunda, which has no sensible properties resembling the plant in question. The tubers of this plant are aromatic, and are used by the Hindus not only as a stimulating condiment and a medicine, but as a perfume. Its sensible properties are similar to those of ginger, but not so powerful. It is employed in the East Indies, as colic, cramp, torpor, &c., where stimulants are indicated. The Zedoary is used under the same circumstances. The roots of both these plants are imported into Europe, but are not used extensively.

C. Zedoaria is a native of Bengal, China, and various other parts of Asia, and of the Asiatic Islands.

C. rubescens has lateral spikes, the tubers pear-coloured in the ground, lanceolate-cumulate, smooth, strongly marked with parallel veins, of a uniform dark green with the nerves or ribs red, 12 to 24 inches long, 5 or 6 broad; the capsules invested with several dark reddish shothaks.

Curcu. The plant is a native of Bengal, and is called by the Bongalees 'Amada.' It is called mango ginger because the fresh root has the smell of a mango. It is used for the same purposes as ginger.

C. Amarada, Mango Ginger, has few-flowered central spikes; the tubers horizontal, palmate, of a deep orange colour inside; the leaves radical, bifarious, petioled above their sheaths, tuberous below, extremely fleshy, cumulate, smooth, on both sides, from 6 to 18 inches long by 3 to 6 broad. This plant is a native of Bengal, and is called by the Bongalees 'Amada.' It is called mango ginger because the fresh root has the smell of a mango. It is used for the same purposes as ginger.

C. angustifolia, with stalked narrow lanceolate leaves, is a native of the forests of India from the banks of the Lona to Nagpore. Its tubers, which are found at the end of fleshy fibres which meet together forming a crown, yield an excellent arrow-root.

C. amara, with slender leaves, is found over India, and is used as a condiment, and for dyeing. (Curculum Longa, P. C.)

There are several other species of Curculum, but the above are those which yield aromatic oils and starch in greatest abundance.

(Lindley, Florica Medica; Louden, Encyclopaedia of Plants.)

CURCUMA LONGA, Medical Properties of. This perennial plant, belonging to the tribe Zingiberaceae, is not ascertained to be native of any particular country in the East; it is occasionally wild, and it is also extensively cultivated in China, Java, Malacca, and in Bengal, prospering in a moist soil. It is employed in the manufacture of the famous Saffron, C. longa, the root of which is destined by the same Turmeric (C. longa). These are generally regarded as the produce of the same plant; but even were they yielded by two, it is altogether incorrect to assign the root to Curculum rounda, Limn., which is the Kempfiera obesa, Roscoe, a rare plant, the root of which is destined by the same Turmeric (C. longa). The name is derived from the Persian karukum, which means saffron; hence it is sometimes termed Saffron des Indes, but must not be confounded with common saffron, from Crocus sativus, of Persia. It is likewise called by the French Terra merita (Curculum, hae Galla Terra merita male dietur), see Royce, "Antiquity of Hindoo Medicine," p. 87.

Round turmeric occurs in knobs, roundish, ovate, or oval,
sometimes pointed, and insensibly running into the long turmeric, and is of a deeper, more cambous-like colour in the interior. The pieces are from one to two inches long, and nearly one in diameter. The long turmeric occurs in pieces about two inches long, either straight, or curved, and doubled up, presenting on the surface more marks whence the rootfibres have sprung. The colour externally is of a brownish yellow, internally lighter than that of the round sort. The fracture has a waxy appearance, and the odor is unctuous. The taste is bitterish, aromatic, and like ginger, but less potenti. In the fresh state it has a rather unpleasant smell, somewhat resembling curry, which goes off a good deal on drying.’—Ansell’s Medicinal Cures. This article is very liable to be eaten by small beetles. Old, worm-eaten specimens should be rejected. Hard compact pieces, which with difficulty can be powdered, are best. It has been analysed by John, and subsequently by Vogel and Pelletier.—

<table>
<thead>
<tr>
<th>John’s Analysis</th>
<th>Vogel and Pelletier’s</th>
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<tr>
<td>Yellow volatile oil</td>
<td>1</td>
</tr>
<tr>
<td>Curcurmin</td>
<td>10 to 11</td>
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<tr>
<td>Yellow extractive</td>
<td>11 to 12</td>
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<td>Gum</td>
<td>14</td>
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<td>Woody fibre</td>
<td>57</td>
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<tr>
<td>Water and loss</td>
<td>7 to 5</td>
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<tr>
<td>Turmeric</td>
<td>100</td>
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The colouring matter is given out very freely to water, and alcohol, but curcurmin in a pure state can only be obtained by digesting the alcoholic extract of turmeric in aether, and evaporating the aetherial tincture to dryness. Its appearance in the market is brownish yellow, but when powdered a full yellow. It is tasteless, odourless, almost insoluble in water, but readily soluble in alcohol and aether. The alkaloid colour reddish-brown, and readily dissolve it. The alcoholic solution evaporated with boric acid, becomes red. Hydrochloric acid also affects it. The alcoholic reaction of curcurmin produces colourless precipitates, with several salts, such as acetate of lead and nitrate of silver (Perciera). The frequent use of turmeric as a test renders a knowledge of these points necessary. (See Fresenius, 'Chemical Analysis,' by Bullock, p. 31.)

Turmeric has aromatic qualities which render it useful in languid habits, where digestion is difficult, and the circulation slow. The reputed cure for jaundice and dropsies was founded on the doctrine of signatures (Cullen. 'Mat. Med.,' p. 25). It is of some importance as a dye, but it is as a condiment, both in the East and in this country, that it merits notice, as it is an ingredient in all curry powders and curry paste. When in excess the colour is too brown, and one flavour predominates, which is contrary to sound artistic law. The same observation applies to Cayenne pepper. ‘With us, turmeric and Cayenne pepper prevail in them far too powerfully.’—Acton’s ‘Modern Cookery,’ p. 287. The following account, extracted from the 'Pharmacopoeia' (1835, vol. iv. p. 364), supplies an infinite variety of receipts for preparing curry powder. But whichever is preferred should have added to it some mushroom-powder. The root, fish, or

| whatever article is employed as the basis of the curry should always be so perfectly boiled that it can be eaten with a spoon. This necessarily destroys the natural flavour of the meat. The mushroom-powder contains curcurmin, which with the long cooking has disintegrated. The curry-powder should not be added to the dish till a few minutes before it is to be served to the table.’—[Foon. P. C. S.] CURIA MURIA, or better, KOORAYA MOORAYA ISLANDS, are situated on the southern coast of Arabia, and afford protection to an open bay called Koorya Moorya Bay, which is extensive, and has good soundings throughout. They lie in the direction of the eastern continuance of Ras Noss, a very elevated headland, and lie between 55° 20' and 65° 10' E. long., and near 17° 30' N. lat. They are five in number, called from west to east Hasik, Soda, Hallany, Karrawet, and Jebelja. A long reef is said to extend from Hallany to Soda, so as to render it very dangerous, not if impossible, for any vessel to pass between them; but between Soda, Hasik, and the main land, the channels are good. Hallany, the only island that is inhabited, contains twenty-three individuals: the anchorage and village are at the northern extremity, where water may be obtained, but it is brackish. Its mountains are high, and apparently of volcanic origin.

(Captain Owen, Narrative of Voyages to explore the Shores of Africa, Arabia, and Madagascar; Dr. Hutton’s 'Account of the Curia Muria Isles,' in London Geographical Journal, vol. xi.)

CURRANT. [RIBES, P. C. S.]

CURRYING. [LEATHER, P. C. S.]

CURSITOR BARON, an officer of the Court of Exchequer, is appointed by patent under the great seal to be one of the barons of the Exchequer. He attends at Westminster to open the court prior to the commencement of each of the four terms, and on the seal day after each term to close the court.

He administers the oaths to all high-sheriffs and under-sheriffs who are sworn by the court, and to several officers of revenue. Prior to 1824 his list omitted various officers of distinction; but since the passing of the act 3 & 4 Will. iv. c. 99, much of the business of his office has entirely ceased; and the commissioners appointed under the 1 Will. iv. c. 58, in reporting the conclusion of the offices in the Court of Queen’s Bench and Common Pleas, recommended the abolition of the office of cursitor baron. This recommendation, however, has not been carried into effect. (Report of Commissioners in Office of Courts of Justice, 1822; Parl. Paper, No. 129; Parl. Paper, 1829, No. 114.)

CURVE. In the article CURVE, P. C., a list of curves is given, which reference is made to their several articles. As one or two of these have been omitted or misplaced, we insert the present article to supply deficiencies. The numbers at the head of each paragraph refer to the list just mentioned.

5. Semieubilateral parabola. The term parabola has been extended to mean any curve having an equation of the form

\[ y = ax^2 + m \]

where \( m \) is positive. Thus \( y = ax^2 \) is the eubalabul parabola, and \( y = ax^2 + m \) is the semieubalabul parabola. The semieubalabul parabola is the evolute of the common parabola.

[For the Companion to the Cyclopaedia, see Cyclopaedia, P. C. The harmonic curve, so called because it is a portion of it, is one of the simplest forms assumed by a string having a fixed end, for its equation the relation between \( x \) and \( y \) implied in

\[ x = \frac{a}{b} y = b(1 - \cos \theta) \]

12 to 17. These curves are all described in Tetrachronal CURVE, P. C. 95 to 24. See Spiral, P. C.]

CURR

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contains.
Cinchonia, will.
If every be its Cinchonia, so Steam-engine,' but the by
of the equation of this curve: but the celebrity of his name has kept his oval orovals among the curves which serve for exercise to beginners.

**31. Wave's Parent Curves**

The end of the beam of a steam-engine describes an arc of a circle; but it is required that the end of the piston-rod, which must be in some way attached to it, should describe a straight line, or a curve which is very nearly a straight line. Now at and near a point of contrary flexure the beam is nearly straight. If two rods revolve round fixed pivots, their ends being connected by a third rod, the middle point of that third rod will describe a curve which has a point of contrary flexure; and if the lengths of the rods be properly taken, and if one of the rods be the beam of the steam-engine, the reciprocating rotary motion of the beam may be made to communicate what is practically a reciprocating rectilinear (improperly called parallel) motion to the middle point of the third rod, on account of the relation of the two rods or the beams being a curve of contrary flexure. A piston therefore may be attached to the middle point of the third rod, and the requisite condition is practically satisfied. The apparatus described in STEAM- ENGINES, C., p. 477, by James Leverkühn, pp. 100-120, is the addition of a pair of rods which with the first and third compose a parallelogram moveable at all its joints. This is intended to furnish the same reciprocating rectilinear motion to a second piston placed at the new joint, which is nothing to our present purpose. What's the parallel motion curve must be defined as the locus of the middle point of a straight line of given length, the ends of which describe arcs of circles.

The following considerations on the definition of the word curve will be useful to the young analyst:

Geometrically speaking, a curve is described by a point which moves according to one uniform law, and does not describe a straight line. An oval, for instance, formed by arcs of circles in the manner described in books on mensuration, is not a curve, but a junction of several arcs of different curves; and even the two branches of an hyperbola cannot be said, in this primitive view of the subject, to be anything but two curves; accordingly they were called opposite hyperbolas.

But, all this being the case, the meaning of the word curve is much extended. Every curve, just defined, has one permanent equation connecting the abscissa and ordinate of every point in it. The converse is made true by extension of the definition of a curve, which becomes a system of equations, so that each equation constitutes the curve to which the equation is said to belong. Let $x$ and $y$ be the abscissa and ordinate of a point; and $\phi(x, y) = 0$, the equation which is to connect them. If this equation be satisfied when $x = a$ and $y = b$, the point whose co-ordinates are $a$ and $b$ is considered in every case as belonging to the curve whose equation is $\phi(x, y) = 0$. The consequence is that a curve, or what is so called in algebra, may be either the simple curve of geometry — a collection of such curves formed under algebraical conditions of one law — or a collection of such curves not even algebraically connected — or an isolated point — or a collection of isolated points at finite distances from one another — or a collection of isolated points infinitely near to one another, but which are considered as connected by a continuous branch of an ordinary curve. Or it may be any combination of two or more of these. We give some instances, as follows:

- The equation $y = a^2 - x^2$ belongs to both the branches of an hyperbola. If $a$ change, remaining constant, the hyperbola becomes a different hyperbola, with the same asymptotes as before. But if $a = 0$, the equation belongs simply to those two asymptotes, that is, to two distinct and independent straight lines. In like manner the equation $(x^2 + y^2) - a^2 = 0$ belongs to a complicated curve, with various branches. But if $a = 1$, this curve resolves itself into two distinct curves, the straight line $x = 0$ and the circle $x^2 + y^2 = 1$. For the equation then be reduced to $(x^2 + y^2 - 1)(x^2 + y^2 - 1) = 0$ which is satisfied whenever either $x^2 + y^2 = 1$ or $x + y = 1$.

- 30. **Ovals of Cassini**

Dominie Cassini (see James Cassini's Astronomy, vol. 1, p. 148) proposed, as a better representation of the earth, a system of co-ordinates in which the rectangle of the distances from any point in it to two fixed foci is constant. This curve is of the fourth order, and may be one oval, a lemniscate form, or two separate ovals, according to the ratio of the given rectangle to the square on the difference of the foci.

It is hardly necessary to say that Cassini was wrong in his application of this curve: but the celebrity of his name has kept his oval or ovals among the curves which serve for exercise to beginners.

- 29. **Steam Curves**

But in the sense of the word curve which, though it may be said to contain an infinite number of points, infinitely near together, cannot be called continuous. For there is no negative value of $y$ when $x$ is a fraction, and no even number can be an odd denominator. These pointed branches, as they have been called, have only been recently considered. Their admission depends entirely upon definition. Those who would restrict the meaning of the word curve to something like its ancient signification, will reject these. And those who wish to look upon a curve as a tabulation in space of every possible value of $x$ and $y$ which will satisfy a given equation, must admit them. The few hints here given on the extension of the word curve are meant to excite the curiosity of those who have not been accustomed to look at geometrical interpretation as subordinate to algebra.

**CUSCO-CHINA, Medical Properties of.** This bark, which was first distinguished from the common cinchona barks by Jobst, comes from Cusco in Peru, but the tree which yields it is altogether unknown. It is considered by some to be the same bark as the Arica bark, but this also is doubtful. That it is not the same as the Cuscona rubiginosa of Bergen, though so called by Leverkühn, is certain. In general attributes it approaches the yellow (callisia) barks, but it differs from all heretofore described, in the chemical characters of the alkaloid it contains. This is termed Cusco-cinchona, or Cusconia, but it is improper to consider Arica as synonymous with it, since it is by no means certain that Arica bark and the one now described are identical.

The alkaloid is procured by the same process as is used for cinchona, which it resembles in its physical qualities, but differs in its chemical habits. The taste is more bitter, rather heating, and sub-astringent. It is equally insoluble in water, but easily so in alcohol and in sulphuric acid. It forms with acids salts which resemble those of cinchona, but have a more bitter taste. The sulphate conducts itself singularly. A concentrated watery solution of this salt forms on cooling a tremulous jelly, which on drying becomes horny, but which, by the assistance of boiling water, resumes the jelly-like state. Cinchonina, quina, and cusconia are supposed to be one base or radical with progressively increasing proportions of oxygen.

The formula of these is $(\text{C}^9\text{H}^{12}\text{Ar}^5\text{O}^9)$ + O cinchona. $(\text{C}^9\text{H}^{12}\text{Ar}^5\text{O}^9) + 2\text{O}$ quina. $(\text{C}^9\text{H}^{12}\text{Ar}^5\text{O}^9) + 3\text{O}$ cusconia.

This composition renders it worthy in the highest degree the attention of medical men. The warmth which it excites points out the propriety of giving it in cold intermitents, and in tropical stomachic system.

**CUSPÆRIA. [CASPÆRIA, P. C.]**

**CUSTOMARY FREEHOLDERS. [COPHOLD, P. C. S.]**

**CUSTOMS' DUTIES. [TARIFF, P. C. B.]**

**CUSTO'S BRIDUM.** Officers so called existed until lately both in the Court of Queen's Bench and the Court of Common Pleas. They received and had the custody of all the writs returnable in their respective courts, filed warrants of attorney, and various other documents connected with the business of the courts; but by virtue of 1 Wil 4, c. 68, these offices (of which the duties were performed by deputy) were abolished in both courts, and compensation granted to their possessors. The office in the Court of Queen's
Bench was held by Lords Kenyon and Ellenborough jointly, and the compensation granted them was 2089/7, 17s. 4d. per annum. In the Court of Common Pleas the compensation granted to the custod brewin was 605l, 10s. 6d. per annum. (Parl. Papers, 1854, No. 114, 1844, 230.)

CYPHER, a term now obsolete, and of common use in the former times, denotes the chief civil officer of the county, to whose custody are committed the records or rolls of the sessions. He is always a justice of the peace and quorum in the county for which he is appointed. The lordlieutenants are also of the chief military county, and the county recorder is quite distinct from that of custos rotulorum; but it is the invariable practice to appoint the same person to both offices, in whom is united the highest military and civil authority within his county. By statute of 37 Hen VIII, c. 1, and 1 Will IV, c. 21, he is appointed under the queen's sign manual. As he has the custody of the rolls of the sessions, he should attend there in person or by deputy; and this duty is performed by the clerk of the peace as his deputy. (Clerk of the Peace, P. C. S.)

()(Blackstone, Comm.; Burn, Justice of the Peace; Dickin- son, Guide to Quarter-Sessions.)

Cutting and Stabbing. (Main, P. C.)

Cyanogen, Chloride of. (Chemist, P. C. S.)

Cyanometer, from the Greek works κυανός (blue) and μετρόν (a measure), is an instrument which was invented by M. de Saussure for the purpose of enabling an observer to ascertain the density of the air in that region.

It is well known that the visible heavens, when free from clouds, appear to have a blue tint which gradually increases in intensity from the horizon towards the zenith, that the blue color becomes fainter by night than by day, and that the tops of mountains the color is sometimes so deep as to be almost black. These appearances depend partly on the different extents of atmosphere which the rays of light have to pass through, and partly on the quantity of water which the air holds in solution. When, as towards the zenith, the atmos- pheric space traversed by the light is comparatively small, the violet and blue rays are transmitted to the earth in abundance; while, towards the horizon, the spaces passed through by the violet and being charged with vapor and the violet, the blue, and even the green rays are intercepted, the remaining colours only of the spectrum being transmitted: it must, however, be added that the colour of the sky is affected by the terrestrial particles which are occasionally raised in the atmosphere; and also by the refractions of light from terrestrial objects, particularly from naked rocks and from masses of snow or ice. The colour of the sky being thus, in some measure, an indication of the state of the atmosphere with respect to exhalations and the refractions of light from the earth's surface; it is of importance to ascertain with some precision the intensity of that colour.

The Cyanometer, as formed by the inventor, consists of a circular plate of metal or porcelain, on the surface of which, about the circumference, is a band divided by radii into fifty-three equal compartments. One of these is white, and those which follow in succession are coloured with blue of different degrees of intensity from the most faint to the deep- est which can be produced; the rest of the compartments are coloured with mixtures of Prussian blue and ivory-black, and gradually increase in darkness to the last division, which is quite black.

In using the instrument, the observer, who should be in the open air, holds it up between himself and that part of the sky at which he intends to ascertain the colour; and this part should be such that, while the face of the instrument is strongly enlightened, the direct rays of the sun may not fall upon the plate or ring in its own plane, till there is brought directly before the part of the sky that com- partment which, to the eye, appears to be exactly equal to it in intensity of tint; the number of the compartment will express the colour and intensity of blue colour in that part of the sky.

In order to form a scale of numbers for the tints M. de Saussuro placed against a wall a piece of white paper, on which was a circular black spot, about one-seventh of an inch in diameter, so placed from it till the spot ceased to be visible: he then laid on paper a tint produced by Prussian blue, so diluted that, at a distance from it equal to that at which the black spot became invisible, the tint could not be distinguished from a perfect white. This tint was marked No. 1.

The deeper colour was the Prussian blue tint, at an equal distance, the tint ceased to be distinguishable from that of No. 1, the latter being near the

eye: this was marked No. 2; and each of the succeeding numbers up to No. 53 was determined in like manner by a comparison of the corresponding tint with that which pre- ceded it on the plate.

Cyanobasic Acid. (Chemist, P. C. S.)

Cyantha, a genus of plants belonging to the natural order of Ferns. The sori are globose, situated upon a vein or veinlet, or in the axil of a fork of the vein; the receptacle elevated, globose, or columnar; the indusium usually consisting of a column or cup, but occasionally being reduced to a narrow marginal rim. Thalli are often beautifully marked with the scar of the fallen fronds. The fronds are simple or pinnate, or decomposed pinnate. The stipes is frequently aculeated. The species of this extensive genus of Ferns are found most highly de- veloped in tropical climates. They give a peculiar feature to the vegetation of many districts of South America, and specimens have been brought from the forests of Brazil, the moun- tains of Mexico and Peru, from the islands of the Eastern, Western, and Southern Oceans, as well as from the South of Africa, and the interior of India and China. Sir William Hooker, in the 'Species Filicium,' enumerates about forty different species. They are difficult to determine when brought to this country. They have, says Sir William Hooker, 'an excessive number of species, whose appearance is only known to travellers who have the privilege of seeing them in their native soils. The fronds, gigantic in most cases, and large in all, seldom reach us in an entire state. We are acquainted with the fronds which have been found on dry or aculeated, or with any other character which may afford marks of distinction. The shape or outline of the entire food we have rarely the means of ascertaining: nor do we know what is the exact nature of its composition, nor the veins, the fronds that are put upon the more or less downy or scantily covered of the pinnae, or the greater or less breadth of the pinnae, or pinnae, or segments, or the more or less deeply serrated margins. Hence, too, their synonymy becomes inextricable; and with- out a doubt it is only by examining authentic specimens of authors, their species in many instances must be looked upon as doubtful. The difficulty is increased by the older author not considering the nature of the fructification nor the venation, so that in few herbaria do we find the most common, and, we presume, the original species, the one upon which the generic appears to have been mainly founded, Cyanthus arboreus, correctly named.' The following is the definition of the typical species:

C. arboreus, Common Tree Fern, unarmed, or with few distant short prickles on the main rachis, and stipes which are frequently downy; fronds bipinnate, pinnales lanceolate, elongate, much acuminate, deeply pinnatifid, glabrous, or with the rachis hairy; pinnae or segments of the fronds not deeply or aculeate-shaped in age, a little contracted upwars, opening with a beautifully even margin. It is a native of Jamaica, Hispaniola, Martinique, St. Vincent, probably the West India Islands generally, and Brazil. In Hooker's 'Species Filicium' the members of this genus are distributed according to the districts in which they grow.

Twenty-one species are natives of the West Indies, Mexico, and South America. Two only are found in South Africa. Eleven are natives of Eastern India and islands, the Pacific Islands, and New Zealand.

Few of these ferns are used by man, and, although very elegant, are seldom cultivated. One of these, C. medullaris, a native of New Zealand, produces a starchy matter which is used for food. Another, C. lagopus, is found in the roots, and these are baked and eaten as food. (Hooker, Species Filicium; Burnett, Outlines of Botany.)

Cyanothricines, a genus of fossil Crinoidae, ex- found in Miocene strata.

Cyanophyllum, a genus of Madreporellia, which occurs fossil in Paleozoic strata, especially in the car- cases of the Silurian and carboniferous rocks. In the seas of the British isles, and on the coast of Maine and New York, the genera M. arenaria and M. exhibited are well known, and Phillips many species have been recorded from the Eocene rocks of Yorkshire and elsewhere. (Chesm. P. C. S.)

Cyprium, a genus of fossil fishes, from the London clay of Shensby. (Agassiz.)
The spring. 

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Transactions.'

it

Alberico
cyclograph,
twisted
Alberico
Mr.

Beatrice
Pope
Isle

Carrara.

Cycadeoidea.

CYCIDA/THRUS, a genus of fossil fishes from the isas
of Lyne Regia. *Agassiz.*

Cyclograph, an instrument for drawing arcs of circles without centres, used in architectural and engineering drawing, when the centres are too distant to be conveniently accessible. One such contrivance, which however does not produce perfectly circular arcs, is described under COMPASS, P. C., p. 291. Bricklayers and masons, when they wish to strike an arc upon the face of a wall, have recourse to a very simple hut perfect mode of accomplishing the object, by driving a nail into the wall at each extremity of the intended arc, and then nailing two straight laths or rods together at such an angle that while their external sides or edges are in contact with the nails driven in the wall, their apex or meeting point shall touch the crown of the required arc or arc.

When secured to each other at the required angle, the laths or rods are thus in contact with the nails, the apex may traverse the whole distance from one nail to another, in doing which it will describe the required curve, which may be marked on the wall by a piece of chalk curried with the rear end of a joint which forms a socket for the nails, and furnished with two quadrant-shaped pieces of brass, sliding upon one another, by which the rules may be set to any required angle, and secured by clamps. The instrument is usually secured in any laths above described, and it affords the means of inscribing, by the graduation of one of the quadrants, the degrees contained in the arcs described by it. Mr. Alderson's Curvilinear, described in the forty-fourth volume of the same work, p. 151-160, is another instrument of the same principle, but of more perfect construction, in which the pencil may be projected beyond the apex of the angle for the purpose of drawing a second arc parallel with the first. This second arc is not mathematically accurate, but, when the instrument is used accurately, is sufficiently so for all ordinary purposes. Most satisfactory testimonials of the convenience and perfect action of this machine are appended to the description in the Society's Transactions.

The Centralised of Mr. Peter Nicholson, described in the thirty-second and thirty-third volumes of the 'Transactions' of the above Society, pp. 67-70 and 69-81, is an instrument acting on the same principle, although its chief use, is not as a cyclograph, but as an instrument for drawing lines converging to a distant and inaccessible point. It may be compared to a T-rule in which the transom consists of two pieces adjustable to any required angle with each other, and the centre or apex of the instrument is precisely on a line with the fiducial or drawing edge of the stem or long limb of the rule. The instrument being once adjusted to the required angles, and having its angular transom laid against two fixed pins, just like the angle of a cyclograph, the instrument is used in drawing by it as readily as parallel lines drawn by a common T-rule, with its transom sliding against the edge of the drawing-board.

Another instrument rewarded by the Society of Arts, and described in the thirty-fifth volume of their 'Transactions,' pp. 109-112, under the name of a Curvograph, was contrived by Mr. Warcup for copying or transferring curved lines, or describing them originally, of any required curvature, by means similar to those in the engines used in the clock and watch trade. Under Buxsi, P. C., p. 192. The adjustable ruler itself consists of a thin pliable slip of whalebone, and the adjusting ribs, answering to the screws f.f, in the figure above referred to, instead of being screwed, are merely adjusted by pressure of wedges acting upon small

P. C. S., No. 67.

(Lozow, Encyclopaedia of Plants; Babington, Manual of Botany; Burnett, Outlines of Botany; Koch, Flora Germanica.)
pieces of cork inserted in the ruler or stock through which they pass.

CYCLOID FISHES. One great division of fishes is thus termed by Agassiz, from the concentric striation apparent in their scales, of which the substance is horny, not bony. They are rare in the species, in all except the many recent strata, but abound in the actual creation.

CYCLOLITES, a genus of Madrephyllina, including single-celled species. [Madrephyllina, P. C.]

CYPOMA, a genus of fossil fishes from Shippey (Agassiz).

CYCLOPTERIS, a genus of fossil ferns (Bronnqnaert), remarkable for the size and orbicular or oval shape of the leaves. To the species from the coal-measures (C. cyclopteris, C. orbicularis). On the remark applies better to (C. Beani, dilatata, &c.) from the olites, which are really of a different genus.

CYCLOPTERUS. [Discophlebium, P. C. S.]

CYLINDRICAL LENSES are made by grinding each of the opposite surfaces of a plate of glass in the form of the segment obtained by cutting a cylinder by a plane parallel to its axis. Two segments thus obtained being placed with their plane surfaces in contact, and so disposed that straight lines parallel to the axis of the cylinder being drawn on the convex surface of one may be at right angles to lines similarly drawn on the other, would constitute a lens of the kind here described.

Lenses of this kind were devised and executed soon after the commencement of the present century by an Optician of Paris, who introduced them as eye-glasses in spectacles in place of the usual spherical lenses. This person afterwards, conversing with the makers of these lenses, was induced to destroy, attempted to employ them as simple object glasses for telescopes. But the chromatic aberration is as great in the cylindrical as in the spherical lens; while the aberration arising from the form of the surface, which in spectacles is not always more apparent than the spherical aberration in a common lens, produced, when the image of an object was viewed through the eye-glasses of a telescope, distortions exceeding those of a spherical lens of equal focal length.

In any case, it is obvious that the excessing lenses of cylindrical forms with accuracy, it may be observed that all the sections passing through the optical axis, except two, will be bounded by portions of ellipses of different convexities in each section. Now, if these bounding lines were circular arcs, there would be the same aberration of the marginal rays as in a corresponding spherical lens: but, from the nature of the ellipse, the radii of curvature, instead of being constant, decrease as points are taken more remote from the extremity of the ellipse a little beyond the summit of the lent; consequently the cylindrical aberration, as it may be called, will be greater than that which is produced by a spherical surface. (Thomson's Annals of Philosophy, October, 1816.)

CYRILLUS, P. C. S.

CYMI'NUM CYMI'NUM, Medical Properties of. This annual umbelliferous plant (the generic name of which is most commonly spell Camelium, which mode is correct if it be a mere Latinized form of the Arabian word Qamnouk, but incorrect if it be a reduplication of the Greek qamnus) is native in Egypt, Ethiopia, &c., and was cultivated by the ancients in Palestine, as it is by the moderns in Malta and India. The fruit (improperly termed seed) is the officinal part. Externally it is of a greyish brown; internally, and is larger than those of caraway or anise. The seed within more readily separates from the pericarp than happens with most other umbelliferous fruits. It is distinguished from others by having the ridges (jugae) prolonged into a point at the summit of the fruit. The primary ridges are five, filiform, and furnish with very fine prickles; the secondary are four, prominent and prickly. Beneath each of these is one vitta. The odour is strong aromatic, and rather unpleasant; the taste is rather unpleasant. The fruit is概括; the fruit is gathered mainly due to a volatility oil which is more abundant in this fruit than in most umbelliferous plants: one pound yields half an ounce of this oil, according to some; while ten pounds yield only three ounces and a half, according to others. Notwithstanding the name, which is a remarkable illustration of the frequent use of inedible parts, the oil is pale yellow, but speedily becomes brownish, very lupid, of a specific gravity of 0·976. The odour is, like that of the fruit, disagreeable, and the taste very bitter, but it becomes acid, and according to Charrcler contains succinic acid.

The disagreeable odour of cumin seems to have gradually discarded it from medicine for man, and restricted its use to veterinary medicine. Its employment in this way may be a relief of its antient repute, for the Israelites esteemed it highly as a medicine for cattle and to drive off the bites of insects. (Lady Calloot's Scripture Herbal, p. 192.)

Still it is a potent carminative, and was esteemed by Cullen the best of this class of remedies, a preference to which the very large portion of essential oil it contains justly entitles it. It was reported also to be diarrhoea, dyspepsia, &c. In former quality it was employed as a plaster. It was reckoned one of the semina 4 calida majora. In the north of Europe it is still much used as an addition to bread and cakes. It enters into the composition of many powder-powders, but should be introduced into these in very small quantity.

CYNANCHUM (from κυνάχνειν, to strike, &c., a genus of plants belonging to the natural order Asclepiadiaceae. It has 6-handed somewhat rotate corolla, a crenum of appendages consolidated, 5-lobed, when 5-lobed with the segments opposite the anthers; the pollen-masses ventricose, pendulous; the stigma usually apiculate, sometimes blunt, very rarely with a beak enclosed below the summit; the silicles smooth. The species are herbs or under-shrubs, with opposite leaves and mostly twining stems.

C. Vincetoxicinum has an erect stem, a beardless corolla, a simple umbel with the pedicels three times longer than the peduncle; the corona 5-lobed. This plant is a native of Russia and parts of Asia, &c., and in the same place of Great Britain. It possesses emetic and purgative properties, and was once celebrated as an antitoxin for poisons, from which it has derived its specific name.

C. Montpellierianum, Montpellier Cynanchum, is a hardy species with umbel of flowers, nothing like a common, with roundish corollae-stalked leaves, with a semilanceolate contracted point; the segments of the corolla lanceolate, bluntest; the coronet tubular. It is a native of the sea-coast of Italy, of Spain, of the South of France, and Greece. The juice of this plant is a drastic cathartic, and when dried it is used as a medicine under the name of Montpellier Scammony.

C. cauliflora is a stout climbing plant, with oblong oval acuminate leaves; many-flowered corolla; peduncle not longer than the pedicle; the corolla 10-cleft, as long as the corolla; the stigma pointed, emarginate. This plant is a native of Penang, where, according to Dr. Wallich, it is used for the purpose of procuring from its sap caoutchouc, which is of an excellent quality.

C. Argel has erect, pale, round stems; the leaves scarcely stalked, about an inch long, ovate lanceolate, acute, smooth on each side, and rather wrinkled, glaucous on the under side; the corolla small, axillary, with many smooth alternate segments, the segment of the corolla lanceolate, blunter than the calyx. It is a native of Upper Egypt. The leaves and the whole plant act as a powerful diuretic purgative. This plant appears to be a native of the same districts as those from which the Alexandrian Senna is derived, and all the samples of that senna contain these leaves. They do not however appear to be added for the purposes of adulteration, but are collected with the leaves of the senna through the ignorance of the persons employed in their collection. The leaves of Tunbulliany Senna are not found to contain those of the Cynanchum Argel mixed with them. Much of the unpleasant gripping effect of the Alexandrian Senna is attributed by some writers on Materia Medica to the mixture of the leaves of the Argel. Senna leaves are always mixed with those of the Gonnocarpus fruticosus, which are in Syria also called Argel or Argel.

The Cynanchum Speciosum of Willdenow, the Asclepia aristata of Roxburgh, is now referred to the genus Typhonor (Tezourea, P. C. S.)

CYNARA/CE, one of the primary subdivisions, in the system of Jussieu, of the natural order Composite. It is included in the Tubuliflorae of Sondolino. It is characterized by an umbel, the segments of the corolla lanceolate and large, having involucral, the florets of the ray of the flower tubular, inflated, and regular. Of the three subdivisions this is the smallest. Its type is the genus Cynara, to which belongs the common artichoke, C. scolymus.

The following British plants belonging to this subdivision are as follows: —

Section I. — Cynarinae.

Sausages 1 species.

Carina 1 species.
narrowed into a long petiole, upper leaves lanceolate, slightly narrowed below, clasping. It is found in Great Britain, by roadsides and in hedges in shady situations.

About fifty other species of Cynoglossum have been described, besides the British ones above named. They are all small plants, but one or two small forms are so few that few are desirable for ornamental cultivation. They are however of the most easy culture, and will grow in almost any situation and soil. The greater number of the species is biennial, and may be propagated by sowing their seed in spring in the open border.

(Babington, Manual; Don, Gardener's Dictionary.)

CYPERUS. [Cyperaceae, P. C.]

CYPRIPEDIUM, a genus of plants belonging to the natural order Oenotherales. The flowers are small and insignificant. It has a patent perianth; a ventricose inflated lip; column trilobed above; the lateral lobes bearing stamens, the middle lobe sterile, dilated; the two lower sepals combined; the germen straight.

C. calculeus, Lady's Slipper, has a leafy stem; the middle lobe of the column nearly ovate, obtuse, deflexed; the lip slightly compressed, shorter than the calyx. This plant has been found in Great Britain, but is extremely rare.

All the species are small, exceedingly elegant plants. They are mostly inhabitants of North America and Northern India. Two new species have been lately introduced. In their cultivation they require great care. They will not thrive in a rich soil, but in a soil partially covered with sand. The American species should be covered with some dry straw in very severe frosts, or if there should be too much wet; they are not easily increased, but will perfect seeds in favourable situations, particularly if pains be taken to apply the pollen to the stigma.

(Babington, Manual.)

CYRTO/CERAS, a Nautiloid genus of fossils, proposed by Goldfuss, which occurs in the Paleozoic strata of Devon, the Eifel, and Ireland principally, and includes many species of great beauty and interest. The septa are plated by a subdorsal siphon: the last whorl finishes in a straight extension. (Phil. Pal., Foss. of Devon.)

CYSTIPHYLLUM, a genus of Madreporics, proposed by Lonsdale, to include species which have a vascellar internal structure, instead of clearly defined horizontal disposals and vertical lamellae. Occurs in the Paleozoic strata of Shropshire, Devon, and the Eifel.

CYSTOPTERIS, a genus of Ferns belonging to the tribe Aspidaceae. It has the indusium attached by its broad hooded base under the sorus, with a lengthened fringed free extremity, at first covering the thece.

C. fragilis, Brittle Fern, has hippocrene fronds; the pinnae ovate-lanceolate; the pinnae ovate or ovate-lanceolate, obtusely rounded or pointed; the rachis is a remarkable variable species of fern. Three forms or varieties may be distinguished—C. f. dentata, with obscure ovate pinnae, pointless, bluntly toothed or rarely pinnatifid, not decurrent; C. f. angustata, with pinnae linear, lanceolate, decurrent, more or less toothed or slightly toothed; the ultimate subdivisions ob-long or linear, not dilated, rounded or ovate, sometimes notched at the end. The other form has the pinnae ovate, acute, pinnatifid, cut and serrated, slightly decurrent. These plants are common in Great Britain, and found on rocks and walls, especially in limestone districts. They are of a diminutive size, and of a remarkably brittle nature, from which circumstance they have obtained their common name.

(Babington, Manual of British Botany; Newman, History of British Ferns.)

CYTOBLAST. In the development of the tissues of plants from the Blastema, or Cyto-blastema, which is a fluid consisting of water holding in solution sugar, gum, dextrine, &c., some of the granules assume a definite form, and become darker than the surrounding granules. These dark spots may be seen in the fluids of the growing parts of all plants. It is to these that Schliciden has given the name of Cyto-blasts.

The cytoplasmic substance from which the cell has become distended, other cytoplasts are produced in its interior, which, by producing other cells, burst the parent cell and increase the substance of the part in which they are found. (Tissues, Vegetable, P. C.) A growing point in the natural history of the plants, when the tissues of the animal kingdom, and it has been thus demonstrated that in the original growth of their tissues there is an identity between the animal and vegetable kingdom. (Tissues, Animal, P. C. S.)
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DABECIA (from St. Dabeeo), a genus of plants belonging to the natural order Ericaceae. It has a 4-petaled calyx; the corolla oval, ventricose, the limb 4-toothed; 8 stamens included, the filaments dilated, glabrous; the anther linear, sagittate at the base, the cells of the anther parallel, loosed at the apex, decaying lengthwise; the stigma simple, truncate; the capsule 4-celled with a septical dissection. There is but one species, *D. polyfollia*, which is a dwarf bush, evergreen shrub, a native of Ireland and the Pyrenees. This plant was the Andromeda Dabesia of Linnaeus, the Erica Dabesia of Smith, the Menthesia Dabesia of De Candolle, and the Menthesia polyfolla of Jussieu. In Ireland, which is its only locality in the British Islands, it is called Irish Whorts, Canterbury Heath, and St. Dabeeo's Heath. It is a pretty shrub, and well fitted for decorating the fronts of shrubberies or for rockwork. It may be propagated by dividing the whole plant, or by cuttings, or by layers.


DADAUSIUS [Sculpture, P. C.]

DAFFODIL. [Amaryllideae, P. C. ; Narcissus, P. C.]

DAHL, MICHAEL, a Swedish portrait-painter, who had a very successful career in England, in the reigns of Anne and George I., and was the principal rival of Sir Godfrey Kneller. He was born at Stockholm in 1666, was taught painting by Ernstian Klocko, and came to England in 1710, after exhibiting in his country for many years, where he continued to be received. He went to France, and thence to Italy, where he remained three years. At Rome he painted the portrait of Christina of Sweden, then advanced in years; she terminated her wanderings and her eccentric life at Rome, a few years afterwards.

In 1688 Dahl came again to England, 'where,' says Walpole, 'he found Sir Godfrey Kneller rising to the head of the profession, and where he had yet merit enough to distinguish him from his competitors, yet he received his portraits well, and, attempting nothing beyond portraits, he has certainly left many valuable pictures, especially as he did not neglect everything but the head, like Kneller, and he drew the rest of the figure much better than Richardson. Some of Dahl's works are worthy of Riley.'

Walpole mentions, among other works by Dahl, a portrait of his mother, at Houghton, which he says possessed great grace. There is an equestrian portrait by Dahl, at Windsor, of Charles XI. of Sweden; and there are several portraits in the gallery of admirals at Hampton Court, and some whole-lengths of ladies at Petworth.

'Virtuous and esteemed, easy in his circumstances, and fortunate in his health,' says Walpole, 'Dahl reached the long round of years, and died in London in 1745, and was buried in St. James's church.'

(Walpole, *Anecdotes of Painting in England, 6th.*)

DAIBY. [BAILLY, P. C. S.]

DAILLY, 1820-44, was one of the many self-taught men of this country, who have attained considerable eminence in mathematical science by the mere force of genius, and in defiance of the obstacles opposed by fortune to their progress, was born in Gloucestershire, in the year 1764, and appears to have been instructed in the rudiments of Latin and Arithmetic at a grammar-school in that county. By his friends he was destined to be a clothworker, but his taste leading him to the study of mathematics, he laboured, by the aid of Stokes's *Elementary Algebra,* and Martin's *Trigonometry,* to qualify himself to be an usher in a country school; and he actually engaged himself in that unenviable capacity to Mr. James, who kept a boarding-school at Stoke-Bishop near Bristol. At the end of three years he opened a school of his own in an adjoining part of the country; but meeting with no success, he came to London in 1772.

Here, in consequence of an advertisement, he offered himself, and was accepted, as an usher, to teach arithmetic in Archbishop Tenison's Grammar-school, near Clarington Cross; and while fulfilling the duties of that employment, his name having already appeared in some of the magazines of that time, particularly the Ladies' *Diary,* among the correspondents who occasionally answered mathematical questions, he became known to many of the most celebrated men of science in town.

Among those were Dr. Maskeline, the astronomer royal, Dr. Hutton and Mr. Bonnycastle, both of the Royal Military Academy at Woolwich, the Rev. Messrs. Crakel and Lawson, and Mr. Landen, Mr. Wales, Mathematical Master of the Marylebone Hospital, and Mr. W. Mitchell, Master of the Royal Naval Academy at Portsmouth; among them, also, are the names of many persons who, by day, pursued their avocations, one as an attorney, another as a bricklayer, a third as a subsalt, and a fourth as a draper, who, by night, cultivated mathematical science as a recreation. In a letter written to a friend long afterwards Dalby observed that the greater number of these ingenious men had solved their last problem, and that with them the expression for life had become equal to zero.

Mr. Bayly, who had been employed in making astronomical observations in a building erected near Highbury, by the Hon. Topham Beaucarker, for philosophical purposes, being engaged to sail with Captain Cook, Dalby, after being about a year at the school above mentioned, was appointed to succeed him. In this situation, besides his duties as observer and librarian, he performed, under Dr. Fordego, that of experimenter in chemistry; and amidst these employments, he found time to make himself acquainted with the French language, and revive his knowledge of Latin. In 1781 Mr. Beaucarker's establishment being broken up, and the library, instruments, &c., sold, Dalby was engaged to make a catalogue of the whole. After a short stay in London, during the year he was appointed Mathematical Master of the Naval School at Chelsea. This was supported by voluntary contributions, and it succeeded for a time under the management of Mr. Jonas Hanway; but the subscriptions falling off, the Institution was given up.

In 1787 Mr. Ramsden, the distinguished maker of philosophical instruments, to whom for several years Dalby had been known, recommended him, as an assistant, to Major-General Roy, who was then employed in the trigonometrical operations for connecting the meridians of Greenwich and Paris; and during that and the following year he was employed in extending the triangulation through Kent and part of Sussex to the coast opposite France. Dalby was subsequently employed in making the computations preparatory to the publication of the account of the proceedings; and on this occasion he was led to apply a theorem (ascribed to Albert Girard) to the purpose of computing the excess of the angles of a spherical triangle above two right angles. The account was published in the 'Philosophical Transactions' for 1789; and in the volume for the same year is a paper by Dalby on the figure of the earth, in which it is proved that the excess is, without sensible error, the same whether the earth is considered as a sphere, or as a spheroid. In 1796 and in the following year Dalby was engaged, together with Colonel Williams and Captain (since Major-General) Mudge, to carry on the survey of England. [TRIGONOMETRICAL SURVEYS, P. C.]

The operations commenced by a re-measurement of the original base on Hounslow Heath, and before Mr. Dalby quitted that service the triangulation was extended through the southern counties of England to the Land's End. The accounts of the survey were published in the 'Philosophical Transactions,' but in 1798 Dalby, together with Colonel Mudge, made a revision of General Roy's papers, and connected the operations of that officer with those which had been previously taken place to the end of 1786; these form the subjects of a volume which was published separately.

In the year 1799, on the formation of the Royal Military College at High Wycombe, Dalby, in consequence of an application from Colonel Le Marchant, the Commandant of the college, offered his services to the senior department of that Institution; at this time, as he observed in a letter to a friend, he was more than fifty years of age, and desirous of securing a retreat from the fatigue of the field. He continued to hold the appointment during the years that the department to which he was attached was at High Wycombe, and subsequently to its removal to Famham in Surrey: but in the year 1820, it being then united to the junior department at Sandhurst in Berkshire, his infirmities obliged him to resign. He continued however to reside at
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Farnham till his death, which took place October 14, 1824, when he was in the eighty-first year of his age. His attention to his duties was unremitting; and besides his chemical researches, he wrote for the use of the Military College a valuable Course of Mathematics in two volumes, which, with successive improvements, was continued to a sixth edition.

(Dallad's Dictionary, vol. v.)

DALTON, JOHN, was born Sept. 5, 1766, at the village of Eaglesfield, near Cockermouth in Cumberland, where his father, Joseph Dalton, was the owner and cultivator of a small copyhold estate, which descended to his eldest son Jonathan, and is the hold by which the family.

John Dalton attended a school kept by John Fletcher, a Quaker, till he was twelve years of age. In his thirteenth year he himself began to keep a school at Eaglesfield, but gave up that by a body lay at his personal observation. In 1781, when he was fifteen, he removed to Kendal, in order to become an usher in the school of his cousin George Bewley. Dalton, for two or three years before he left Eaglesfield, had been kindly noticed and assisted in his studies by Mr. Robinson, a man of property; and a similar good fortune attended him at Kendal, where he obtained the friendship of Mr. Gough, a blind gentleman who was devoted to the study of natural philosophy, and who, besides the use of his library, afforded him what was at that time still more highly, of his instruction and conversation.

Dalton continued in his situation of usher till 1783, when Mr. Gough having been asked to name a person fit to become professor of mathematics and natural philosophy in the New College, Oxford, had recommended Dalton, who was accepted, and immediately removed to Manchester, which became his place of permanent residence during the rest of his life. The college was removed to York in 1799, when Dalton withdrew from it, and began to give lessons in mathematics and natural philosophy at his residence in Manchester, as well as at private seminaries. He afterwards delivered public lectures, of which the first course was given in the rooms of the Literary and Philosophical Society of Manchester, and the success there was so great that he was valued still more highly, of his instruction and conversation.

In 1784 Dalton paid a visit to Paris, with a single introduction and with no funds to his disposal, next day he received an invitation from M. de la Place, by whom he was introduced to the most distinguished scientific and literary men in Paris. Before this time however Dalton had published his two most important discoveries in natural philosophy and chemistry, and he had become known to the French chemists, and they became more and more highly appreciated in England during every succeeding year of his life.

George IV. having, in 1826, given 100 guineas to the Royal Society of London for the purchase of two gold medals to be given to persons who had most distinguished themselves by discoveries in science, the first medal was unanimously awarded to the council to Dalton. He attended, at York in 1831, the first meeting of the British Association for the Advance ment of Science, and was the object of general respect and admiration; at the second meeting, at Oxford in 1832, the University conferred on him the title of Doctor of Civil Law; and the third meeting, at Edinburgh in 1835, Professor James Sibree, after pronouncing an eulogy on his character, announced that William IV. had granted him a pension of 150l. a year; at the fourth meeting, in Edinburgh in 1834, the University of Edinburgh conferred on him the degree of LL.D., and the Royal Society of Edinburgh elected him a member. In 1836 his pension was raised to 300l. a year.

Besides the honours conferred upon Dr. Dalton during the meetings of the British Association, his friends in England did not neglect to make him the object of every possible attention and assistance, and to execute a statue of him in marble, which is now in the entrance-hall of the Royal Manchester Institution.

On the 10th of April, 1837, Dr. Dalton, then in his seventy-first year, had a fit of paralysis, and another slight attack the 21st; his right hand was deprived of the power of speaking, and his mind appeared to be in some degree affected, but after an illness of some months his body and mind regained their powers, and his voice was restored, but his articulation was less distinct ever afterwards.

On the 3rd of May, 1844, Dr. Dalton had a third paralytic stroke, which affected his right side, and increased the indistinctness of his articulation. He partly recovered from the attack, and on the 15th of July attended a meeting of the Council of the Manchester Literary and Philosophical Society, where he received a vote of thanks for the unanimous resolution passed at the annual meeting of the Society. Being unable to articulate distinctly, he delivered a written reply. He died July 27, 1844. He had made his usual entry of his death in the family.

He was buried in the cemetery at Ardwick Green, on the 18th of August. The funeral ceremony was conducted with great magnificence, and was attended by a vast concourse of persons.

Dalton, during his residence at Kendal, had occasionally contributed to 'The Gentleman's and Lady's Diary,' and in 1788 had commenced a series of meteorological records and observations, the first results of which he published soon after he went to Manchester. The results of this series of Meteorological Observations and Essays,' 8vo., 1788. He continued the habit of observing and recording the state of the atmosphere with the greatest regularity till the day before he died, taking several records daily; he had registered altogether upwards of 10,000 separate observations. In the volume of the 'Transactions of the Manchester Literary and Philosophical Society' related to a peculiarity of his own sight, and was entitled 'Extraordinary Facts relating to the Vision of Colours, with Observations,' by Mr. John Dalton. It was read October 31, 1794, and is inserted in the 'Transactions,' vol. 5, part 1. In 1801 he published 'Elements of English Grammar,' London, 8vo., probably in expectation of making a small addition to his limited income, for his tastes and inclinations were more philosophical than literary.

In the Manchester Transactions for 1802, part 2, there are six papers by Dalton, chiefly on subjects of meteorology, of which the most important is one called 'Experimental Essays on the Constitution of Mixed Gases; or the Force of Steam, or Vapour from Water and other Liquids, in different Temperatures, both in a Torricellian Vacuum and in Air; on Evaporation; and on the Expansion of Gases by Heat.' He discusses with great acuteness the difficult problem of the exact temperature of each one of the substances of unequal densities; and, besides other facts of importance, he proves that water, when it evaporates, is always converted into an elastic fluid, or vapour, and that the elasticity of this vapour increases as the temperature increases; at 32° of Fahrenheit the column of mercury is 1 foot 1 inch high; at 212° it balances a column 30 inches high, or is equal to the pressure of the atmosphere. He determines the elasticity of vapour at different temperatures from 32° to 212°, points out the method of determining the quantity of vapour which exists at any time in the atmosphere, and determines the rate of evaporation from the surface of water at all temperatures from 32° to 212°. The principles laid down in these essays have been of the highest importance to chemists in their investigations respecting the specific gravity of gases and have enabled them to solve many interesting problems.

Dalton began to work out his grand discovery of the atomic theory in 1803; in August, 1804, he explained it distinctly at a meeting of the Philosophical Society of Manchester, but when he visited the city of Peru, he was too weak to speak distinctly. In 1808 Dr. Dalton published 'A New System of Chemical
In the first chapter he treats of heat; in the second, of the constitution of bodies, in which his element of oxygen is compared with the peculiar notches respectively of elastic fluids which had been advanced by Berthollet and were supported by Dr. Murray of Edinburgh; in the third chapter, which occupies only a few pages, he gives the outline of the law of the volume of a compound. At the end of the volume he gives the symbols and atomic weights of 37 bodies, twenty of which were then considered simple, and the seventeen others compound. In the 2nd volume of his 'New System of Chemical Philosophy,' published in 1810, he treats of the element of nitrogen, oxygende, hydroxyde of azote, carbon, carbon, phosphorus, and the metals; next he treats of the oxygen combined with hydrogen, azote, carbon, sulphur, and phosphorus; and of hydrogen combined with azote, carbon, phosphorus, and finally, he determines the atomic weights of the fixed alkalies and earths. The table of atomic weights at the end of the volume, though more complete than the one he had given at the end of the first volume, is still very imperfect.

The atomic theory is probably the most important contribution which has ever been made to chemistry, and hardly less important were Dalton's attempts to determine the atomic weights of the different substances, though scarcely a single number need be credited to the time when he made his discovery there was not a single chemical analysis which could properly be considered as correct; there was not a single gas whose specific gravity was known with any approach to accuracy; and Dalton displayed infinite capacity in connection with this branch of science. 

The introduction of the atomic theory, the knowledge of chemical combination has been simplified to an amazing extent, and the processes of analysis, which constitute the essence of chemistry, have become not only a matter of accuracy, but almost approaching to mathematical precision. Manufacturers have been benefited as well as science; the quantity of each constituent of any article can be regulated with perfect accuracy, so that there is no waste, and the result of the combination can be reckoned upon with unfailing certainty.

Dalton represented his atoms by symbols, as, for instance, oxygen by a circle, hydrogen by a circle with a dot, and other elements by similar simple figures. He considers that all bodies are composed of atoms, no two atoms having the same weight. The symbols of oxygen and hydrogen placed together represent water, which he supposed to be composed of an atom of each; and other symbols were used in a similar manner. The atomic weights are the relative or combining weights, not the absolute weights. 

Assuming hydrogen to be the lightest body, he called it 1; oxygen he determined to be 7, but it has since been ascertained to be 8. Dr. Wollaston has called oxygen 1; hydrogen 8. Dalton popularized the invariable principle of combination in definite proportions, but he stated the chief laws of combination on which modern chemical analysis is based: 1, that the same compound consists invariably of the same constituents; 2, that the elements of every compound combine in the same proportions by weight.

Gay-Lussac, in 1809, proved that gases unite in the same proportion by volume as well as by weight; 3, that, when any element combines in more proportions than one, those proportions are multiples—1, 2, 3, 4; 6, 12, 18, 24; 8, 16, 24, 32, and so on; 4, that, if two substances combine in a certain proportion with a third, they combine in exactly the same proportion with each other; 5, that the combining proportion of a compound is the sum of its constituents, and oxygen, for example, is 8, and 8 constitutes the word proportion for that of atom, and Wollaston that of equivalent, which is now generally used; but, whatever be the term, the meaning is the same; and in proportion as analysis have become more accurate, in regard to the laws which Dalton laid down have been more remarkably confirmed. 

For details, see ATOMIC THEORY, P. C. 

The third volume of Dalton's 'New System of Chemical Philosophy' was not published till 1827, but the greater part of it was completed long before this. He rested not on the metallic oxides, the sulphates, phosphates, carboxylates, and of the alloys. In the interval between the printing and publication, many of the facts had been anticipated by others, and atomic theory has been thrown into shape by others also; but as to the structure, although certainly not in the happiest or most refined taste, it by no means deserves the oblivion that has been heaped upon it; for in some respects rather uncommon, it is a plate which fairly stands the test. The most important part of the volume is the appendix, of about ninety pages, in which he discusses his usual sagacity various important matters connected with heat and vapour. He gives a new table of atomic weights, much more copious than those contained in the two preceding volumes, and in which he introduces the corrections rendered necessary by the numerous corrections which had been made since the publication of the second volume.

Dr. Dalton's other works, which are tolerably numerous, are inserted in the 'Manchester Transactions,' 'Nicholson's Philosophical Magazine,' and consist of experiments and observations on heat, vapour, evaporation, rain, wind, the aurora borealis, dew, and a variety of other physical subjects. 

Dr. Dalton was of middle stature, and strongly made. His face was of a decided type, and bore a certain power of mind was naturally strong; he was a patient observer, and an independent thinker, with the most perfect self-criticism, and with an extraordinary power of tracing the relations of phenomena. He was a man of peculiar character, but were steps in some process of wide generalization. By such a process, comparing the results of numerous experiments and numerous facts which had been established, he elicited order out of seeming confusion, and truly said, to have been the legislator of chemistry, which before his time was little better than an experimental art—an accumulated mass of disconnected and imperfectly developed facts. Dalton laid down the laws of the combination of gases, and thus took rank as the founder of a new science. 

The rank of a science. His moral character was worthy of his intellectual. He was a man of the strictest truth and honesty: independent, grave, reserved, but not austere; frugal, but not parsimonious. Unassuming, the honours which he received were given to him for the sake of his work, and he was able to estimate the value of his services to science and manufacturing industry; unostentatious, it was some time before his townsman in Manchester were aware of his merit, but a small salary was a means of securing good health, and when he received his pension, offered to provide him with as independence, that he might devote the whole of his time to science, but he declined to accept it, observing "that teaching was a kind of recreation, and that if richer he would probably not spend more time in his investigations than was accustomed to do." His mode of life was singularly uniform. He was rarely from home except when he went to some place to lecture; he attended the meeting of the Society of Friends, of which he was a member, twice every Sunday; he went daily to his laboratory, of which the apparatus was of the simplest and indeed rudest kind; he played at bowls on the afternoon of every Thursday; and he paid an annual visit to his friends and the mountains in Cumberland and Westmorland.

He was never married. He had left 2000l. to endow a chair of chemistry at Oxford, but he revoked the bequest before his death, and is said to have left the money to the relatives of those who had assisted him in his early days.

Dr. Dalton was born in the year 1766; and in May 1792; he was elected a corresponding member of the Institute of France, and a few years later was enrolled a foreign Fellow. He was also a member of the Royal Academies of Science of Berlin and Munich, and of the Natural History Society of Gottingen.


By JAMES, D. P., A. M., F. R. S. (Astr. Soc. F. R.)

DANCE. There are two architects of this name, father and son. The elder GEORGE DANCE was architect to the Corporation of London, and erected the Mansion House, the first stone of which was laid October 25th, 1739, and the different parts in 1739, 1740, and completed by others at a later period. It was bought by those who have been exceedingly liberal of their praise towards buildings in not much purer taste—for instance, St. Martin's Church. Ralph, the architectural oracle of London in the last century, says of it, in regard to the church, that it was originally a shipwright; and, to do him justice, he appears never to have lost sight of his first profession. Whether such was really the case, or whether the remaining portion of the building, the Brandon wing, is really the architect's own work, or by others at his own cost, I am in no position to say; but as to the structure, although certainly not in the happiest or most refined taste, it by no means deserves the oblivion that has been heaped upon it; for in some respects rather uncommon, it is a plate which fairly stands the test. Telford says of it, 'It is grand and impressive as a whole, and reflects credit upon its architect;' and his opinion was expressed of it while the building was as originally designed, with the huge superstructure across the roof at the north end,
but that excurscence was taken down in 1840. The elder Dance also built the churches of St. Botolph, Aldgate; St. Luke; and St. Leonard, Shoreditch. He died February 9th, 1768, and was succeeded in his appointment of City Surveyor by his eldest son,

Daniel Dance, Jux. (born in 1740), whose talent acquired for the family name far higher distinction. Not only trained up to architecture, as a pursuit in which a safe and certain career, if not a brilliant one, was opened for him, he had been, at least the better part of his life, constantly engaged in the practice of that art. In the carrying on what was required by the routine of that day, and be further possessed both a natural and cultivated taste for the fine arts generally, poetry included. He certainly stamped something of poetry, as well as energetic character, on the very first productions of his hand. He was so aware of the opportunity by which he signalized himself, for Newgate, that 'proudest of prisoners,' was begun by him in 1770. This structure, one of the few truly monumental pieces of architecture in the metropolis, has been chiefly extolled for its striking degree of character; yet it surely requires no very great ability to make an edifice of so peculiar a class express its purpose so clearly that it cannot possibly be mistaken for any other than what it is. Newgate might have been equally praised in aspect had it been merely a dismal mass, utterly devoid of all aesthetic charm; it was by conferring upon it the latter—by breaking up the monotony of such a mass as not at all to disturb unity, but enhance it—not to dissipate parts, but to reunite them into a single body, into an impressive whole—that Dance showed himself a great artist;—let us say, a great tragic architect. The mode of treatment adopted by him might in less able hands have only weakened the expression aimed at; whereas here results it all the more impressively. True felicitations is the manner in which, by being divided into boldly distinct and well articulated parts, the composition acquires artistic play without losing anything of its severity. Truly felicitous also the effective relief both as to perspective and light and shade thrown into it, not according to the usual practice of bringing parts forward, but of recession them, and placing masses in the rear of others, so that the general line of front is preserved unbroken in its lower part. The great drawback on this, the principal ornament of the staircase, is the jambs of its windows, thrown into profile, as if a stair-square or governor's house. Well intended as is the kind of contrast between that part and the rest, the contrast actually produced is far from the happiest, the character given to the centre being somewhat prosaic and insignificant—by far too much like that of an ordinary dwelling-house, the windows being so many, in proportion to the space they occupy, as absolutely to crowd it and cut it up, to destroy breadth and repose, and to occasion an air of littleness; whereas, had there been only three windows of any size, the impression would have been incomparably better externally, and probably without the slightest inconvenience as regards internal plan. At all events the attic story is a sad blunder, a most palpable termination of all the interest of the staircase, which gives variety to the whole composition, without any sacrifice of dignity. If it was Dance himself who was afterwards complaisant enough to mar his own work, in order to provide an additional story that might just as well have been concealed within the roof, very little is the pity we have to bestow upon him.

The proximity of Newgate has perhaps deprived Gilteeur Street Compter of some of the celebrity it might else have obtained as a piece of architecture; and yet the same proximity is not altogether favourable to the other, the arrangement observed in the design of the Compter being decidedly better than that of the governor's residence in Newgate. Resembling the latter in style, this other work of Dance's is of different materials and character. It is a solid mass, of three storeys, which, unpalatial as it may be to English eyes, has of late years been affected and revived in Germany, both for royal palaces and other buildings, intended for far different purposes than private residences. It has been designed, however, as a prison, and is situated near the London Hospital than from the Compter; in fact more than we can account for. Undoubtedly it looks expressly like what it is, and so generally does an ordinary workhouse; it is a mere horrible reality without any aesthetic beauty infused into it. Whether that building has been overrated or not, there can be but one opinion as to the front of it.

Daniel Dance, R.A., painter and engraver, was born in 1739, at Cape Comorin, and was educated at Guildhall, erected by Dance in 1789. Its ugliness we might tolerate, its absurdity we might excuse, but ugliness, absurdity, and excessive pauperness combined together render it quite unbearable. In mitigation of the sentence due to such a monstrosity, it is a very poor plea to urge that Gothic architecture is not suited to all by reason of a certain understood or not as style, its character might have been perceived—its expression felt—by any one who had seen any examples of it. If Dance had nothing else to study, there is still a great deal more to be learned. Here his character is now remiss; and there was also, what has since been taken down, the small Gothic chapel attached to the east end of the front. So far from being any excuse, his utter ignorance of the style only renders his attempting it all the more unpardonable. Monuments, besides being sources of profit, have been, on occasion, because, even had it been tolerably satisfactory, the front he added would have still been a mere mask to the hall itself, insomuch as, instead of indicating a single capacious room in any part of the interior, its physiognomy is that of a building divided into several floors.

Among Dance's minor works are the Shakspeare Gallery, Pall Mall, now the British Institution, and the Theatre at Bath, in the front of which last he introduced the tasteless engraving adopted by his pupil Hoe (so fine a figure and captivating without bases or capitals, and having more the character of carpenter's or joiner's work than masonry.

Dance was not only one of the earliest members of the Royal Academy, but for several years was in its office of President. He was the last but one of the original members of the R.A., and ever since, I believe, the last but one of the R.A., and was engraver to King George III., and prepared the plates for the Royal Academy, and the History of Architecture; yet he never delivered any lectures, nor does he seem to have exhibited drawings at its exhibitions. Still if be neither lectured nor lectured upon that branch of art which he pursued as a profession, he gave the world evidence of his ability in that which we we consider as the true architecture; we allude to the very interesting series of portraits of the public characters and artists of the day, which appeared in two volumes, folio, 1811-14, and were engraved by Wm. Daniell, R.A., his uncle, near Wren's original drawings. All of them have the air of being striking likenesses, far more truthful indeed than always flattering, and they have also the peculiarity of being nearly every one of them represented in profile and looking the same way. Dance held his position as an artist even in a country which has never much esteemed the art; but he was beloved and esteemed in France, as well as in England, with implicit trust, but we may presume that the artist must have been skilful of whom Hayley has spoken so highly in his second epistle on painting—

"To Dance--in cordial strong, / Transcendant force and truth of line belong," 8c.

In 1774 he exhibited his Orpheus lamenting Eurydice, and in 1776 his Death of Mark Antony. More than anything else casts doubt upon Nathaniel Dance's talent for art was the vulgar ambition which led him not only to abandon his pencil when he bad no longer any occasion to exercise it for emolument, but even to obliterate all record of his works by burning up and destroying as many of them as he could obtain for paper. This burning to ashes, and the lamenting expression of Nathaniel Dance obtained for him the band of the wealthy Yorkshire heirencs, Mrs. Dunser, and from that time he became heartily ashamed of his former profession. On his marriage he received the sum of nearly £500, and was a Baronet. His conduct, however, was truly gentlemanly, for he was no longer given to the evil of dissipating his money; and he was made a baronet in 1800. His income he acquired with his lady was about 18,000l. per annum, and as the Dummer estates were entailed, he contrived to amass for himself about 2000l. per annum. The son of one of those who had been associated with them for many years, the family heap, of whose the son to a very high degree, and the value of his work is no longer extant, and the title for talent which he might have left, he had himself renounced and extinguished.

DANIELL, WILLIAM DANIELL, R.A., painter and engraver, was born in 1749, at St. Luke's, near Aldgate, where he was educated at the School of the Royal Academy in 1763, and afterwards for some years at the School of Architecture; and of 1763, and afterwards for some years at the School of Architecture; and of
everything that was beautiful or interesting in the country between that point and Serinaur in the Himalaya Mountains: this arduous undertaking occupied them ten years. They took an amazing number of sketches, which they arranged and published, in a large form, comprised in one great work entitled 'Oriental Scenery,' in six volumes, completed in 1808. Five of these six volumes were engraved by or under the direction of William; the remaining was named 'The Caves of Ellora,' was executed by Thomas, from drawings by James Wales. Besides the above work, William Danelli engraved and published, between 1801 and 1814, the following works:—'A Picturesque Voyage to India,' 'Zeography,' in conjunction with Mr. Wood, 'A Theory of Nature,' 2 vols., a series of views entitled 'The Docks,' and 'The Honeecock,' after R. Smirke, R.A. Between 1814 and 1825 he was chiefly engaged in a work of extraordinary labour, entitled 'Voyage Round the coast of India,' in six volumes, comprising a number of years every year, collecting drawings and making notes. The difficulties he met with in prosecuting this plan were extreme, and had it not been for the cheering influence of the hospitable reception which he occasionally experienced from persons to whom he had letters of introduction, the accomplishment of his task would have been impossible: immense fatigue, exposure to weather of all kinds, wrecked fare, and still more wretched accommodation, were his constant attendants.

Danelli, William, was an accomplished artist, his works were of a very high order, both in the way of drawings and paintings; many large and beautiful oil pictures of remarkable places or scenes in India. In 1832 he painted, in conjunction with Mr. Paris, a panorama of Madras; and, more recently, two others by himself—'The City of Lucknow,' and 'The Elephant-hunt;' and he was the author of his account of the 'Natural History of colouring was rather hard and red, which arose probably from the climate of India and the peculiar nature of its scenery. He died in 1837.

Daniel, Thomas, was a fellow of the Royal Society and a member of the Royal Academy, and a very able landscape painter and engraver; he was originally a heraldry painter. He published some works on India besides that already mentioned. He was a fellow of the Royal of Asia, and of the Antiquarian Society; in 1840, founded a new branch of this society, Samuel Daniel, also distinguished himself by some similar works. He spent three years at the Cape of Good Hope, and published, in 1806, some prints, descriptive of the scenery, habitations, costume, and character of the natives, and an account of the animals of Southern Africa. He published also, in 1808, illustrations of the scenery, animals, and native inhabitants of the island of Ceylon.

Daniel, John Frederick, was born in Essex Street, Strand, March 12, 1790, and was the son of Mr. George Daniel, of West Humble, Surrey, beneficer of the Middle Temple. At an early age he became a pupil of Frederick Brassey, and was admitted in 1807 into the society of Mr. George Daniel, with whom he always spoke as one endeared to him by similar tastes and early associations. Mr. Daniel entered originally into business as a sugar-refiner. His fondness for scientific investigations was however manifested at a very early age, and, when a mere lad, he used often to astonish his young companions by exhibiting to them some of the wonders of pneumatic chemistry, a department of physical science on which the labours of Black, Cavendish, Lavosier, and Priestley had thrown a new and unexpected light. His soon relinquished business for pursuits more congenial to his taste. In 1814 he became a fellow of the Royal Society. In 1815, associated with Professor Brande, he commenced the 'Quarterly Journal of Science and Art,' the first twenty volumes of which were published under their joint superintendence. He married in the following year Charlotte, youngest daughter of the late Sir W. Rule, surveyor of the navy. From this time to his death hardly a single year elapsed without some of his observations on the phenomena of chemical or meteorological subjects from the pen of Mr. Daniel. In 1820 he published the account of his new hygrometer, an instrument which, for the first time, rendered meteorological observations on the dryness and moisture of the air practicable. In this instrument he applied the principle of the cryosphere of Wollaston to obtain the requisite cold for the production of dew upon a dark-coloured glass containing ether. The temperature of the inclosed ether is measured by a delicate thermometer without the bulb, and corresponds with the dew-point. This instrument has been extensively employed in all climates, and has been of the greatest service to meteorology. In 1823 his great work, 'Meteorological Essays,' appeared, which is still the standard work upon the subject. The second edition was published in 1827, and he was engaged in revising the third edition at the time of his death. This was the first synthetic attempt to explain the general principles of meteorology by the known laws which regulate the temperature and barometric pressure of the atmosphere. The results of his observations and isolated phenomena presented by the earth's atmosphere were considered in their most extensive and general bearings.

One of the most interesting of his theories connected with meteorology was that which he proposed to account for the horary oscillations or periodic daily rise and fall of the barometer, by which he predicted the occurrence of a fall near the poles coincident with the rise at the equator. Actual observations showed the existence of this unsuspected phenomenon was established beyond dispute.

In the year 1824 he published an Essay on Artificial Climate, for which he received the silver medal of the Horticultural Society. Dr. Lindley has expressed a strong opinion on the practical value of this paper in completely revolutionising the methods of horticulture till then adopted.

About this period Mr. Daniel became managing director to the directors of the Societies of the principal European cities with Sir W. Congreve and Col. Landsmann, making the arrangements by which many of them are lighted at the present day. He also invented a new process for obtaining inflammable gas from resin, by which some millions of pounds have been saved annually in Autum.

On the establishment of King's College in 1831 he was appointed Professor of Chemistry, the duties of which office he discharged to the day of his death. About this time he published the account of his new Pyrometer, an instrument still the best for measuring high temperatures, such as those of fusing metals, furnaces, &c. For this simple and perfect invention, the Royal Society, in 1832, awarded him the Rennard Medal, a triennial medal left by Count Rummard to the Royal Society. He was also placed on the Council of the Society, and was elected a member of the Royal Society, in 1832. In 1836 he communicated to the Royal Society a paper in which he described his valuable improvement in the voltaic battery. In this communication he traced the cause of the rapid decline of power in batteries of the ordinary description, and an arrangement by which a continuous current of voltaic electricity may be maintained for an unlimited period. The importance of this discovery was recognised immediately by the whole scientific world, and in appreciation of its merit, the Royal Society, in 1836, awarded him the Copley Medal. Mr. Daniel was the author of several scientific discoveries made in any part of the world during the previous year. In 1839 he published his Introduction to Chemical Philosophy, an admirable treatise on the action of molecular forces in general, though it modestly professes to give little more than a simple introduction to the discoveries of Faraday, and their applications to chemistry. He continued his researches in the same department of science till the time of his decease, communicating the results of his experiments to the Royal Society. For two years these papers, expressing most essentially on the theory of salts, he received, in 1842, one of the Royal medals.

In 1843 the University of Oxford conferred upon him the honorary degree of D.C.L., and in the same year he published the second edition of his Introduction to Chemical Philosophy. For more than thirty years he was a zealous and active member of the Royal Society, and for the last six years he held the honourable office of foreign secretary to that learned body. In 1848 he was one of the professors of chemistry when the post of lecturer to the East India Company's military seminary at Addiscombe, and was examiner in chemistry at the University of London since the opening of that institution.

On the 24th of March, 1849, Mr. Daniel was appointed a member of the council of the Royal Society, and having just spoken on a point under consideration, apparently in perfect health, was seized with an apoplectic fit. In five minutes from the commencement of the attack he was dead. A subscription has been entered into at King's College for the purpose of having a bust executed, and for the establish
3rd, in connection with the college, of a Daill scholarship in the number of which he was so distinguished an ornament.

It is worthy of remark, as illustrating the extent and diversity of his attainments, and the importance of his discoveries, that he is the only individual on whom all three the medals in the gift of the Royal Society were ever bestowed. The following is a list of the most important essays with their dates:


1817, 'On the mechanical structure of iron, developed by the combination of sixes in cast-iron,' ditto, vol. ii. p. 278.


1821, 'Experiments to ascertain the effects of the great Eclipse in September, 1820.'


1822, 'Inquiry, with Experiments, into the Nature of the Products of the slow Combustion of Ether,' ditto, vol. xiii. p. 64.

1822, 'Comparative Remarks (with three tables) on the Weather, and Seasons of the years 1819, 1820, and 1821,' ditto.

1822, 'On the Correction to be applied in Barometrical Measurement for the Effects of Atmospheric Vapours by means of the Pyrometer,' ditto, vol. xiii. p. 76.

1823, 'On a Meteorological Essay, first edition.'


1826, Correspondence concerning the last paper, ditto, vol. xxi. p. 230.

1827, Second edition of 'Meteorological Essays.'

1830, 'On certain Phenomena resulting from the Action of Mercury on different Metals,' in Royal Institution Journal, 1830, vol. i. p. 1.

1830, 'A New Register Pyrometer for measuring the Expansion of Solids, and for determining the higher degrees of Temperature upon the Common Thermometric Scale,' in Phil. Trans., 1830.


1832, 'On the Water Barometer erected in the Hall of the Royal Society,' in Phil. Trans., 1832.

1832, 'On Voltaic Combinations (the Constant Battery),' in Phil. Trans., 1832, p. 107.

1835, 'Additional Observations on Voltaic Combinations,' ditto, 1835, p. 127.

1837, 'Fourth Letter on Voltaic Combinations,' ditto, 1837, p. 84.

these his figures of Christ, John the Baptist, and Faith, are the most celebrated. His male figures however are effeminate, and in his Christ, meekness, more particularly a female quality, is the predominant sentiment.

Dannecker's greatest excellence is to be found in his busts; he has left many interesting monuments in this branch of art, and foremost among them are the small and colossal busts of Schiller; the busts of Lavater, Guick, the kings Frederic and William of Württemberg, and other members of the royal family. He had also a very successful practice in portrait miniatures.

Dannecker ranks as one of the best of the modern sculptors, and his great merit seems to consist in a proper perception and representation of the finer and more gentle qualities of the human figure, and a true and more cleverly skilful caricaturisation of the human frame. His forms are true to nature, but uniform in character; and the sphere of his art is very circumscribed when compared with the comprehensive range of Canova. Dannecker never attempted, or at least never accomplished, the representation of manly vigour or robust masculine beauty; in the female figure however he was sometimes more natural, equally graceful, and less mannered or affected than Canova; but in his draperies he was frequently untrue. Instead of the natural and elegant folds which loose draperies assume on the human figure, he gave way to the conventional affectation of showing the exact form of the body beneath the draperies, as if they were wet, and adhered to it; producing an effect by no means beautiful, and, except when blown by the wind, and in this case not attached to the body must show a corresponding action.

An account of the life and works of Dannecker was published at Hamburg in 1841, with 25 lithographic prints of his busts, and his earlier drawings by the celebrated sculptor. There is also a notice of Dannecker in the first and second numbers of the Kunstkblatt for 1842.

DAPÉDIUM, changed by Agassiz to Dapedius, one of the first described British genera of fossil Gancid fishes. To D. politum De la Beche (Geol. Trans., 2nd series, vol. I. pl. vi.) six others are added by Agassiz, all from the lias.

D'ARBLAY, MADAME, originally Miss Frances Burney, was born at Lynn Regis, 18th June, 1752, and was the second daughter of Charles Burney, of London, one of the 'History of Music,' who was then organist in that town. Her mother, whom she lost when she was about nine years old, was partly of foreign descent, her maternal grandfather having been a French protestant, who left his native country on the revolution of the ducet of Nanterre. Madame D'Arblay has given her own account of her early life in her Memoirs of her Father. She there assures us that she was so backward when a child, that at the age of eight she could neither read nor write. This is certainly at variance with what is usual, nevertheless, she had begun of her own accord to exercise her talents in composition, and she was soon incessantly busy in scribbling ' elegies, odes, plays, songs, stories, farces, nay, tragedies and epic poems,—her confidante at this date being her sister Susanna. She was a Voltairean in all her early performances; but one of them, the 'History of Caroline Evelin,' kept possession of her memory and fancy, and gave rise to her conception of a sequel to it in the story of the daughter of her former heroine. This, we are told, was all 'pent up in the inventor's memory' before she committed any of it to paper; she then wrote down two volumes of it in a feigned band, and employed her brother to offer them to a publisher. Dodsley declined the work as anonymous, and Lady B—— was, as we are informed, indignant, when she commenced it by dictating to her brother a third volume; Lowndes gave her twenty pounds for the manuscript; and it was published under the title of 'Evelina; or, the History of a Young Lady in the World.' The circumstance left out of account by the reader of this detailed account is, that Evelina' was written and published no very long time after the burning of the earlier story of 'Caroline Evelin,' and, indeed, it used to be generally understood, and has been repeatedly stated, that Miss Burney was the author of both. But it is not possible that the reader of this novel appeared. The fact is, that it was published in the year 1778, when she was six and twenty. She goes on to inform us that it was written and given to the world without the knowledge of any of her other relations except her sister and her two brothers; that she merely told her father, who used to employ her as his amanuensis (on which account she had employed the disguised hand in writing out the first two volumes), that she was going to print a little book; that she was not suffered to commence it, but that her brother was to have been her; that she sat as a listener with the rest of the family while it was read through at a friend's house, where she was staying, without her concern in it being suspected; but that after a little time it began to make a great stir, passing from the favourable criticism of the Monthly Reviewers into the hands of the beautiful Mrs. Bulwer, and the Hon. Mrs. Cholmondeley, from her to Reynolds, Burke, Sterne, and Mrs. Thrale. By the time however that it reached these last, the authoress was known; and they were her father's intimate friends, and naturally disposed to admire and applaud. They thought with the Monthly Reviewers, and the enthusiasm with which they extolled the work, and hailed the wonderful genius who had suddenly started up among them. And Evelina would, no doubt, have been in some measure patronised in the company of her father's friends for a whole year; but it is still more surprising upon the whole as that of a young woman in her twenty-sixth. Its most striking characteristic is the immaturity of mind which it displays, the girlishness of conception that pervades it, the want of the power of penetrating beyond the outside show of objects, the utter incapacity of appreciating motives and probabilities, the childish absurdity of the whole construction and movement of the story, and of the conduct at every turn of the persons figuring in it. There is much of the same, and occasional vivacity, and yet the latter is nowhere brilliant, and much of it is made up of mere boyish rattle and practical peculiarity, and often of inrepid vulgar exaggeration and the lowest force. This addicdness to caricature discriminates there among the greatest; the singular incongruity of Miss Burney's 'Evelina,' was the Memoirs of an Heirress,' appeared in 1782. It is in five volumes, and is a considerable improvement upon Evelina. For more than a dozen years after the publication of Evelina, Miss Burney's mother, the Rev. Dr. Burney, was appointed one of the Dressers or Keepers of the Robes to Queen Charlotte, and this situation she held for five years. In July, 1795, she married M. Alexandre Piochard D'Arblay, a French eminent artillery officer; and the same year she published an essay, pamphlet entitled Des Femmes au service de l'Emigrant French Clergy. In 1795 her tragedy of 'Edwy and Elgiva' was brought out at Drury Lane; but it was speedily withdrawn, and was never printed. The next year she published 'Evelina,' which contains a novel, 'The Life of a Young Gentleman, in the Character of a Novelist,' which she published by subscription, thereby realising, it is said, above three thousand pounds. It is not rated by her admirers so high as either of its predecessors. After the peace of Amiens, in 1802, her husband and she went to Paris; and M. D'Arblay, having given his adhesion to the existing government, they remained in France. In 1812 however Madame D'Arblay found means to pass over to her own country; and she had thus the satisfaction of having the life of her daughter printed very speedily at the age of eighty-seven. Her husband, now General D'Arblay, joined her at the peace; and they resided together till his death at Bath in May, 1818. Meanwhile she had, in 1814, published her fourth and last novel, 'The Wanderer, or, Memoirs of Madelina,' and in 1817 'Evelina,' which had to have given her 1600L; but it met with little success, and is considered the poorest of her performances. She lived however for many years after this; and in 1832 once more came before the world through the press with three volumes of 'Memoirs of her father, Dr. Burney. This work was unlike anything she had previously written, as much in manner as in subject; instead of the fluent, familiar style of her novels, she surprised her former readers, and the public in general, by a pungent, indirect, 1840, style, laying strong stresses on the only issue of her marriage, the Rev. Alexander Charles Louis D'Arblay; he was a fellow of Christ's College, Cambridge, and perpetual curate of Camden Town Chapel, and he had published several single sermons. Her own death fell in generally by a most unfortunate, 1840, death, which was considered no less than 2500L worth of her letters and papers, and has been very extravagantly published. She was disposed to have given as much as 4000L; but she was very rich. (Gent. Mag. for Aug., 1840; Madame D'Arblay's Works.)
DARWAZ is a country in Asia in the valley of the river Oxus, situated north of its course between 37° and 38° N. lat., and between 68° and 71° E. long. Its extent northward would only describe the basin or the unknown country of Karategin. On the east of it are Shahgah and Roshan, and on the south Badakshan. It is an Alpine country, consisting of a succession of high mountains and narrow valleys; the mountains are so difficult of access, that they were never visited by travellers, who only approach them affected by paths which do not admit of animals of burden of any kind. Cultivation is extremely limited, but cotton is extensively cultivated. It is made into cloth by the inhabitants, and the principal article of export, for which in return grain and gunpowder are received. A small number of cattle are kept; and sheep and goats are numerous. There are few horses. The natives of this country are Tajiks, and most of them Sooni Mohamendans. Their language is Persian.

Though the other small countries in the neighbourhood have been compelled to submit to the authority of Murad Bey in Kunduz, the Shah of Darwaz has been able to maintain his independence, and the intercourse between the two sovereigns is limited to an exchange of presents. The Shah keeps up some show of state, and a large force, large at least when compared with the troops of his weaker neighbours.

(Elphinstone's Account of the Kingdom of Cabot; Wood's Narrative of a Journey to the Source of the River Oxus.)

DARWAZ was settled 1669. The fruit of the cultivated plant and the carrot (called improperly seeds) of the wild plant, are used. The former rapped down in a fine pulp is sometimes applied raw, to chapped nipples, and even externally to the eyes, but more commonly it is boiled, and beaten into a uniform mass, and applied as a poultice to fetid, sloughing, and other ill-conditioned sores, which it cleanses, and otherwise improves. Upon what its power depends is not well ascertained; the juice of the root, analysed by Wackenroder, gave the following constituents:

Uncrystallizable sugar, with starch and malaic acid. 93.71
Albumen. 4.35
Fixed oil (along with some volatile oil). 1.00
Carotin. 0.34
Ashes containing alumina, lime, and iron. 0.60

Carotin is a ruby-coloured substance occurring in four-sided plates. It is tasteless, odourless, insoluble in water, soluble in alcohol or ether, also in fatty or fixed oils, which it colours yellow.

The volatile oil is colourless, of a peculiar penetrating odour, and disagreeable taste. Thirty-four pounds of the fresh root yields not much more than one pound of the seeds is similar. (Pereira.) The fruits of the wild carrot are about one line and a half long, oval, flat, and clothed along the ridges with hairs. The colour is peculiar, aromatic; the taste aromatic and bitter. Their primary action is warming and carminative; and in their secondary effects, they are occasionally diuretic. They are seldom used.

The root of the wild carrot is said to produce injurious effects, and should be avoided.

The cultivated carrot, particularly the yellow kind, contains in the root a large quantity of starch. This is greatest when it is raised on unmanured ground, exactly as wheat when raised on undugoned ground has more starch and less gluten than when manured. The quantity in the carrot seems greatest at the end of September. One hundred pounds (troy weight) of the fresh root then yield four and half ounces of starch. It has been proposed to separate this starch in the same manner as starch from potatoes, to employ it medically, or as a very soothing and demulcent article of food for persons with pulmonary irritation and the cough which remains after the influenza. It is most likely a very digestible form of starch, but not more so than arrow-root. It may be raised at a cheap rate however, as any light soil will answer, and as manure is needed it cannot be expensive. The refuse after the starch is extracted is good food for cattle, and should not be wasted. The white or Flemish carrot is a valuable food for cattle.

(D'Avenant, Charles, a writer on politics, political economy, and finance, was born in 1656, and was the eldest son of Sir William D'Avenant. He was educated at Bath College, Oxford, and first made himself known by a dramatic piece, entitled 'Circe, a Tragedy,' to which Dryden added a prologue and Lord Rochester an epilogue, and which was brought out in 1674, but not of an operatic character, like most of his father's productions in the same line, and of very little merit; as indeed Dryden intimates, with slight disguise, in his prologue. D'Avenant was born as an appendix, in the fourth edition, to the study of the civil law; and he was some years after this time a Doctor of Laws by the University of Cambridge. Of his public employments, the first that is recorded is his appointment, in 1659, as one of the commissioners to whom the great expectations, which arose during this time, on that part of the revenue, which had for many years been let out to farm, coming again into the hands of the crown. In 1665 he was appointed Inspector of Plays, conjointly with the Master of the Revels; and that year also he was returned to parliament as one of the members for St. Ives. He was afterwards returned for Bedwin in 1698, and again in 1700; and on the 3rd of June, 1703, he was appointed Inspector-general of Exports and Imports, being the second person who had held that office, the first having been William Culliford, originally a custom-house officer in Ireland, who was appointed in 1656, and was now raised to be a commissioner of the customs. (Chalmers' Historical View of the Domestic Economy of the Kingdom, 1709, p. 321; 3rd ed. 1812.) This office D'Avenant retained till his death, 14th November, 1714.

D'Avenant's publications on commerce, finance, and politics range over a period of about eighteen years. We will enumerate some of the more important of them. The following are the more important of the 'Discourses on the Public Revenue, and Means of Supplying the War,' 1695. This tract immediately gained him considerable reputation for an acquaintance with the subject of the public finances; and for some years all his subsequent publications which he acknowledged were designated on the title-page as being by the author of the 'Discourses on Ways and Means;' but he is believed to have been the author of several pieces upon which no such intimation appears. 'Discourses on the Public Revenues, and of the Trade of England,' 1701; 1702; and Part of the Commerce of the 'Foreign Trade of this Kingdom,' also 1698. To the first part is annexed a translation of Xenophon's 'Discourse on the Revenue of Athens,' by Walter Moyle, which is also appended in Moyle's collected works. The subjects discussed in the 'Discourses' are the use of political arithmetic, credit and the means of restoring it, the management of the king's revenues, the public debts, the general nature of foreign trade, the best way of profiting by it, the exorbitant duties levied on goods entering the India's. A reply was made to some things in the first part of this work, in 'Remarks upon some wrong calculations and conclusions contained in a late tract entitled Discourses, &c.; or Remarks upon a Letter to Mr. Moyle, 1697-1705, and Part of the Commerce of the Foreign Trade of this Kingdom,' also 1698. To the second part was annexed a letter to Mr. Moyle, on 'The State of Excise, and Resumptions,' 1700. This was written to recommend that certain late grants of crown lands, &c., should be resumed; and it was answered the following year in an elaborate treatise entitled 'Just Regium; or, the King's Right to grant forres, and other revenues of the crown, fully set forth,' &c. 'Essay upon the Balance of Power; the Right of Making War, Peace, and Alliances; Universal Monarchy,' 1701. This was another attack upon the government of King William I, and was answered the same year in 'Animalversions on a late factious book entitled Essays,' &c. It was also formally censured by the Upper House of Convocation for a passage in which the author had declared that he could point out several persons whom nothing had recommended to places of the highest trust, and often to rich benefices and dignities, but the open enmity which they had, almost from their cradles, professed to the divinity of Christ. 'Essays upon Peace at home and War abroad,' in two Parts, 1702. To this Mr. Moyle, in his 'Thoughts and Considerations,' 1704, in his office, of course supports the existing government. He still however attacked himself to the Tory party; and in 1710, in a work extending to two 8vo volumes, entitled 'New Dialogues upon the Present Posture of Affairs, by the author of Essays upon Peace and War,' 1703, he exhibited his opinions, which he is believed to have commenced many years before in an anonymous publication which appeared, in two successive parts, in 1701 and 1702, under the title of 'The Two Brothers: or Memoirs of a Most Curious Character,' which performances were 'Reflections upon the Constitution and Management of the Trade to Africa,' (anonymous), in three
parts, fol. 1709; and two 'Reports to the Commissioners for putting in execution the Act for examining the Public Ac-
councks.' 5vo. 1712. D'Avenant's position of the poli-
tical and commercial works of Dr. D'Avenant was published in 1771, in five vol. 8vo., by Sir Charles Whittworth, M.P.,
aftersward Earl Whittworth.

D'Avenant's writings are generally of some value for the instruction and amusement, or rather than on some points be saw rather
farther than the generality of his contemporaries; but he is a
beavy writer, and was evidently (notwithstanding his poetical descent) a dull man, and as such (though the common
notion of the stage) was by no means a person to be trusted
even in the handling and statement of facts. His notions
upon the principles of trade and political economy also were very
imperfectly systematized, and in some respects extremely im-
mature; upon no one question perhaps be more than par-
amount. His connexion with Duddley North, for example, in the conclusions to which he had come, as if they had been separated by a century.

(Biographia Britannica, 2nd edit.; Cran's History of
British Commerce, i. 85, &c.; M'Colloch's Literature of
Political Economy, pp. 351, 352.)

D'A'VILA [Hernando-Caterina Davila, P. C. S.]

DAYS OF GRACE. [Bill of Exchange, P. C.]

DEAN OF GUILD, in the municipal system of Scotland,
is an official, of which the present state of the great
unt looking to duties of the magistrates, who are called
chant guilds, or societies of trading persons. An officer with
this title used generally to be a member of the town council
of every burgh, large or small; but by a clause in the Burgh
Regulation of 1773, (9 & 10 W. IV, 276, sec. 4.)
the duties of the functions of the dean of guild are apportioned to be performed in
each of the smaller burghs by some member of the council,
chosen by the majority; and an officer chosen by the guildry,
et and entitled to sit as a member of the council, became pecu-
nar to Edinburgh, Glasgow, Aberdeen, and Dundee.

In Edinburgh the dean of guild has by courtesy the title of lord, and
there are current many ludicrous anecdotes, arising from the
misapprehensions of persons not acquainted with the character
of the office, on hearing its title thus addressed. By the act 14,
c. 184, the dean of guild was invested with extensive
judicial powers in commercial questions, but this jurisdiction
has long been in desuetude. Its principal powers are now of
an austere character. They are consuetudinary—not fixed by
any general law, but dependent on the local customs of
the various towns, so far as these have not been checked in their
divergence from a general principle by the decisions of the
courts. The dean's authority is generally exercised in a court,
of which he is the sole or the principal judge, according to
the usage, and its proceedings are sometimes conducted with
the advice of a professional assessor. The character of his authority is thus defined:—"It belongs to the dean of guild
to take care that buildings within burgh be agreeable to law,
nor other public places, private property, nor on the public
streets or passages, and that houses in danger of falling be
thrown down." (1 Enk. Inst. 4, 25.) In Edinburgh no
building can be taken down or materially altered without the
sanction of the Guild Court, which is given after all parties
interested have been heard. Proprietors are compelled to
repair or remove domestic edifices declared by the Guild Court
to be, from disrepair or otherwise, dangerous to the public.

DE CANDOLLE, AUGUSTIN PYRAMUS, was born
at Geneva, where his father was livery-scrivener, in 1778.

In 1789 D'Avenant was exiled from Paris on account of the political state of France, he retired to each of his native
in the year in which Haller, Linnaeus, and Bernard de Jussieu
Died. His family originally came from Marsaille, but had for
more than two centuries been settled at Geneva. His ear-
est tastes were altogether of a literary kind, and from infancy
he used to follow the authors and poets of his day and the
active he too was an industrious
study. He was remarkable for the facility with which he
wrote verses, a taste in which he indulged throughout life.
In the year 1792, with his mother and brother, he sought
refuge, whilst the French were besieging Geneva, in a village
situated at the foot of the Jura. Here he amused himself in
collecting wild plants and acquired a taste for botany, which,
on subsequently attending the lectures of Professor Vaucher
in his native city, became the occupation of his life. In 1790
he was elected corresponding member of the Societies of
cuvier, and Fourcroy. He also became intimately acquainted
with Desfontaines and Lamarck.

The first efforts of De Candolle in botanical science were
rarely noticed. He went more particularly into the grouping or
of species, or rather into the species. He was not only a great
authority on botany, but the first to form a system of classification, and
the second to the theory connected with the physiology or development of plants. His first publication
was a description of succulent plants, delineations of which
were supplied by Redouté. He also drew up the descriptions
for the magnificent work of the same artist on the Linnceae,
from which the Lindernias, and the Flora of the Vegetable Kingdom,
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The natural system of the vegetable kingdom however was
realized in the conversion of the botanical works of Lamarck and the second author was obliged to abandon the design, as a work of too
great magnitude. He therefore in 1824 commenced the publication of a Prodromus of the larger work. But even
this proved a work too extensive for completion during his lifetime. This work embraced descriptions of all the known species of plants. Common herbs with the phanerogams, each order in the natural system was exhausted as far as the materials of the author would allow. All the orders belonging to the polyetal division of Exogens were completed, as also the orders of the botanic division as far as the Composite. To this last difficult order De Candolle had paid much attention, and his desire to give it in as perfect a form as possible led him to devote so much time to it, that there can be little doubt that his health suffered severely from the exertions. The work was not completed by many different hands, but was published in three parts: one the orders of the monocotyledons, the other of the dicotyledons, and the third of the gymnosperms. In the latter the systematic arrangement is well preserved, the names have been observed as nearly as possible to the botanical nomenclature, and the genera are divided into parts according to the natural orders. The above is the index to the third part of the work, published in 1827. It is at present the best work of its kind in the French language, and is highly esteemed. It is at the same time a work of great value to the botanist, as it contains a great number of new species, and many others not yet described. The author has paid much attention to the form and structure of the plants, and has given a great deal of information respecting their distribution and habitat. The work is divided into five parts, each containing a large number of species. The first part contains the family of the Araceae, and is devoted to the genera of this family. The second part contains the family of the Asparagaceae, and is devoted to the genera of this family. The third part contains the family of the Orchidaceae, and is devoted to the genera of this family. The fourth part contains the family of the Cactaceae, and is devoted to the genera of this family. The fifth part contains the family of the Compositae, and is devoted to the genera of this family. The work is illustrated with many beautiful plates, which are accompanied by careful descriptions of the plants. It is a work of great value to the botanist, and is highly esteemed by all who are interested in the subject.

1. Astragalia, nempe Astragali, Biserulme, et Oxyporo gyni, vegetalium historiae, ed. 4vo. Paris, 1792. This work was an account of the Astragali and some allied genera, and was illustrated by Redouté.


4. Essai Elémentaire de Géographie Botanique, 8vo. Paris, 1821. This was a reprint of the article on the Geography of Plants in the Dictionnaire des Sciences Naturelles.

5. Essai sur les Propriétés Médicinales des Plantes, paroixées avec leurs Formes extérieures et leur Classification naturelle, 1804. 8vo. Paris, 1816. This was his inaugural lecture on the medicinal properties of plants in 1804, which he republished in the year 1816.

6. Floré Francaise, ou Description de toutes les Plantes qui croissent naturellement en France. The third edition of this work was edited by De Candolle. It was published at the order of the Horticultural Society of France, and was accompanied by a coloured chart, indicating the distribution of plants throughout France.


10. Memoires sur la Famille des Léguminées, 4to. Paris, 1825. 1825. Up to the time it was written it was the best monograph on the Léguminées. It was illustrated by seventy plates.

11. Notice sur l'Histoire et l'Administrations des Jardins Botaniques, 8vo. Paris, 1822. This was a reprint of an article which appeared on the subject of botanical gardens in the Dictionnaire des Sciences Naturelles.

12. Organographie Végétale, 2 vols. 8vo. Paris, 1827. This work is a description of the organs of plants, and was published with the view of being an introduction to the physiology of plants. It contains sixty plates, representing the structure, normal and abnormal, of the various organs of plants.

13. Plantarum Succulentarum Historia, 4 vols. 4to. and fol. Paris, 1799. This was a description of the various kinds of succulent plants, with illustrations by Redouté.


15. Prodrumus Systematis Naturalis Regni Vegetabilis, 8vo. Paris and London, 1824 to 1845. Of this work seven volumes only are at present published.

16. Regni Vegetabilis Systema Natural, 8vo. Paris, 1818. This work, which was to have contained a full description of all the plants then known, was only commenced by De Candolle, and the Prodrumus was published in its place.


21. Rapport sur la Production de Terre, fait à la Chasse d'Agriculture de Genève, 8vo. Geneva, 1822. This was followed by two other reports on the culture and uses of the potato.

22. Théorie Élémentaire de la Botanique, 8vo. Paris, 1813 and 1816. This was an exposition of the elementary principles of classification, and of the mode of studying and describing plants.

Besides the above works, De Candolle contributed papers to the Transactions of almost every scientific society in Europe, a bare list of which would far exceed the limits of this article.

(Dubony, Dr. Sketch of the Writings and Philosophical Character of A. P. De Candolle; Proceedings of the Literary Society, 1842; Bischoff, Lehrbuch der Botanik; Quérard, La France littéraire.)

DECKER, SIR MATTHEW, BART., was born at Amsterdam in the latter part of the seventeenth century, of a Protestant family of considerable fortune, where his ancestors had been engaged in commerce till they were driven out in the Spanish persecution under the Duke of Alva, leaving their estates to their Catholic relations, some of whom long continued...
to occupy eminent positions in the municipal government at Brussels. Such was the account given by Sir Matthew himself to Collins, the genealogist, in 1727, as recorded by the latter in his 'English Baromette,' iv. 185 (published in 1747, March 12th, to which it was reprinted in 1750); and he was naturalized the following year by the 28th private Act of the 2nd of Anne. Having settled as a merchant in London, he rose to great commercial eminence, was made a baronet in 1716, and was returned to Parliament for Bishop's-Castle. He only sat, however, in the House of Commons for four sessions, and his name does not occur in the reported debates. He married Henrietta, daughter of the Rev. Dr. Richard Watkins, rector of St. Dickick, in Warwickshire; and he died 16th March, 1749, when his will became executors, and his estates devoted upon his three daughters. It is said to have been in the gardens of Sir Matthew Decker's country-seat at Richmond, in Surrey, that the pine-apple was first brought to maturity in England.

Decker is believed to be the author of a little work first published in 8vo. at London, in 1743, and entitled in the fourth edition, which appeared in the course of the following year, 'Serious Considerations on the several high duties which the nation in general (as well as its trade in particular) labours under; with a proposal for preventing the running of goods; discharging the trade from any search, and raising all the public supplies by one single tax. By a well-wisher to the present Great Britain.' The latter, which appeared in the same form in 1756, the tract is stated on the title-page to be 'By the late Sir Matthew Decker, Bart.' It consists in both editions of only 32 pages. The author explains his object in p. 15: 'My proposal,' he says, 'is this that the country shall raise a duty over all Great Britain, and that upon houses.' He would in this way raise an annual revenue of 6,000,000l., being as much as the ordinary expenses of the government then amounted to; with 1,000,000l. over to form a sinking-fund for the discharge of the debt. He calculates that in England, exclusive of Wales, there were then 1,200,000 houses; but of these he would tax only 600,000, counting off 500,000 as inhabited by the working and poorer classes, and 100,000 as uninhabited.

We do not know whether this scheme attracted much notice when it was first proposed, but, from the frequency with which it was reprinted, we may infer that it did. It was, at any rate, elaborately answered, soon after its re-publication in 1756, in a thick pamphlet of 120 pp., entitled 'The proposal commonly called Sir Matthew Decker's scheme, for one general tax upon houses, laid open, and showed to be a deep concerted project to traduce the wisdom of the Legis- lature, and to lead the public into ruin by the means of the pretended manufactures [sic] of Great Britain; most humbly submitted to the consideration of Parliament,' 8vo., Lond. 1757. The author of this attack is understood to be Mr. Joseph Massie, a Scotch lawyer, of the name of that country, and who expected from the title, very angry, and even somewhat abusive. If there be any express personal allusion to Decker or recognition of him as the author of the scheme, beyond the mention of his name on the title-page, it has escaped our search. The author of the 'Serious Considerations' is com-monly spoken of in some such style as the following:—

'Certainly this man must have a front of brass, and a heart of flint' (p. 63).

Decker's work has also been commonly supposed to be the author of another more considerable work, first published 4to. at London, in 1744, and reprinted in 12mo. at Edinburgh, in 1756, both editions without a name, under the title of 'An Essay on the Causes of the Decline of the Foreign Trade, consequently of the Value of the Lands of Britain, and on the means to restore both.' Adam Smith notices and comments upon this work as written by Decker, and designates the scheme of taxation advocated in it as 'the well-known project of Sir Matthew Decker, by which, they tax nature of Wealth of Nations.' It is very evident however that it cannot be by the author of the 'Serious Considerations,' for various reasons. As Mr. M'Culloch has remarked in his late work, 'The Literature of Political Economy,' page 282, 'the interest of the tax, proposed by Sir Matthew Decker, is quite different from that proposed in the "Considerations;" it is, in his own words, "one tax on the consumers of luxuries," or, as Smith has put it, "all that commodities, even those highly esteemed, whose consumption is very speedy, should be taxed in this manner, the dealer advancing nothing, but the consumer paying a certain annual sum to the licence to consume certain goods."' It may be added, that the edition of the 'Essay' published in 1756 is ushered in by a preface, evidently by the author, in which he speaks of this as a second edition, which he had been induced to publish, in order to meet the proposals of 1752, and as affording an opportunity of correcting some things in the preceding impression. Decker, as we have seen, died in 1749. Mr. M'Culloch states, that in a work by Francis Flauquier, entitled 'An Essay on the Knowledge of the Commerce and Debts,' third edition, 8vo. 1757, it is affirmed that the 'Essay on the Decline of Foreign Trade' was written by Mr. Richard de Decker.

The 'Essay' is rather a remarkable work. Besides his main project for a single tax, which occupies above 200 of the 288 pages of which the volume (in the 12mo. edition) consists, he advances the four following proposals:—1, To abolish all our monopolies, unite Ireland, and pay the low-subjects on the same footing in trade; 2, To withdraw the bounties on exported corn, and to erect public magazines of corn in every county; 3, To discouragement idleness by well regulating our poor (he adopts Sir Josiah Child's plan for the management of the poor, and would transport all able-bodied persons who cannot find employment); and 4, To pay off our debts by public bonds, bearing interest, and liquidating part of our debts yearly. The balance of trade theory is assumed, but not examined. The work is written in the seventh edition, of the year 1749. The'severest and to the Court of Session inScotland. Its name explains its nature, which is an action to have it judicially declared that a certain right, or a certain character, exists in the party who pleads it, and that the other party, who raises the action should demand any immediate service from the law, or that there should be any adverse party. It may be raised by persons in doubt how they ought to act to avoid the consequence of a breach of the law, and this frequently had recourse to by public officers. A person whose legitimacy is questioned, though no one may be at the moment denying his right to possess any property of which illegitimacy would deprive him, may bring an action of declarator against any of his creditors, who has a right to possess the property, or claim judicial authority to establish the fact. The principle of the declaratory conclusion is often admitted into other actions where there are many complex claims. The court lays down certain rules, applicable to the circumstances, by which the claims of individuals must be decided. It is the ultimate decision of the court in cases of extensive unsettled claims in connection with bankrupt joint-stock companies this has been found a serviceable procedure. The action of declarator has been applied to many useful purposes, both in the United States and in England, capable of abuse. It is sometimes very oppressively applied when a member of a public body claims some particular privilege. An action of declarator is commenced by the body at large, to which it is in the party's party, for the purpose of ascertaining whether he is entitled to all it is doing, and he may thus be involved in expensive law proceedings.

DECKER, THOMAS. [Decker, Thomas, F.C.] DEL CREDERE COMMISSION. [Agost, F.C.] DELFICO, MELCHIORRE, born of a nobles family at Teramo, in the Abruzzo, in 1744, studied at Naples under Genovesi, Mazzocchi, and other learned teachers, and applied himself particularly to the study of the law and of political economy. After his return to his country, he published his first work, an essay in defence of matrimony, against some loose opinions of the time—"Saggio Filosofico nel Matrimonio," 1774. In 1782 he published a treatise on the advantages of a provincial militia—"Discorso sul Ristabilimento della Milizia Provinciale." He next wrote "La Memoria nella Coltivazione del Riso Comune in Provincia di Teramo," in which he recommended the removal of the unhealthy rice grounds from the neighbourhood of towns and villages, a suggestion which was approved of and acted upon by the authorities of the province. His last work was written against the laws of privilege of the trade in provisions—"Memorie sul Tribunale della Gracia e delle Leggi Economiche nelle Province confinti del Regno." These memoirs being addressed to the king, had also the effect of removing the monopoly of certain branches of rural produce. The government of Naples was at that time disposed to useful reforms, and much was done to improve the condition of the people, until the French revolution broke out, and the measures then introduced caused a considerable change. Previous to that however Delfico continued to assist by his suggestions the progress of social improvement.
wrote, in 1787, a memoir against the abuse of the winter transmigration of sheep from the high lands to the maritime districts of the Abruzzo, by which a large tract of fertile land was kept out of cultivation—Memoria sì i Regii Stucchi, così introvabile in Abruzzo e presso le montagne, ma dove non fa il tempo degli Abruzzi, and soon after he published another trea- sure on the like practice in the plain of Apulia (Capitata, P. C.)—Discorso sul Tavoliere di Puglia, 5vo, 1788. About the same time he wrote a Memoria sui pesti e le misure del Regno, and a second edition was published in 1790, and a third in 1792. Lettera al Duca di Cantalupo sul i feudi devasti, 1795. Here again his recommendation prevailed, and a law was issued for the sale of feudal estates reverted to the crown as alodial property.

Delfico also addressed to the king a Rimostranza, or Memo- rial, by which he obtained the establishment of a Regia Udienza, or royal court of justice for the province of Teramo, which till then was dependent on the court of Chieti. King Ferdinand made Delfico a Knight of the Order of Constantin- ian. In 1799 the French having invaded the kingdom of Chieti, he stayed at home six months after the invasion and the fall of the kingdom, and a few months after they were obliged to evacuate it. In the midst of those blood-stained vicissitudes, Delfico thought it prudent to emigrate, and he repaired to San Marino, where he was received with open arms by the baronial family, and where he waited for more peaceful times. In gratitude for the hospitality which they there met with, he wrote the history of that little state from the documents which he found in its archives. Memorie storiche della repubblica di San Marino raccate dal Cavaliere Delfico, 4to., Milan, 1804. When Joseph Bonaparte became King of Naples, in 1806, Delfico was made Councillor of State, and was also for a time intrusted with the management of the home department. He contributed to the new judi- ciciary organization of the kingdom and other useful measures, among others to the establishment of the house for the insane at Aversa, which has maintained its reputation, for its en- lightened philanthropic management, to the present day. On the king himself Delfico has written a History of the President of the Commission of the Archives. In 1833 he tendered his resignation on account of his great age, and the king allowed him a handsome pension for life. He left Naples, and returned to his native Teramo, where he con- tinued till 1835, when he died at the age of ninety-one.

A few years before his death, as the new king, the present Fer- dinand II., being on a tour through the provinces, repaired to Teramo, in 1833, Delfico, who in his youth had known his great predecessor, and the state of the country in those Neapolitan days, caused himself to be carried to the presence of his youthful king, who received him with marks of respect, had him seated by his side, and conversed long with him.

Besides the works mentioned in the course of this article, Delfico wrote the following:—1, Ricerche sul vero Carattere della Giurisprudenza Romana, e de suoi Cultori, 1781, a work that has been reprinted several times. 2, Pensieri su la Storia e su la Incertezza ed Inutilità delle medesime, 5vo, Forli, 1860, also reprinted several times. These two works are worthy of notice for a certain boldness and originality of thought which sometimes assumes the form of paradox. The author speaks as one accustomed to treat of political and social manners with great severity; he anticipates Niebuhr in his scepticism concerning the legend of the early ages of Rome, and he repeats the sentence of his countryman Vico, who said that the Roman people, until the second Punic war, knew no other art but those of digging the earth and cutting the throats of their neighbours. It is worthy of remark, that Neapolitan philosophers and critics have shown less classical and historical erudition than those of other parts of Italy, and have often preferred the study of their own history and their historical investigations. 3, Dell' Antica Numismatica della Città di Atri nel Piceno con alcuni Opuscoli sulle Origini Italiane, 5vo., Naples, 1850, a work of much antiquarian and historical erudition. 4, Memoria sulla Libertà del Com- mercio, sopra l'arresto del Governo regio alla pubblica demania di Padova sullo stesso Argomento, inserted in the thirty- ninth volume of Costi's great collection of the Italian econ- omists. Delfico was an advocate of free trade. 5, Saggi Antichi Confini del Regno, written for the minister of the interior, but as yet inedited, like many other of his treatises and memoirs. 6, 'Espressioni della particolare Biconoscenza della Città e Provincia di Teramo dovuta alla Memoria di Ferdinand I., inserted in the second volume of the 'Annali Civili del Regno,' and being a recapitulation of all the im- portant events which had taken place in that province under the reign of the elder Ferdinand, chiefly at the suggestion of Delfico.

(Tipaldos, Biografia degli Italiani Illustri; Mozzetti, Dei Studi, delle Opere, e della Virtù di Melchiorre Delfico, Teramo, 1836.)

TREMENS, a disease of the nervous system, to which persons addicted to alcoholic drinks, though not exclusively, are peculiarly liable. As its name indicates, its principal symptoms are delirium and trembling. The disease is usually a constant symptom; but the tremor is not always apparent, or it is only observed. The delirium is accompanied with sleeplessness: the patient is busy, and constantly talk- ing, but is seldom or ever angry or violent. If he is ques- tioned, he answers rationally, but speaks in an agitated and suspicious manner; he mostly does whatever he is told, and is frequently anxious to oblige. His thoughts, however, wander very quickly from objects around him, and he is apparently surrounded by the scenes of his imagination. Here, according to his occupation, he busily engaged. If he is a master, he endeavors to carry on with all the anxiety obeying his master's commands. The sailor, the soldier, the coachman, all get busily engaged in their occupations. His thoughts are mostly distressful and anxious; his actions are uncertain, and he acts as if he were madness. If reptiles or animals are running after him; he looks suspiciously behind the curtains or door, or under the pillow, and wants to wander about. He seldom meditates harm either to himself or others. When there is treachery, the tremors are fiercer and the patient is more beside himself with them. In addition to these symptoms is others less ob- served; the tongue is moist and creamy, the pulse though frequent is soft, the skin is perspiring and emits a peculiar odor.

The disease with which this may be confounded is inflamm- ation of the brain; and it is of the greatest importance that it should be distinguished, as the remedies that cure in the one disease will destroy in the other. Although delirium tremens is observed in all persons under the influence of alcohol, yet, when a person who drinks much alcohol presents many of the above symptoms, there is strong ground for believing it to be delirium tremens.

When the symptoms of this disease are obvious, its treatment is simple. The patient must have a sufficient quantity of opium administered to him to procure sleep; it should first be commenced in small doses, and then continued. A third of a grain of morphia may be given every two hours to begin with, and the dose may be increased according to necessity. Generally, after a first sleep the patient becomes refreshed, and not unfrequently wakes up entirely well. Sometimes opium alone is not sufficient; this is the case where the disease has continued for a considerable time. In these cases an accustomed stimulus; in these cases it will frequently be necessary to let the patient have his ordinary beverage in order to prevent that degree of exhaustion which appears to keep up the irritability of the system. This remedy ought not, however, to be continued after the patient has acquired sufficient strength to do without it.

When the disease is about to terminate fatally, the delirium abates, and coma takes its place; the tremor of the limbs becomes subslus and the evacuations are passed im- voluntarily, the face becomes suffused, and the patient dies as though he were in apoplexy. The attacks of delirium tre- mens are very apt to recur, especially in drunkards who do not, after their first attack, give up the vice to which they are addicted. First attacks seldom prove fatal, but subse- quent attacks are not uncommonly attended with fatal symp- toms. After death from delirium tremens, the ventricles of the brain are usually found effused with serum. Serum, and occasionally a lymph, may be found in the abdominal cavity. (Watson, Lectures on the Practice of Physic; Marshall Hall, Diseases of the Nervous System.)

DELIVERY. [Dekko, F. C.]

DELORME, PHILIBERT, was born in 1518, at Lyon, as he was hardly fifteen when he had upwards of three hundred workmen to receive their directions from him; which probably means that such directions were only transmitted through him. Soon afterwards, he had an opportunity of displaying his precocity

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In a different field, for in 1533 he was sent to Rome, but his professed pursuits there engaged only a subordinate share of his attention, and what he most studied was to ingratiate himself with persons in power; though, towards the end of 1534, he was a courtier by intuition, and in a very short time secured a protector in the Cardinal Santa Croce, who took him into his household. The devotions which he now bestowed on the saint for Delorme, which did not extend to more than making ordinary sketches. Yet if he did not profit much by diligence, he was favoured by accident: in making what was then considered an important discovery, namely, that of the mode practised by the ancients for finishing their sculpture in marble, the house in which Maria Staniszewski,—a discovery subsequently claimed for Palladio, although Delorme's prior right to it is neither to be disputed nor suspected, because the other did not visit Rome till 1570, whereas the first edition of Delorme's works appeared in 1567.

On his return to his native city in 1536, Delorme, who brought back with him a high character for religious strictness, was employed to erect the portal of the church of St. Nazier, which, as far as it was ever finished, gives no very favourable idea of his architectural talent. The alterations of the Hôtel Billass, in the same city, obtained for him much more credit; but there is nothing of it left but the name. That work completed, he was soon afterwards summoned to Paris by Catherine de Médicis, to whom he had been recommended by the Cardinal du Bellay, who had himself been charged by Santa Croce (raised to the papal see in 1556, by the sites of whose church (which thru twenty days) to promote the advancement of his protege. Catherine perceived in him other merits than those of a mere artist, and rewarded them accordingly. Although he was not in orders, having only received the tonsure when at Rome, seven church benefices were conferred upon him, and he was appointed Aumônier du Roi. No wonder therefore, when rewards of that kind were showered upon him so unacquiescently, that he should have obtained much of the most important and lucrative of them, without his applications being narrowly inquired into; and there is something flippantly extravagant in saying, as Milhau has done, that Delorme's talent was discovered by Henri II., and that he was the first to strip architecture in France of its Gothic dress, and clothe it in that of ancient Greece. Delorme was associated with Primaticcio in the erection of the monument of Francis I., and that of the Valois princess at St. Denis (taken down 1719), but as they were designed by the same architect, they are only a portion derived from them as works of art. Among works of a more strictly architectural nature, he built the Château de Meudon for the Cardinal de Lorraine, and completed the Château de Madrid in the Bois de Boulogne at Paris; but his work most admired was the ingenuity of his proposers. To these may be added, the Court (en fer de cheval) at Fontainebleau, the royal seats of Villers-Cotterêts, de la Muette, and St. Germain-en-Laye, and the celebrated Château d'Anet, built for the Duchesse de Valentinois, a lady far less distinguished by her title than by her name of Diane de Poitiers. Of these buildings, such as remain at all have been so altered at different times that their original character is nearly effaced; but of the Château d'Anet the portal or lofty centre compartment is preserved having been taken down, and re-erected as a restoration, in the court of the Ecole des Beaux Arts at Paris. The reputation, however, obtained by that monument for Philibert is, Callet assures us, in reality due to the device of his brother. Yet the early success of Callet was altogether unmingled with valorations; there were those who ventured to murmur at Delorme as the creature of court favour, and to hint that he was rewarded more profusely than was altogether becoming even were his talents far greater. On the death of Henri II. (1559) he not only lost his appointment of Royal Aumônier, but fell into disgrace with the new king Francis II. Nevertheless the queen-mother continued her protection, and he was accordingly intrusted by her with the work of her new palace of the Tuilleries (1564). In the history of these vast edifices, the architects who have been employed, whether nearly at the same time or at considerable intervals, there is generally a great deal of doubt and confusion; and as Bullant (Bullant, P. D. L., 1749, vol. i. p. 219) has observed, it is certain which of them had the greater share in the original structure, more especially as we have seen that Philibert Delorme was not the man to be particularly scrupulous about taking as much credit as he possibly could to himself. Besides what Delorme had added, the various architects of Cardinal Mazarin now hardly exists except in name, and the portion attributed to Delorme (the centre pavilion of the façade) has undergone such changes that it can no longer be recognised as the original. According to Callet, it was Bullant who was the author of the general design. Philibert, who had earlier worked with Nizier (Nizier, M. d'Aumônier, a repair to Catherine (1567), gained credit to himself only for the 'Ionic order' and some other minor parts, but carefully avoided mentioning the name of the other architect. What Delorme's talent and skill were, no one can judge of by the few specimens which no one will envy him the credit of, the house which he erected for himself in the rue de la Cré- saie, and of which Callet exhibits two elevations and a ground-plan; for it is of studied inconveniences as a dwelling, and very far from that perfection which is shown in his works of art from 'antient Greece.' It was there that Philibert died, May 30, 1577, at the age of fifty-nine.

As to his brother Jean Delorme, no particulars respecting him have come down to us, and no wonder, since Philibert, that 'Jeanse de roye court,' Callet calls him, took care that he should be considered a mere nobody, and therefore unworthy of notice. The probability is that Jean died some years before his brother, since otherwise the prudence of the latter would not have refused to give the public the portion of the house which he erected for himself in the rue de la Cré-saie, and of which Callet exhibits two elevations and a ground-plan; for it is of studied inconveniences as a dwelling, and very far from that perfection which is shown in his works of art from 'antient Greece.' It was there that Philibert died, May 30, 1577, at the age of fifty-nine.

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To have any influence upon prices a demand must be accom-
panied by the means of purchase. A demand is not simply
a want—a desire to obtain and enjoy the products of other
men's labour; for if this were its meaning, there would never
be the least proportion between demand and supply: all men
would always want everything, and production could not keep
can be regulated, and the value of the articles which
are produced, is fixed by the laws of the demand and supply.

Adam Smith, in his famous Wealth of Nations, described
the market as a mechanism that regulates supply and demand
in a way that benefits society as a whole. He argued that
prices are determined by the interaction of supply and demand,
which itself is influenced by consumer desires and the ability
to purchase goods. In this way, the market ensures that goods
are produced efficiently, with resources flowing to activities
that are valued most highly by society. Governments, on the
other hand, may intervene to correct market failures, such as
monopolies or externalities, by using tools like taxation and
subsidies to alter the balance between supply and demand.
through the medium of price, whenever the one exceeds the other. This is the result of natural laws, the operation of which is incapable of increase, it economizes consumption; if the supply can be increased, it encourages production. In either case it is of great benefit to the consumer. To revert, for a moment, to the case of an article of food, it is obvious that the harvest in excess of the demand of the home market and the foreign supply. Suppose that prices did not rise, but remained precisely the same as if the harvest had been abundant, what would be the consequence? The whole population would consume as much bread as usual, and use flour in every way. Any increase of the supply of any article of food may be purchased by the farmer instead of being carried to distant points. The farmers might even feed their cattle with wheat. By reason of this the whole of the corn would be consumed before the next harvest, and the horrors of famine would not be averted. However large the Diy of corn, they were in the midst of plenty. This evil is prevented by a rise of prices, which is a symptom of scarcity, just as pain is a symptom of disease. By timely precaution the danger is averted. A high price renders economy and providence compulsory, and this limits consumption. The supply, therefore, instead of being exhausted before the next harvest, is spread over the whole year. In the case of food, it is true that such economy is painful, and presses heavily upon the poor; but this inaccuracy is compensated with the advantage that the poor, who had been endued before scarcity became alarming, none but rich men could buy a loaf; for every one who had a loaf to sell would be risking his own life if he sold it.

These observations are also applicable in some measure to cases where the price of millinery, cutlery, or any other thing is raised by one to a few persons, who have contrived to buy up the whole or nearly the whole of any commodity. But such exclusive possession (sometimes improperly called a monopoly) cannot last for the length of time at which the supply is capable of increase. The extreme ease has been put of a besieged town in which the whole supply of corn was monopolized by one man. Under those circumstances of course he would demand a high price; but unless his exclusive supply were upheld by law, it does not follow that the inhabitants would suffer on that account. A most provident consumption of food is absolutely necessary for the defence of a town, and no organization could distribute provisions according to the wants of the people as well as articles of which the supply is capable of increase. It must also be recollected that, without any such exclusive possession, the fact of the siege alone must raise prices by cutting off fresh supplies. If the siege continue, provisions are more likely to fast out by the instrumentality of prices than by any other means. At the same time the sole possessor of the corn would be restrained from keeping back the supply beyond the actual necessity of the occasion by many considerations. He would know that it was his interest, when the town was besieged, to raise the price—capitation agreed to, or the place suddenly carried by assault—the value of his exclusive property would be destroyed. His own interest, therefore, is coincident with that of the people. It is better for both that the supply should be maintained, not the price; it is dangerous to both that it should be immediately moderated.

In circumstances less peculiar than these, very little evil can arise from an exclusive possession of any commodity not protected directly or indirectly by law. If the supply be capable of increase, and the demand be sufficient to enable the owner to secure a high price, for reasons already explained, the market would rapidly be supplied from other quarters. If the supply cannot be increased, that fact alone would raise the price. It would be a self-regulating system. If a monopolist were so great without the extraordinary activity of the capitalist who had been able to secure for his country the whole accessible supply to be collected from the markets of the whole world.

A monopoly, properly so called, is of a totally different character: for however abundant the supply of an article may be, it may, nevertheless, be inaccessible to the consumer. [Mosoror, F. C.] Such monopolies were properly condensed into a code by the legislature of this country, but did not observe any distinction between a legal monopoly of the highest in a country excluded from the common, miscellaneous monopolies; and severe penalties were inflicted both by the common and statute laws against offences called "badgering, forestalling, regrating, and engrossing." The impolicy of such laws was gradually perceived. If prices were occasionally raised by speculations of this kind, yet the restrictions upon commerce, which resulted from these laws, were infinitely more injurious. These statutes were therefore repealed by act 12 Geo. III. c. 71; but the common law, and all the statutes relating to the offences of forestalling, regrating, and engrossing, were not repealed by the act. It was provided by the common law that a corporation, other than a trade or craft, by the king's authority, should not have an exclusive right to all the goods of their business. These things only must be produced for which there is a demand, and they must not be produced in greater abundance than the demand warrants. But the more generally machinery is used, the more abundant will be the products which men...
DEMISEMIQUAVER, a musical character, formed by adding three hooks to the stem of a crotchet, Ex.

and in length, or duration, is equal to 1/4 of a semibreve. (Stevens, P. C.)

Brown, THOMAS, was the son of Thomas Dempster, of Muireak, in Aberdeenshire, where he was born, on the 23rd of August, 1759. His life is a series of strange adventures, where the literary triumphs of the wandering scholar are mingled with fierce controversy and occasional deeds of armed violence. His wild career seems to have commenced in the centre of his domestic circle, of the moralitv of which he gives a startling picture, telling how one of his brothers had taken to wife his father's concubine, collected a band of robbers, with whom he was soon attacked and captured that father and his attendants; afterwards fled to Orkney, where he headed a band of freebooters, who, among other violence, burned the bishop's palace, and ended his career as a soldier in the Netherlands, where he was put to death as a criminal by being torn limb from limb by wild horses. Thomas Dempster commenced his classical studies at Pembroke Hall, Cambridge, at the age of ten, and completed his education at Paris, Louvain, and Rome. He took the degree of D.C.L. at Cambridge, at a time when, according to his own account, he must have been but seventy years old. The history of his various wanderings from university to university, his literary researches and discoveries, and his personal quarrels, is too lengthy to be followed here. He was for some time principal of the college of Beaune, in the University of Paris, as his locum tenens, he caused a student of high and powerful connections to be ignominiously fogged. Several relations of his were involved his charge of having attacked the college; but Dempster showed that he had resources equal to the occasion: he fortified his college, stood a sort of siege, and concluded the affair by taking some of the belligerents prisoners and confining them in the college belfry. After this affair he fled from France. At the beginning of the year 1761 he was married Susanna Waller, a woman whose disposition appeared to be of a less hardy and reckless character than his own. Some time afterwards, when he was passing through the streets of Paris with this woman, her dazzling beauty and the degree to which she was once elevated, brought another attack of the attentions of a mob of followers, and compelled them to seek refuge in an adjoining house. Afterwards, while Dempster was teaching the belles-lettres in the University of Bologna, he was involved in a more serious difficulty. In the course of a number of disputes, he found that his wife had eloped with either one or more of his students. After an ineffectual attempt to overtake the fugitives, he died at Buti, near Bologna, on the 5th of September, 1762, the victim apparently of over wrought energies and a broken spirit. Dempster's works are more celebrated for their profuse miscellaneous learning than their critical accuracy. They are very numerous. Dr. Irving, in his 'Lives of Scottish Writers,' gives a list of fifty, stating that the list is as complete as he has been able to make it. His 'Antiquitatum Romanarum Corpus absolutissimum,' an edition, or rather an enlargement, of the work by Rosinus, bearing that title, published in 1613, is well known. There are many editions of it, and it forms, both in the subjoined foundation of new printed works, and in the multitude of popular books on Roman antiquities. His 'De Etruria Regali,' left in M.S., was magnificently edited in 1728-4, in two volumes, by Sir Thomas Coke. His 'Historia de Itinere' was published at Bologna in 1627, and was reprinted for the Bannatyne Club in 1892. It is simply a biographical dictionary of Scottish authors, and as such has been often referred to in this work. In many instances its information may be depended on, but whoever consults the work must bring with him some previous critical knowledge of the subject, as the author is very prone to exaggerate the literary achievements of his countrymen. He not only makes out to be Scottish persons whose birth-place was in the subject of his history. He describes Egeria, Egeria, and, but also includes such names as Egleshean, Furnier, Flacre, St. Novatus, Pelagius, and Rabanus Maurus, who are well known not to have been natives of Scotland.

DENRODUS, a genus of Placoid fishes, from the old red-sandstone of Elgin, Moray, and Ross. Professor Owen described five species, and Agassiz admits a sixth. (Reports of British Association for 1843.)

DENYNA, CARLO GIOVANNI MARIA, born in 1791, at Revello in Piedmont, studied at Saluzzo and Turin, took priest's orders, and was appointed professor of philosophy at the University of Turin. He was discussed rather freely, in a play which he composed, the various systems of education, he incurred the dislike of the Jesuits, who had at that time the monopoly of education, and who, finding the author was dismissed from the University, wrote a work, 'De Studio Theologico, et Norma Fidei,' 1758, which was much approved of, and the author was soon after recalled to Piedmont, and was appointed professor of humanities and rhetoric in the High College of Turin. He then began his work on the revolutions of Italy, which is a general history of Italy from the Eturcan times to the beginning of the seventeenth century: 'Istoria delle Rivoluzioni d'Italia,' in 24 books, to which he added afterwards a 25th book, which brings the narrative down to 1760. This was the first general history of Italy, with the exception of the 'Annals' of Muratori, and although it is at times deficient in sound criticism, it is not destitute of merit. The work has been translated into almost all the European languages. In 1777 Denina went to Florence, where he published anonymously his 'Discorso sull' Impiego delle Persone,' which was intended as a reply to certain charges brought against his historical work by ecclesiastical critics, because Denina had censured the abuses of monastic institutions, at an earlier period. He had questioned the propriety of binding a vast number of persons to celibacy. There was a law in Piedmont by which any native of that country was forbidden to publish a book, even in a foreign country, without the previous sanction of the Turin censorship. Denina was in consequence deprived of his benefice. The archbishop of Turin however took up his defence and he was allowed to return to the capital, where some time after he received, through the Prussian envoy, an invitation to visit Berlin. He left Turin, and, having written a work on the revolutions of Germany, Denina accepted the offer, and repaired, in 1782, to Berlin, where he
remaind many years, and where he composed his 'Rivolutions della Germania,' and also 'La Russide,' being a panorama of the great events of the empire of Russia, and 'La Bretagne,' in which he wrote a work in French on Prussian literature, 'La Prusse Littéraire sous Frédéric II., ou histoire abrégée de la plupart des auteurs, des académiciens, et des artistes qui sont nés ou qui ont régné dans les États Prussiens depuis 1740 jusqu'en 1795,' par M. de Barbier, his biographer, 1790-91. He also wrote an 'Essai sur la Vie et le Regne de Frédéric II.' In 1792 Denina revisited Italy, and after his return to Berlin he wrote 'Considerazioni d'Italian sulle arti,' in which he defended his view of the importance of the arts in the country, for the information of the philologists of Germany.

Another and a more important work is his 'Vincende della Lettura,' 4 vols. 8vo, in which he sketches with concise but clever touches the progress and vicissitudes of the literature of Italy to the age of Augustus. The book displays a vast extent of bibliographical erudition.

In 1804 Denina was introduced to Napoleon at Mainz, to whom he dedicated his 'La Céf des Langues, ou observations sur l'origine et la formation des principales langues de l'Europe.' Soon afterwards he was appointed imperial librarian. He then removed to Paris, where he wrote his 'istoria dell' Italia Occidentale,' being a sort of supplement or continuation of his 'Rivoluzioni d'Italia.' It is a history of Piedmont and France, and contains information which Denina collected in 1782 in local chronicles and documents, which Denina had consulted while he lived in his native country. He also wrote 'Tableau historique, statistique, et moral de la Haute-Italie,' which was afterwards translated into French. Denina died in Paris, at an advanced age, in December, 1813. Besides the works above mentioned, he wrote many minor ones, among which the following are deserving of notice:—1, 'Guide Littéraire,' being a sketch of the Prussian monarchy, and of its civil and literary institutions. 2. Della Lett. Carlo Emmanuele Ill., R. di Sardegna. 3. 'Elogio storico di Mercurino di Gattinara, Gran Cancelliere dell' Imperatore Carlo V., e Cardinale.' It contains a sketch of the condition of Spain under Charles V. 4. 'Elogio del Cardinale Gaetano Biscellieri, who was papal legate in England against Reginald Pole in 1555.' 5. 'Lettera a Frederic l'Espange?' Berlin, 1756, and afterwards translated into Spanish. It is a reply to some harsh judgments upon Spain in the article 'Espagne' in the 'Encyclopédie Méthodique.'

Denina shows that Spain has contributed more than is generally supposed to the European stores of science, letters, and fine arts. 6. 'Essais sur les traces anciennes du Caractère des Italiens modernes, des Sardes, et des Corse.' Denina was a great supporter of the theory of the influence of climate on the race of a people. 7. 'Bibliografia dell'Arte de' Libri.' 8. 'Istito politica e letteraria della Grecia libera,' which ends at the death of Philip, father of Alexander.

DENNER, BALTHASAR, a celebrated German portrait painter, distinguished above all other artists for the elaborate finish of his works; their extraordinary finish however is their chief merit. Of Denner's early life little is known; he was born in Altona in 1685, and lived some time with a painter at Danzig; after having distinguished himself at the courts of several German princes, he came by the invitation of George 1. to London. He spent a few years in England, but his success here was not what he had anticipated; he excited more surprise than admiration, and he left this country in 1728. After performing various journeys in the north of England, he went to Rostock, and in 1733, or, according to Van Gool, at Hamburg in 1747. Though Denner bestowed more labour upon his pictures than any painter probably ever did, he still contrived to paint a considerable number; some are however more finished than others, but some are finished with a degree of attention to the minutest inconsiderable to those who have not examined them. Yet in a personal inspection, in some cases, recourse to the magnifying glass is said to be necessary, to do justice to his labours. There is the life-size portrait in the gallery of Vienna, for which the Emperor Charles VI. gave him 4700 imperial florins; Denner's own portrait in his forty-second year, in a similar style, is placed near it. There are also two old heads of extraordinarily high finish in the gallery of the house of Baden, said to be portraits of the king and mother. Denner painted many of the German princes of his day, and three kings, one of whom, Frederic IV. of Denmark, he painted, according to Van Gool, about twenty times; the other two were Peter III. of Russia, and Augustus III. of Poland.

(Van Gool, Nieuwe Schouburgh der Nederlandsche Kunstdschilders, &c.)

DENON, DOMINIQUE VIVANT, BARON, was born of a wealthy family at Châlons-sur-Saône, in 1747. Though from his early years a bibliophile and bibliomane, and in some years devoted himself to them as an amateur only, yet he was early distinguished for his taste and judgment in matters of art; Louis XV. employed him to make a collection of engravings of the principal works of the Most High empire, and he commenced however his active career in life as a diplomatist, and was first attached to the Russian embassy. Upon the accession of Louis XVI., he found a valuable patron in the minister for foreign affairs, the Comte de Vergennes, who sent Denon on a mission to the State of the Church of Sweden in 1778, when he was President of the Voltaire at Ferney, and drew a portrait of him, which was engraved by St. Aubin. He was next sent by his patron to Naples, as secretary to the embassy under the Comte Clermont d'Amboise. He lived seven years at Naples, and devoted much of his time to the study of the arts, especially etching and mezzotint engraving. He also at Naples served two or three days in the capacity of Chargé d'Affaires of France, in the interval between the resignation of M. Clermont d'Amboise and the appointment of the Comte de Talleyrand. The death of the Comte of Vergennes however put an end to Denon's diplomatic career, and he thenceforth adopted the arts of design as his profession. He removed from France to England in 1787. Here, through the influence of his friend Quesnel de Quillery, he was elected a member of the Royal Academy of the Arts; his presentation work was an insignificant etching of the Adoration of the Shepherds after L. Giordano. He returned to Italy, spent five years at Venice, and some time at Florence. He then visited Switzerland, where he learned that his property had been sequestered, and his name enrolled in the list of emigrants. Notwithstanding this threatening state of his affairs, he ventured to make his appearance at Paris, where, he was employed for five years. In 1793, he published his Travels in Italy, and in 1794 his Travels in France, where he had contrived to have his name erased from the list of emigrants, and procured him an order from the government to design and engrave a set of republican costumes. He was engaged in this occupation during the horrors of the Revolution.

After the more violent features of the Revolution had subsided, the house of Madame Beaumarchais was a centre of attraction where the most distinguished men in politics, art, literature, and commerce were wont to assemble. Quesnel de Quillery came acquainted with Bonaparte, whose exploits had already commanded the admiration of all. Denon was a most devoted admirer of the great general, and when Napoleon asked him, in 1796, to accompany him on his expedition to Egypt, he put aside his fifty-first volume, and went with the utmost enthusiasm. He accompanied General Desaix in his expedition into Upper Egypt, and during the whole stay of Napoleon in the East he was indefatigable in drawing all the most interesting and striking Egyptian monuments. He returned with Napoleon to France, and in the short space of about two years published his great work on Egypt—Voyage dans la Basse et la Haute Egypte, pendant les Campagnes du Général Bonaparte, 2 vols. folio, 1802; a second edition in 4to. was published in the same year, and a smaller edition in 1804. A very elegant quarto edition was published in London, in 1802, by M. Pelletier, with several appendices by various members of the Egyptian Commission.

1 'Istoria politica e letteraria della Grecia libera,' which ends at the death of Philip, father of Alexander.

2 'Istoria politica e letteraria della Grecia libera,' which ends at the death of Philip, father of Alexander.

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8 'Istoria politica e letteraria della Grecia libera,' which ends at the death of Philip, father of Alexander.
Density's stähling is numerous, amounting to upwards of 500; they are chiefly in imitation of the style of Rembrandt, and consist of portraits, historical and genre pieces, from Italians and Flemish masters. Besides his Voyage in Egypt, he is author of the following literary productions:—*Julie, the Princess of Parma* (1763); *Voyage en Suisse* (1767); *Voyage en Suisse et à Malte*, 1788; *Dissours sur les Monuments d'An- cientes à l'Italie*, 1804; several biographical notices of painters in *Le Gallerie des Hommes célèbres*, and *Point de Vue*.

He was Membre de l'Institut, of the class of fine arts, of the Legion d'Honneur, and knight of the Russian order of St. Anne, and of the Bavarian crown. He was created Baron in 1834. (Biographie Universelle Suppl.)

DEPARTURE. (See LADY, p. 40.)

DEPOSIT. (See LADY, p. 40.)

DEPOSIT. The term is applied to the sum of money which a man puts in the hands of another as a security for the fulfillment of some agreement, or as a part payment in advance.

The Roman word depositum signified anything which a man put in the hands of another as a security for the fulfillment of some agreement, or as a part payment in advance.

The Roman word deposuit signified anything which a man put in the hands of another as a security for the fulfillment of some agreement, or as a part payment in advance.

The depositor was bound to take care of the thing, and to make good any damage that happened to it through fraudulent design (dolus) or gross neglect (lata culpa). The depositor and recover the thing by action; but the depositor was entitled to satisfaction for any loss that he sustained in the matter of the deposit by any default (culpa) on the part of the depositor.

The depositor could make no use of the deposit, except with the permission of the depositor, either given in express words or by implication.

If a man refused to return a deposit, and was condemned in an action of deposit (actio depositi), infamy (infaamia) was a consequence of the condemnation.

DEPOSITION OF MERCURY is intended, here, to specify the diminution of the height of the column of mercury in the tube of a barometer in consequence of a small quantity of air which, from accidents in carriage or otherwise, may get in the upper extremity of the tube and there act, by its elasticity, on the head of the column. When the barometer is to be employed in determining the relative heights of ground, it may not be possible to get this air out of the tube by any means in the lower extremity of the tube, and it then becomes necessary to have a formula by which a correction may be applied to the observed height of the mercury at any station, in order to have the height at which the top of the column would stand if the tube were free from air.

For this purpose, before setting out, the height of the column of mercury in the defective instrument must be compared with the height in one which is perfect, in order to ascertain the mean density of the air which is confined in the upper extremity of the tube. Let AC be the length of the bore of the tube above A, the surface of mercury at B be the height of the column in a barometer free from air, and AB the observed height in the defective instrument. It being understood that these heights are read at the same time and place, so that the temperature and density of the air may be the same; and also that both instruments are provided with adjusting screws so that the surfaces of the mercury in the two columns may be made to coincide with the zeros of the scales of inches. Then the difference of the excentricities (or horizontal velocities) of the column AB, and the difference between that pressure and the pressure equivalent to the elasticity of the air in CB' is:—it follows that the weight of a column of mercury in CB' measures the pressure last mentioned: let this be represented by ml, in which l is equal to the height BB', and ml is to be added to the observed height in order to obtain the corrected height of the column of mercury at the station.

DERECK, SAMUEL, whose name occupies an obscure place in the literature of the eighteenth century, was a native of Ireland, and born in 1724. He was first a linen draper in Dublin, but about 1748 became professionally an author in London, and soon afterwards appeared unsuccessfully as an actor. A life of irregularity and debauchery introduced him to some fashionable acquaintances, whose influence procured for him the appointment to some free or natural monies at Bath and Tunbridge. His extravagant habits remained with him there, and he died very poor, in March, 1769. His somewhat literary works are of little importance. The edition of Dryden's poems, and the credit to the printer than to the editor.

His translation of the third Satire of Juvenal was commended at the time it appeared.

Design, Schools of. *English Schools of Design.*—In the year 1836 a committee of the House of Commons was appointed to inquire into the best means of extending a knowledge of the arts and of the principles of design among the people (especially the manufacturing population) of this country; also to inquire into the constitution, management, and effects of educational institutions connected with the arts. Numerous witnesses, examined before the committee, deposed to the great cost and importance of procuring designs, patterns, and models for manufactured articles, such as should win approval by their elegance and good taste; and there was a general tendency to the opinion that the Frens, from a better system of instruction in the arts of design, are more successful in patterns and designs generally than our own countrymen.

In the early part of the next year, 1838, another committee was appointed, by whom nearly forty witnesses were examined; and in the Report the committee to the House they advent with expressions of regret to the little encouragement which had been given in this country to the cultivation of taste among workmen. 'Towards us,' the Report states, 'a peculiarly manufacturing nation the connexion between the arts and manufactures is most important; and for this merely economical reason (were there no higher motives) it equally imports us to encourage art in its loftier attributes; since it is admitted that the cultivation of the more exalted branches of design tends to advance the humbler pursuits of industry, while the con-
neonization of art with manufacture has often developed the genius of the greatest masters in design.' (p. 3.) The general recommendations of the committee were, that there should be a 'Normal School of Design' established by the government, where both theoretical and practical instruction should be given on the application of art to manufacture, that there should be 'local' or 'branch' schools established at the chief seats of manufacture, such as Manchester, Coventry, the Potteries, Sheffield, &c.; that the government should advance part of the funds for such branch schools, the rest being provided by the subscriptions of the manufacturers; that exhibitions should be held in every province, and the prizes be distributed as in the case of the Royal Academy, and in every branch of the fine arts. The committee also recommended the establishment of a Museum of Art in provincial towns, as a means of diffusing a knowledge and love of art; that such a museum might be connected with branch schools. These recommendations were acted upon, and the establishment of a School of Design at Somerset House was at once taken up by the government. In the same year the Board of Trade recommended to the Treasury an application for a grant of £1500 for the establishment of a School of Design. It was proposed to intrust the management of the scheme to a council of competent persons, guided by such regulations as the government should make for the proper expenditure of the public money. It was further proposed that the officers of the school should be a director, two assistants, and one or two examiners; that the duty of the director or curator should be to select proper objects for the museum, to submit estimates of the expense to the Board of Trade, and to manage the system of the school; that the examiners should be all applicants, upon payment of a small fee; that the museum should be by degrees furnished with books, casts, specimens, drawings, and prints; and that exhibitions, premiums, and nominal rewards should be introduced, as incentives to improvement, and a partial conformity with this plan, two school buildings, morning and evening, were opened in 1837. The fee payable was a monthly amount, (from the opening of the school to the end of the year 1838) to 10s. per month for the morning school, which varied from the number of pupils who paid these monthly rates varied from eight to twenty-five in the morning school, and from eighteen to fifty-eight in the evening school. At the commencement of the year 1839 a reduction was made in the morning school fee from 16s. to 4s., and in the evening school fee from 4s. to 2s. Mr. Papworth was director of the school till August, 1838; after which he was succeeded by Mr. Dyce. In the spring of 1838 Mr. Dyce, who had been sent abroad by the Board of Trade, was appointed director of the School of Design at Somerset House, giving the result of certain inquiries which he had instituted on the Continent, the object of which was to determine whether foreign Schools of Design present individually a model which might be proper to follow in organizing the art of design in this country; or to collect such a model or principles which might serve as a general guide in making out the course of instruction. Mr. Dyce visited France, Belgium, Prussia, and other countries, and gave a full account of the Schools of Design in those countries; from which he drew the inference that, though there was no one school calculated to serve as a model, there was a general spirit or character pervading the whole; this general spirit consisted in making the Schools of Design not mere drawing schools, but institutions for the practical education and professional improvement of artists. In February, 1841, a report made by the council of the School of Design to the Board of Trade detailed the chief results obtained from the opening of the school down to that date. The school was in the morning session, from ten till four o'clock, was established; but in order to make the object in view more fully, an evening school meeting from six to nine was afterwards established, and much more fully attended that which held in the morning. Soon after and consequent upon re- commendation of the report the council reported that a sum of 10,000l. should be placed at the disposal of the council, for the establishment of Branch Schools in the more important towns. Applications had been made to the council from many of the great manufacturers who had established branches in the towns to this effect, and it was determined to establish branches and to give aid to the object. The terms proposed were as follows: 1st. That 6000l. should be expended in making a collection of moulds in the various departments of art, from which casts might be furnished gratuitously or at a very cheap rate. 2nd. That 5000l. should be applied in aid of the com-

tributions of the supporters of Branch Schools of Design, in the outfit and engagement of teachers: 3rd. That each contribution from the public grant should be proportionate to the amount of each provincial subscription: 4th. That for the proper management of the schools should be attached by the council to the same body of the Grant, the duties of these being to see that none of these grants were applied either for the benefit of persons who did not, or by individuals who felt an interest in the progress of decorative art. At first these prizes were given for the best designs in certain branches of industry dependent on the taste of the committee; subsequently the award was made for the best original design; and some of the prizes were therefore given for specimens of drawing, painting, or modelling from fruit and flowers; the others being awarded for designs for particular purposes, such as wall-papers, painted cottons and silks, silver plate, stained glass, and other articles in the decorative art. The plan of instruction was modified to the following form:—It was divided into three sections, of which the first comprised drawing, modelling, and colouring; each subdivided into many branches; the second comprised the history, principles, and practice of ornamental art, distinguishing antique, medieval, and modern styles; while the third comprised the practical application of the above studies to the production of designs for manufactures. 'If there be we believe that little has been done that is in accordance with an efficient mode of instruction in these two latter branches. With respect to drawings and casts, the council, during or about the year 1842, put in force the following three plans: 1st, an annual fund of 150l. was set apart by the director, Mr. Dyce, and published in sheets; 2nd, a collection of ornaments was procured from the Ecole des Beaux Arts at Paris, with a view to the production of moulds and casts for general diffusion in this country; 3rd, a system of copes for enjoyment at the Loggie of the Vatican, the copies being executed in damster on canvas screens the same size as the originals. Another feature was, the establishment of the Female School of Design (of which one had been established at Spitalfields), the council selected. Manchester, York, Coventry, Sheffield, Nottingham, Norwich, and Birmingham, as the recipients of the grants, with a prospectus extending to other towns as itinerant. In all these cases the grant consisted of a sum of 600l. as a start, varying from 500l. to 500l.; and an annual payment for three years, varying from 100l. to 500l.: the period of three years being fixed upon to test the system. A further sum of 40l. was also given. Each of these schools (of which one had been established at Spitalfields), the council selected. Manchester, York, Coventry, Sheffield, Nottingham, Newcastle, Norwich, and Birmingham, as the recipients of the grants, with a prospectus extending to other towns as itinerant. In all these cases the grant consisted of a sum of 600l. as a start, varying from 500l. to 500l.; and an annual payment for three years, varying from 100l. to 500l.: the period of three years being fixed upon to test the system. A further sum of 40l. was also given. Each of these schools (of which one had been established at Spitalfields), the council selected. 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so the state of the arts of design in Paris. On his return he published a Report to the council, in which he entered with such minuteness into the subject. Mr. Wilson and Mrs. M. ... chases various articles of manufacture, at the 'Exposition' which took place in Paris last year, for the use of the pupils at Somerset House; and the latter for the purpose of studying porcelains, &c. From these are selected a portion of a class for that purpose in the government School of Design. The Report made by this lady contains much valuable information as to the probability of employing females in the artistic branches of manufacture.

The Report of the Council for the present year, just issued, brings down the details to the end of April, 1845. From this it appears, that the number of students on the books of the Morning School, from May, 1844, to April, 1845, varied from 60 to 115, and the number of students on the books of the Evening School, from 43 to 65. The largest number attending at one time was 192, at the Evening School, in January. In almost all the departments an increase in the numbers had taken place as compared with the year 1844-5. The following table gives the relative ages of the students, in the month of February, 1845:

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<tr>
<th>Age</th>
<th>Morning School</th>
<th>Evening School</th>
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<tr>
<td>15</td>
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<td>15 to 20</td>
<td>65</td>
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<td>20 to 25</td>
<td>21</td>
<td>83</td>
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<td>25 to 30</td>
<td>7</td>
<td>17</td>
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<td>30 to 35</td>
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The number of schools under the control of the Council, in February, 1845, was 177; the number of students at that time as follows:—Somerset House, 396; Spitalfields, 199; Manchester, 150; Birmingham, 257; Coventry, 106; Sheffield, 47; Nottingham, 36; York, 79; Newcastle, 140; Glasgow, and Paisley, 84.

Drawings have been obtained from Italy of arabesques, mosaic pavements, terra-cottas, &c. M. Guizot has presented to the schools casts from the celebrated gates of the Baptistry at Florence. Specimens of paper-hanging, silk, glass, porcelain, bas-relief, and ornamental objects, have been purchased or presented for the use of the schools. Books have been purchased or presented, forming a library of reference in matters relating to art and decoration; and some of these books have been loaned, for certain regulations, lent out to the students. Books have been sent by the Council to all the provincial schools, in some cases as a gift, and in others on loan, to be transferred from one school to another in succession. In the Female School, the students are in most cases preparing for the following examinations:—pattern-designers, designers for wood-engraving, for lithography, for children's books, for porcelain, and for ornamental articles generally; or else as teachers: and the specimens produced by these competitors, of the work designed for wall-paper, for porcelain, &c. On two days in the week, instruction in wood-engraving is given to a small class. The prizes offered to students at Midsummer of the present year are for designs for carpets, silk-damask hangings, table-covers, paper-hangings, furniture and chiniers, chandeliers, &c.; as also for arabesques, frescoes, encastres, drawings, original models, copies from casts, drawings of flowers, &c.; most of these are competed for in the Male Schools only, but some are open also to the Female School. Several rooms in the Strand front of Somerset House are used for the purposes of the school. The room for the female students is on a different floor, and wholly distinct from the others. The morning and evening students in the school are independent of each other.

In the first, an anteroom, the walls are covered with specimens of fresco, encastre, distemper, oil, and other kinds of painting, comprising arabesques and ornamental subjects generally; the copies from the arabesques of the Vatican are placed upon revolving quadrangular pillars, for the convenience of the students copying them. Beyond this room is the large room where the greater part of the students assemble; it is provided with long ranges of desks and seats, and conveniences for removing the drawings with the views of objects are to be copied; and there are porticoes at hand for containing a large collection of ornamental designs and drawings. On one side of the room is a bench where the students in modelling, or preparing objects for copying. Around the room, at a considerable height from the ground, is a gallery, the walls of which are filled with plaster casts, illustrating various kinds of decorative art. Adjoining this large room is a smaller one containing casts from statues, busts, groups, frescoes, bas-reliefs, and other specimens in plaster, with conveniences for drawing and copying.

Admission to the schools is not obtained without a recommendation from respectable individuals; and the fees payable continue the same in amount as they have been for some time past; viz. 4s. per month in the Morning School, and 2s. per month in the Evening School and the Female School.

Foreign Schools of Design.—Mr. Dyce ('Farp. Pam. 1840, vol. xxix. p. 683) states that the present system of Art-education in Prussia consists of Primary or Elementary Instruction; Secondary and Normal Instruction; and Academic Instruction, in the Schools of Fine Art; a division corresponding very closely with the system followed in Prussia for general education (for which see Schools, P. C.). In Prussia, 'under the term Fine Art, every species of decorative design is supposed to be included; no difference in principle being recognised between that kind of art which is applicable to manufacture, and that which has for its object the poetical, the imaginative, or the historical. The immediate result of this opinion is, that in the matter of education, the difference between a school of design for manufacture and an academy of fine art is made to consist not in the kind of instruction afforded, but in the amount or degree to which it is carried.' The schools of Fine Art in Prussia, are, one at Berlin, one at Düsseldorf, and several others, in provincial towns, give instruction in 'Drawing from the Antique,' 'Modelling from the Antique,' and 'Geometrical and Architectural Drawing.' They are open to all applicants, on payment of an average fee of about twelve shillings per annum.

The next higher grade includes two schools, the 'Gewerbeinstitut' and the 'Bau Akademie,' both at Berlin. In the former of these two the studies have reference to all the branches of science or art bearing upon manufactures; comprising drawing of machinery, modelling in clay, elementary geometry, architectural drawing, principles of construction, various branches of mathematics, the physical sciences generally, practical mechanics, mineralogy, original sketching, perspective, sculpture, and studying in workshops belonging to the Institute. Admission to this school is generally contingent on a favourable progress through the elementary schools; and many of the students who leave it become competent overseers and directors of large manufactories. The education is gratuitous; and rewards are occasionally given to the students. The second of these two schools, the 'Bau Akademie,' is for the education of artists in the branches of manufacture depending on architectural knowledge; architecture being here considered rather as a science than a fine art. All the matters which bear in any way on building, civil engineering, or surveying, come within the scope of this school. The highest class of schools is that in which each belongs to the Royal Academy of Berlin, and in which the fine arts are embraced in their widest range, without reference to any particular mode of application; all the other schools being subordinate to this as parts of the national system.

In Bavaria (Dyce, p. 645) the education in art is so peculiarly mixed up with education generally, that it is scarcely possible to separate them.

There are six different kinds of education, and four grades. The six are:

1. Purely scientific education.
2. Purely popular education.
3. Agricultural combined with scientific education.
4. Agricultural combined with popular education.
5. Technical combined with scientific education.
6. Technical combined with popular education.

The four grades are:

1. Elementary.
2. Gymnasial.
3. Lyceal.
4. University.

Some of the six sections go through all the four grades of study, while others embrace only two or three. In all of the sections the study of art occupies a position, especially in that one which approaches nearest to the Schools of Design, in the Technical or Polytechnic. The earlier stages of this department are taught at the elementary schools scattered about the country; the foremost one, or that which is in each large town; and the last stage is at the Lyceum, of which there are three. The Lyceum at Munich attends chiefly to architecture and the application of the fine arts to
manufactures; that at Nuremberg to metal-coating and wood-carving chiefly; and that at Augsburg to textile manufactures. The regulations of all the schools, and the bearing which they have upon each other, are minutely detailed by Mr. Dyce.

In France (Dyce, p. 657) there are, innumerable, between the schools and the royal academies, several others which treat of art in its relation either to manufacture or to science; and which are either supported partly by the state and partly by municipalities, or are private establishments assisted by municipalities. The 'École des Beaux Arts' at Paris, schools of a somewhat similar kind at Lyon, Strasbourg, Dijon, Nancy, Bordeaux, &c., the 'École Royale Grattzie de Desin,' at Paris, are the principal of these; and in most of them a very extensive system of studies is pursued, bearing in view the instruction and advancement of practical and medical arts. The school of art at Lyon, in particular, is an important one in connection with the silk-manufacture carried on in that city; and every endeavour is there made to foster taste in manufacture. Dr. Bowring spoke pointedly upon this subject in his evidence before the committee in 1836; and said that the origin of all the schools of art in France, amounting to about eighty in number, is to be traced to a conviction that the application of the principles of art and science to manufacture is the best means of advancing it. Mr. Dyce illustrates the matter thus: 'At Lyon the commercial value of taste is valued so high, that when a young man displays remarkable powers, a house will admit him to a partnership, in order to monopolize the manufacture of his productions. In general employment, a Lyonnaise pattern-designer in good practice realises as much as 10,000 francs per annum.' (Report, p. 35; or p. 687 of the volume before quoted.)

DESMODE''LIUM. [Zoocareus, P. C.]

The following are examples of a term employed in the London clay of Sheppy. (Geol. Trans., N.S., vol. v. t. 8, f. i.)


DEVASTAVIT. [Executor, P. C.]

DEVONIAN SYSTEM. A great portion of the Palæozoic strata of North and South Devon has been thus termed by Sedgwick and Murchison (Geol. Tranc.,) and also referred to as the Devonian system with the distinction of a sub-division.

Further investigation has shown that a portion of the strata in North Devon belongs to the Carboniferous system, and is equivalent to the lowest shales and sandstones thereof. The old red-sandstone must certainly be admitted to be coeval with some parts of the Devonian strata, which besides contain several red-sandstone members; but there is reason to think that the true place of much of the stratification of South Devon, on the ordinary geological scale, is rather among the oldest shales and sandstones of the Carboniferous system, than as the old-red-sandstone member of the Devonian strata. These rocks harmonize with the distribution of organic remains in the Silurian, Devonian, and Carboniferous deposits. DIANAChora, a fossil genus of Conchifera, allied to Pseudolytia. Dianchiara striata and D. lata are described by Mr. Sowerby in the chalk and greensand (Nat. Conchology of Great Britain)

DIAPER, a kind of textile fabric, formed of either linen or cotton, or a mixture of the two, upon the face of which a figured pattern is produced by a peculiar mode of twining, or twizzling. [Weaver, P. C. pp. 177, 178.]

Diapers, which, excepting damasks, are the most ornamental kind of twilled cloths, are chiefly used for table-linens, fine towels, &c.

The word 'diaper,' observes Mr. Flanché, in his 'History of English Costume,' 1698, 'is derived from the French word "D'Ipres," i.e. "of Ypres," a town in Flanders, famous for its manufacture of rich stuffs and fine linen before the year 1200.' 'Ducange,' he adds, 'derives it from the Italian "disegno," the jasper, which it resembles in its shifting lights; but the first is by far the most plausible conjecture; and though we read of diapers of Antioch, it is only because Ypres, having given its name to its peculiar manufacture, any similar cloth received the same appellation.

A diaper, in weaving, and in the ornamenting of glass, the term "diapering" is sometimes applied to a small delicate pattern introduced to diminish the appearance of baldness where a considerable space is covered with one colour, and thus to relieve the monotony of forming any part of the main design. In heraldic painting, especially, it is resorted to, particularly where the juxtaposition of considerable masses of black and white might prove unsightly; but in all such cases it should be remembered that the diapering forms no part of the heraldic bearing.

DIASPASE. [Chemistry, P. C. S.]

DIATOMACEAE. [Zoocaracps. P. C.]

DIBIDIN, THOMAS, one of the sons of Charles Dibdin, was born in 1771. After having spent some time at a school of the United Church of England in London, he was apprenticed at the age of sixteen to an upholsterer in London, whom he served for four years. He then joined a company of strolling players in Essex, and for several years wandered through the country in that profession. In 1795 he returned to London, where he was engaged at once to Mr. Proctor, as manager of the large Diaper and Derby theatres; and in 1797 he was engaged as an actor at Kenton Garden theatre, with which, as actor or author, he continued to be connected for fourteen years. The latter part of his life was spent in indigence. At the close of his days he was engaged by the Lord Chamberlain of the minor theatres; and for which he received an allowance from the Lords of the Admiralty. He died at Pentonville on the 16th of September, 1861, leaving children by each of two marriages. Thomas Dibdin's comedies, operas, and farces are numerous enough to fill a long paragraph with their bare names. Many of them were composed for temporary purposes; and many others had little or no success. But there are some which, either through merits of their own or by their adaptation to particular actors and stages, still maintain a place on the stage. Such are the operas of 'The Cabinet,' and the farce of 'Past Ten o'Clock.'

DICERAS, a fossil genus of Conchifera, allied in form to Chama. It includes species mostly occurring in the upper part of North England, and (D. Longissimus) the lower part of the greensand. D'Orbigny ranks the latter species as Caprotina.

DICHOBUNE. [Apothiutriniun, P. C.]

DICHROISM, from the Greek words δί (double) and λεισμός (glare), is a term employed of certain crystals by which they exhibit different colours according to the position of their axes with respect to the incident pencil of light.

Some of the phenomena relating to the differences of colour in a crystal were observed by Dr. Wellston in tournaiolines and some other minerals, but Dr. (Sir David) Brewster was the first to discover that they were caused by the different absorptions of the rays of coloured light in their passage through the crystal. Coloration in crystals is due to the presence of a few mineral species, which form the admixture of the specific substances of which the crystal is composed. The differences of position of these functions of the lengths of waves, by which the tints of colour are expressed. Sir David Brewster observed that when common light was transmitted through certain species of beryl, the tint, a bluish-green, was the same in every position of the crystal; and the like equality of tint, when common light was transmitted in any direction, was found to exist in yellow carbonates of lime, and in many other minerals: but this was found to be not always the case; in some species of coloured minerals the phenomena depend on some mutual relation of the axes of the crystal. When the crystal is placed along the axis of the crystal emerges of a deep red colour, and that passes perpendicularly to the axis is green; also, in some specimens of sapphire the colour seen along the axis is a deep blue, and that which is seen perpendicularly to it is a yellow tint.

A pencil of common white light being suffered to fall on a prism of doubly refracting crystal, Sir David Brewster found that the colours of the two images, which were the same when the refracted rays were parallel to the axis, differed from one another when the rays were inclined to the axis, and so much the more as the inclination was greater, the difference becoming greatest when the angle of inclination was a right angle.

And Sir John Herschel has represented (Treatise on Light, in the manner in which they are connected with the ordinary and extraordinarily refracted pencils by algebraic equations of the forms

$$x = a + y \sin \theta, \quad \sigma = a + y \sin \theta,$$

of which the terms are functions of the lengths of undulations for the different colours: thus, $x, y,$ denote expressions for the tints of the ordinary and extraordinary pencils when the incident rays are parallel to the axis of the crystal; $y, \sigma,$ expressions for the tints of the pencils when the incident rays are at right angles to the axis of the crystal; $\theta,$ the angle which the incident pencil to the same axis; and $a, \sigma,$ are the terms of the ordinary and extraordinary pencils corresponding to the value of $\theta$.

Adding these equations together, there is obtained

$$a + \sigma = x + y \sin \theta,$$

Now, when $\theta = 0, a + \sigma$ becomes equal to $x + y \sin \theta$; and the latter is an expression for the tint arising from the combination of the two pencils in the direction of the crystal axis; or it is the tint observed in the crystal when common...
light is transmitted in the direction of the axis: let therefore
\[ x + x' \] be represented by \( a \). Again, when \( \theta = 90^\circ \), \( a + a' \) becomes a straight line, and this is an expression for the tint arising from the combination of the pencils in a direction perpendicular to the axis of the crystal; or it is the tint observed in the crystal, in that direction: therefore let this expression be represented by \( b \); then we shall have \( y = y' = \beta + \alpha \). From substituting these values in the original equation, there arises
\[ a + a' = a \cos^2 \theta + 2 \sin \phi, \]
and the second member is the expression for the tint arising from the union of the trans refracted pencils; this is an incident light makes any angle \( \theta \), with the axis of the crystal.

Sir David Brewster also found that there are several crystals
on which if a pencil of white light polarized in any plane, be allowed to fall, the transmitted light will vary in colour according to the plane by which it is crossed. The first condition of these were of different colours; one having the tint which would be produced by transmitting through the prism polarized light, in a certain position of the axis; and the other, the tint which would be produced by turning the crystal at right angles to the incident light, with the axis in a position which was calculated for 1819. Sir David Brewster has given lists of crystals, both uniaxial and biaxal, which possess these properties; and Sir John Herschel has given, for the expressions of the \( t \) of the ordinary and extraordinary images in every position of the crystal, the equations:
\[ a = (x + y \sin \phi) \cos \phi, \quad a' = (x - y \sin \phi) \sin \phi, \]
in which \( \phi \) is the angle made by the plane passing through the axis of the crystal and the incident pencil with the plane of the incident light, so that every tint is the emergent pencil, or \( a + a' \), the expression
\[ a \cos^2 \theta + (a \sin \phi + n \sin \phi) \sin \phi \]
in which \( m \) and \( n \) denote the tints seen when \( \phi = 0 \) and \( \phi = 90^\circ \) respectively; and he finds that \( n + m \) is equal to the tint which was before represented by \( b \).

DICTAMNUS. [Flaxinella, P. C. S.]

DICTYOCDA, a genus of fossil Insuforitis, from the Poierschifter of Opun.

DICTYPHELIUM, a genus of fossil plants, proposed by Lindley and Hutton (Fossil Flora) to include a large specimen (D. crassianum) from the new red-sandstone of Liverpool, and a more delicate species (D. rugosum) from the oolithic shales of the Yorkshire coast. The latter is regarded as a few years since first noticed as in the midst of the various kinds of 'fusible metal,' such as will melt at a low temperature. Type-metal, consisting of five parts of lead to one of antimony, will answer for the purpose, but it is deemed better to use an alloy of the same metal, and differing alloy, tin, lead, bismuth, and antimony, however, will suffice. The die to be employed is fixed face downwards at the lower end of a hammer, which works within a box or case to prevent the liquid metal from splashing about; at the bottom of the box is a cast-iron plate, on which is placed a small paper tray. The alloy is melted, and allowed to cool down to a pasty state; a little of it is placed in the paper tray; the box is closed on all sides, and the stamp is allowed to fall on the alloy; a modellling is produced from the die, rough at the edges, and with an impress, only on one side. The contact of the cold die solidifies the alloy, and produces a clear and tolerably sharp impression. The medalion so produced are trimmed at the edge by a lath, and rendered smooth by being finely cut, and polished and then returned to back, to form a perfect medallion, and sometimes they are mounted in cases, with only one side visible; the surface being bronzed with metallic sulphates. In some instances, instead of clitch medals being produced from castings, clitch moulds are produced from models made of plaster, wood, sulphur, clay, wax, or metal; thus, the Italian figure-casters often make casts from medallions and small basse-rilievi by means of moulds which have been made en clitch from models. The process of copying medals by engraving (to which an allusion only, without any description, was given in Engraver, P. C.), depends partly on the same principle as the Silhouette or profile machine; that is, a lever of which one end traces over the object to be copied, and the other end over the copy itself; so that the two, though differing perhaps in extent of movement, make movements of the same
depth than in the dies for coins, such as those intrusted to the hands of Mr. Wyon. By very minute touches, and by the aid of small clitch tools, the engraver cuts away the steel until he has produced a relief. A die, then, is, an exact reverse of the design for the medal or coin. The steel, in a soft state while being engraved, requires hardening before being applied to use. The face of the die is covered with a protective coating, and then it is placed in an acid and it is then placed face downwards in a crucible, where it is surrounded with pounded charcoal; after being heated to a 'cherry-red' temperature, it is taken out by means of tongs, the face being washed in water, which renders the steel extremely hard. When further prepared, so as to be rendered more durable, it obtains the name of the matrix, and might be used in that state to stamp coins or medals; but as such a matrix is very costly, and might be broken quite easily, the dies are usually made from multiplied copies of it. A small block of soft steel is, by immense pressure, made to receive an impression, in relief, from this matrix; and from this second piece, which obtains the name of the pamphlet, after being hardened and re-touched by the graver, dies or duplications of the original matrix are produced, as briefly noticed in Intaglio, P. C. These dies, when intended for coinage, are intrusted to the 'Clerk of the Irons' at the Mint, whose duty it is to superintend the die-making and testing. A specimen of the 'reverso' of the 'Pistocci' is preserved at the Mint for 1819, 1820.
and. The object in view, in medal engraving, is to produce an engraving which shall catch the eye in a belief that the surface is raised like a medal, instead of being flat; and such medals as have been produced within the last few years. We may suppose a medal to be laid down flat, and that placed near it is the copper plate on which the engraving is to be made. A peculiar bent lever tool is used in scratching a tracing or drawing. This lever tool has a tracing-point at one end and an etching-point at the other; the tracing-point comes down vertically on the metal, whereas the etching-point comes nearly horizontally into contact with the etching-ground of the copper plate. When the tracing-point passes over a flat level part of the metal, the tracing-point marks or engraves a horizontal line on the etching-ground; but when the tracer rises over any part of the relief of the medal, the etching-point makes a curved line, more or less convex in proportion to the degree of relief of the copper plate. By passing the tracing-point over every part of the surface of the medal, in parallel lines, the etching-point is made to mark an equal number of lines on the etching-ground of the copper plate; but these latter lines, instead of being straight and parallel, have varying degrees of curvature. In passing over a sloping part of the device on the medal, the lines in the engraving become either more closely placed or more widely separated than in the former case, according to the direction taken by the sloped surface; thus giving the light-and-shade appearance of a surface in relief.

The principle here noticed was the one acted on until within the last twelve or fourteen years; since which time Mr. Bates and M. Collas have introduced several improvements in the method of forming the lines of formaux which necessarily resulted from the older method. Mr. Bates has traced the plate over the medal at an angle of 45°, instead of vertically, an angle which he shows to be better fitted to avoid distortion than any other. A few years ago there was a project before the public, to publish engravings of the large collection of medals contained in the British Museum, as a means of illustrating the history of the times when the medals and coins were struck, and to form the engravings into a work to be called 'Medallion Illustrations of British History.' A committee of the House of Commons, appointed to investigate various matters relating to the British Museum, had its attention drawn to this point; and Mr. Brockden, as an example of the rapidity with which medal-engraving could be effected by Mr. Bates's machine, mentioned the following:—

'This large medal of Henry IV., about four inches in diameter, was begun last evening at four o'clock, and finished at two o'clock this morning, that is, finished in the tracing upon the etching-ground: it was then passed into the lazaret, and was done at the rate of eight lines per hour; and the lines traced through the ground with an acid; and it is now a proof that if an artist had superintended it, it would have united all the beauties of such a work of art.'

II. A genus of plants belonging to the natural order Araceae, to which the Caladium Seguinum, Dumb Cane, belongs. [Caladium, P. C. S.]

DIEPENBECK, ABRAHAM VAN, a distinguished Dutch historical painter of the Flemish school, was born at Hertogenbosch (Bois-le-Duc) about 1607. He was already a good painter on glass when he entered the school of Rubens at Antwerp, in which he was the fellow-pupil of Vandyck; and he is the scholar who is said to have been pushed against the great picture of the Taking down from the Cross, which was painted at the wet, the consequent damage to which was so admirably repaired by Vandyck. Diepenbeck lived at two periods with Rubens, before and after a visit to Rome, but in the second period more in the capacity of assistant than scholar: He was one of Rubens's assistants in his cabinet of instruments, who in each capacity success in this art; but in colour: in design he was never excellent; he was too hasty in his execution. He had however a great reputation at Antwerp, and in 1641 was elected director of the academy there, an honor which he held until his death.

Diepenbeck came to England in the time of Charles 1., and was employed by William Cavendish, duke of Newcastle, to make the pictures for his book on horsemanship, some of which in Watford's time were still exhibited in the hall at Wadsley. Diepenbeck's works are very numerous, but they consist chiefly of designs made for booksellers. Heckenhein has given a long list of the engravings after them in his Dictionary. One of his best works is a series of engravings published in 1559 at Paris, under the title of 'Tableaux du Temple des Muses,' with illustrated letter-press by the Abbé Marolles: the subjects are from Ovid's 'Metamorphoses,' and the engravings are executed by Bloemaert, Matham, and other eminent engravers. There are several later editions and translations.

His oil paintings on canvas are scarce: some pass probably as the works of Rubens; but there are still many of his prints in the churches of Antwerp. Houbraken says Diepenbeck was the best painter on glass of his time.

DIEZ, ALBERT, a landscape painter and engraver, was born at Hanover in 1755. He learnt the first drudgery of painting under an obscure artist of Hanover, with whom he spent three years: at the expiration of this period he visited Dresden for a year, whence he went to Rome in 1778, with the recommendation of Petitot, a French engraver. When he returned to Rome he attracted the notice of the celebrated Piranesi of the earl of Bristol, who wished to make a second Savonarola; but the painter preferred sketching from nature to copying or to imitating the works of the gloomy Novecento. He also carried out commissions for portraits, and for a number of mechanical inventions. He was highly esteemed by the French Academy, and was made a member of it in 1796, but II. 1746 he received in 1796, but

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appointment in the picture gallery, with a salary of 400
six-dollars per annum, or about eighty guineas; and when the
Academy of the Arts, of Dresden, was established in 1763,
Dietrich was one of the first directors. He spent nearly
six-dollars, and he was, at the same time, made director
of the school of painting in the porcelain manufactury at
Meissen. He died at Dresden in 1774, aged sixty-two, and
is supposed to have hastened his death by his incessant appli-
cations. He had a passion plant in him, and his exec-
tion was an indefatigable painter, and laboured at his
art with little interruption till within the last few years of
his life, when his weak state of health rendered it physically
impossible for him to do much in which he copied
his master with surprising exactness. He was most able,
however, as a landscape painter; but his views were
usually arbitrary compositions, well coloured, transparent,
and effectively lighted. He often painted in imitation of the style
of his celebrated master, Everdingen, Poelenburg, Berghem, 
O. Claude, and in all occasions the imitations were excellent.
He copied also, with equal facility, the style of Raphael,
Correggio, Miers, and Ostade. He also repeatedly imitated
the style of Rembrandt, both in paintings and in etchings,
especially in religious pieces, but with somewhat less
accuracy as to the costume and the proportions of the human figure:
but for this circumstance the most experienced judges might be
decieved; yet all his works display something in the
character of his master.
Dietrich painted also many rustic pieces, and pieces in the
style and manner of Watteau. Two collections of etchings
by him have been published, which are very scarce, especially
during the second, consisting of 87 plates, published
after his death, and under the title of Zing. Some of his etchings are signed Dietrich, and others
Destry; the earlier ones are marked with the former name.
There are also many prints after his works by other masters.

There are twenty-seven of Dietrich's pictures in the Royal
Gallery at Dresden, and there is a good collection of his
drawings and sketches in the collection of prints there.

[Manuel, Miscellanea Artistici Inhulta; Heinicke,
Morgen vom Künstler, &c.; and Dictionnaire des
Artistes, &c.]

DIFFERENCES, EQUATIONS, OF, [Equations of
Differences, P. C. S.]

DIFFERENTIAL EQUATIONS. [Equations, Dif-
ferential, P. C. S.]

DIGBY, GEORGE, EARL OF BRISTOL, was born
in 1612 at Madrid, where his father John earl of Bristol
was then ambassador. He was educated at Magdalen College,
Oxford, travelled in France, and in 1640 entered public
life as one of the advocates for the ears of the late
king, and during all this time his career was marked by that
interrupted series of clever inconsistencies, which make his life like a novel and
his character like a riddle. Neither his character nor the
succession of his debtor's possessor is sufficiently understood, only from a full
collection of particulars. Such a collection will be
found in the very long memoir of him given in the 'Bi-
graphia Britannica.' After distinguishing himself in the
army of Commons as a member of the opposition, he sud-
only joined the court in the middle of Strafford's trial; after-
wards he advised the seizure of the six members, and was one of the
most violent of the king's imprudent advisers. Com-
pelled to leave England, he served in the French wars of the
Fronde, where he gained much reputation, but behaved
in some instances as if to be cashiered: and next, seeking service
with the king of Spain, he was embraced the Roman Catholic
religion, against which he had formerly written a treatise.
After his restoration he returned to England, and sat in the
House of Lords, where he, a Roman Catholic, spoke and
voted in favour of the Test Act. Another of his most
prominent public appearances was his impeachment of Lord
Clarendon in 1663. This able but eccentric and useless man
died at Chelsea on the 5th of August, 1677. His literary
character is not more than respectable. His principal works
are several speeches, a good many letters, a translation of
the first three books of the French romance of 'Cassandria,' and a
long play called 'Elvire, or the Worst not always True, a
Comedy in Five Acts, by the most celebrated Mr. Dryden,'
and printed in 1677, and is reprinted in Dodgley's 'Old Plays.'

DILIGENCIA, a genus of grasses belonging to the tribe
Poaceae. It has bladed spikes, the spikelets of which
lie on one side of a flattened rachis, unarmed, 1-sowered with an
inferior rudiment & the glumes 2, lower very small, upper 3-
nerved; the sterile flowers of one 5-7-nerved palea resembling
the upper glume and equaling the flower. This genus has obtained
its name from the singular form of its heads
of flowers which look like fingers. Two species are described
as natives of Great Britain. D. saxorum is found
in Battersea Fields, near London, but is not a true
native. It has the leaves and sheaths hairy, the flowers
oblong-lanceolate, glabrous with downy margins. It is a
weedy plant, and has oblong-lanceolate, glabrous leaves from
an idle trick which the boys in some parts of Germany
have of pricking another's nose with its epipetala till they
bleed. It abounds by the roadsides in Poland and Lithu-
ania. It is also found in Sweden and Norway, are collected, and boiled
whole like rice with milk, and is esteemed a pleasant
article of diet. The other species is D. humifusa; it has leaves
and sheaths glabrous, flowers elliptical and downy,
with glabrous nerves. This is a rare plant, and grows in sandy fields.
It is a true native in many parts of England.

(Babington, Manual; Loudon, Encyclopaedia of Plants.)

Diligence, in the law of Scotland, is an expression
nearly equivalent to execution in the law of England.
It includes the various means by which the person
may be seized and imprisoned, or the property attached and disposed of,
to the end of enforcing payment of debt or performance
of any civil obligation. It would not give a comprehensive
view of the object of this procedure to say that it is for the
satisfaction of creditors; for it has a much broader
use because it is a characteristic of Scottish procedure that not only
will an agreement properly executed between parties to allow
diligence to proceed without a judgment (as in a warrant
to seize land), or a judgment (as in a mortgage enforced in England) be a suffi-
cient warrant for diligence, but certain obligations, of which it is the characteristic that summary or
the more rapid kind of diligence can proceed on them if they are
not in any way vitiated or imperfect. These documents and
bills of exchange and promissory notes, and a facility
of recovering the debts contained in such documents, by a
rapid method of execution, is a marked feature in the
mercantile code of Scotland, and one which is believed to have
beneficial effects. The only instance of diligence can issue, such a doc-
ument must be protested and registered in the books of some
competent court, and thence the diligence issues, as if it were
found on the decision of the court. The registers being
accessible to the public on payment of certain fees, it is
believed that this facility for tracing the initial steps of bank-
ruptcy is made use of by members of the mercantile community
of Scotland, who have a machinery by which they can inform
each other of the persons whose names appear on the register.
Diligence is neither against the person, before imprisonment, or
against the estate, but against a 'third party.' This term is
divided into two kinds—that against the heritable or real estate
[Adjudication, P. C. S.], and that against the moveable. This
latter admits of a subdivision into an attachment of property in
Scotland, and the proceedings in the court ofill of
Poinding, P. C. S.), but where it is by a landlord for rent, Se-
questration; and an Attachment, in the hands of a person who is
owing money to the debtor or holds property belonging to the
debtor in his custody. [Arrestment, P. C. S.] Formerly
diligence was, in the greater number of cases, proceeded on the
assumption that the debtor, being charged to pay in the king's name
and refusing, was to be denounced a rebel by a messenger at
arms, who certified that he performed the denunciation by
force blasts of a trumpet, and it was nominally as a rebel that
his person or estate was seized. A more simple and econo-

mical procedure has been substituted for this by 1 & 2 Vict. c. 114.

DilleNIUS, [Sherard, P. C.]

DILUVIAL FORMATION. The superficial deposits of
gravel, clay, and sand (sometimes containing shells and bones
of land mammals), which lie far from their original sites on
hills, and in other situations to which no forces of water
now in action could transport, and which are horizontally
arranged. The formations proposed by geologists are various, and yet unassis-
tently demonstrated. Violent floods passing over the land;
streams flowing formerly at levels and in lines now impossible;
the littoral action of the sea during the time of the uplifting
of the earth; and; glacier action, or the carrying of sediment over the surface while yet it was covered by the ocean, have
all been strongly proposed for adoption; but the phenomena
are very complicated, and seem to require many partial solu-
tions of these phenomena, many of which are now con-
ceptual. For a statement of many interesting facts
on this subject, see Buckland, Religio Dilettavis; Ausania,
DIOCYSIUS CATO. This name is given to the author of a Latin work in four books entitled *Dionysi Catonis Distichis de Moribus et Filium.* But the real name of the author is unknown, and the date when he lived. It is admitted, however, that he lived before the time of the Emperor Valentinian. These Distichs, which are in verse, are short moral precepts intended for the education of youth.

The work was edited by M. Catullus, but the younger Cato (entitled *Carmen de Moribus,* from which Augustus Gallus (xl. 2.) has given several extracts; but it was not a poem, as some critics have falsely concluded from the word Carmen: for that word meant something expressed concisely, and did not necessarily imply any metrical arrangement of the words.

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(Dabr. Geschicht. K. Lit.; Schweitzer, Handbuch der klassischen Bibliographie.)

DIOCYSIUS OF CLOPHON, a celebrated Greek painter, who lived in the time of Pericles. His works were known to Aristotle, who, in speaking of imitation, says, that it must be superior, inferior, or equal to its model, which he exemplifies by the works of three painters, Polygnotus, he says, men painted better than they are, Pauson worse than they are, and Dionysios as they are. By which we may infer that Polygnotus had a good natural hand, as we learn from Plutarch, who states that his works had both force and spirit, yet they appeared to be too much laboured.

Polygnotus and Dionysios were contemporaries, and, according to Aelian, painted similar subjects in a similar style, except that Dionysios painted in small, and Polygnotus in large. Aelian, in the passage alluded to, evidently refers to the styles of the two painters, and not their pictures; he says that Dionysios excelled in every respect, except in size, the art of Polygnotus. Nearly the same might be said of Garofolo with respect to his small works and the art of Raphael, without implying that Garofolo copied in small the pictures of Raphael, which is the interpretation given by Silius and other modern writers. Aelian, namely, that Dionysios copied in small the pictures of Polygnotus.

There was another painter of this name who lived in Rome about the time of the first Roman emperors. Pliny states that his was filled picture galleries; he was probably a portrait painter, and was the same Dionysios who was called, according to Pliny, the Anthrolograph, because he painted nothing but men.

(Aristotle, Post. c. 2; Plutarch, Ther. 36; Aelian, Var. Hist. 28, 30, 31; Pliny, Nat. Hist. xxvii. 40.)

DIOCURIDES, a celebrated antient gem engraver who lived at Rome about the time of the Emperor Augustus. Augustus and later emperors were in the habit, according to Suetonius, of using a seal, representing Augustus, which was engraved by the artist. There are several portraits which was engraved by the artist.

There are still several gems extant which bear the name of Diocurides, but the genuineness of most of them has been questioned; a few of them however are beautifully finished, and are perhaps worthy of the reputation of the greatest gem engraver of antiquity, a reputation which Diocurides had, according to Pliny.

A DIOCURIDES of Samos was a worker in mosaic; two of his works have been discovered in Pompeii.

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before they produce roots. It cannot be propagated in this country either by cuttings or seeds.

(Loudon, Encyclopædia; Lindley, Flora Medic.)

DISCOBOLI, the third family of the Malacostracous oceaneous fishes in the arrangement of Cuvier. The dissection, being in his hands, he has preserved the body, of a disk composed of the united ventral fins. The fishes of this family are popularly known as sucking-fishes. The most common and most remarkable species inhabiting the British seas is the Lamp-sucker, Cyclopsomatus Lumbatus. It is a large fish, but the property, having a erect crest or ridge, and having a powerful sucker under its throat formed of the combined pectoral and ventral fins. Before the spawning season it is of a brilliant crimson colour mingled with orange, purple, and blue, with glimmering iridescent markings. When full grown it is well furnished with taberecles, but when young is smooth and beautiful, marked with brilliant stripes of various hues. In the seas of the Orkneys, in June, numbers of the young fish, half an inch in length, are seen swimming around floating seaweed. For a long time they were supposed to belong not only to a different species, but even to a different genus. In the old fish the sucker is so powerful that a pail of water, containing some gravel, has been lifted up by a person holding the tail of a Quantalum, and by its aid carried through the street of Distien. It's brought to market, but oftener as a curiosity than as an article of food. The Cyclopsomatus Lumbatus ranges from the shores of Greenland to those of the south of England, and weet there are several other species. For the future, all the members of this family is Lepidogaster, consisting of a number of small fishes which have two disks on the under surface of their bodies, the one formed by the pectoral fins and the other by the ventrals. They adhere to stones, rocks, and shells by these disks. They have wedge-shaped defensive scales, smooth and without scales, often painted with the most brilliant and defined colours. The Ses-Noa, or Lippus, is a third genus of this family, the species which resemble gobies in form and habits. These fishes are chiefly at home on mud, and are not as brilliant as others of the tribe. They are furnished with a single sucker formed by the united ventral and pectorals.

DISCOIDEA, a genus of Echinoderms, in which are ranked, by Grey and Agassiz, several species generally referred to in works on organic remains under the title of Galeraxies. They belong to the chalk, greenand, and oolite.

DISCOVERY. [Invention and Discovery, P. C. S.]

DISPAIT. This word is defined under Dispaft, P.C.S., and is only to be observed in the dictionary. It is a pith; at the base of the gun, an angle equal to that which, in a vertical plane passing through the axis of the bore, would be contained between that axis and a line (called the line of marks) in which the gun is thought to be aiming. It is the angle subtended by the base of the gun. It is measured in a 24-pounder gun, nine feet long, for example, the dispaft is equal to 27 35 inches, and the angle subtended by it is equal to 27 nearly; allowance must consequently be made for this value in pointing the gun by the line of metal.

In order to place the axis of the bore at any angle with a horizontal plane, a tangent scale is employed (Ordinance, P.C.S.); and in determining the graduations of this scale, it is manifest that the length of the part raised out of the groove in the base of the gun should (the length of the gun being considered as the radius) be equal to the tangent of the difference between the number of degrees in the proposed angle of elevation and the angle subtended by the dispaft; in order that, on lowering the base of the gun till a line joining the top of the scale and the top of the muzzle is parallel to the horizon (which may be determined by a spirit-level on a rod laid from one of those points to the other), the axis of the bore may be correctly elevated. Thus, in the gun above mentioned, for an elevation of 70 degrees, the cutting on the division of 70 corresponds with the top of the base ring, the part raised should be equal to the tangent of 39 only; for an elevation of two degrees, the part raised should be equal to the tangent of 1 38°; and so on.

DISPOSITION, in the law of Scotland, is the name given to any unilateral writing, or, as it might be termed in England, deed poll, by which a party solemnly makes over to another a piece of property heritable (viz. real) or moveable. It is next seldom used as a title to moveables alone, and it is in the law of real property that it is of most frequent use and of highest importance. When a new feu or fief is created, it is by charter, but when a fief is transferred from one holder to another it is by Disposition, and notwithstanding the system of mimicking or substituting by Secession, the Disposition took the place of regular title. In the Disposition, the character of the tenures, and all the conditions on which the property is to change hands, are set forth, and being given to the disponente, he is in no respect liable for the fulfillment of the acts to which he is under any other obligation to make good. If a person has given him a full title, and contains the warrants for getting the title made real by indenture and registration, and by obtaining the superior's sanction to the new investiture. The disposition is not only used for the absolute transference of heritages, as that term is understood, but for the change of real securities. The ordinary heritable bond was found insufficient to give the security-holder a prompt and effectual means of realising his debt by taking possession of the subject of the security, and this was the disposition. The subject, under reversion to the debtor, or with a right of remainder to him on paying the debt. As heritable property cannot be bequested by testament in Scotland (W. J., F. C.), the usual form of family settlements in which such property is disposed of is the Disposition.

DISSEN, GEORG LUDOLF, an eminent German scholar, was born on the 17th of December, 1784, at Grossen-Schoneen, near Göttingen, where his father was pastor. He had both his parents at the age of thirteen, and Disson, with his two brothers, went to Hanover, with his father, of whom Disson was a benevolent friend procured for him admission, free of expense, to the celebrated school at Pforta in Saxony, whither the boy was sent in his fourteenth year. He remained an excellent foundation for his future philosophy. Notwithstanding his delicate and weakly appearance, he enjoyed excellent health, and displayed the greatest activity. In 1804 he left Pforta and went to the university of Göttingen, where till the year 1808 he devoted himself to the study of philosophy and philosophy and gained an academy to help his friend continued to support him in the university; but he was obliged to increase his means by private tuition and reading with such students as bad come to the university without being the study of a professor. He was so much more beautiful in general, was his delight, and gave to his mind that tone and tendency which we can trace in all his literary productions. Towards the end of his academical course, in 1808, he spent some time at Dresden with his friends and pupils, and the famous picture gallery of that place made an impression on his mind which was never effaced. On his return to Göttingen he obtained the degree of Doctor in Philosophy, together with permission to deliver lectures in the university.

In the first of his lectures he said, "The Temporibus et Modis Verbi Graeci," Göttingen, 1808, 4to. The principal subjects with which he now occupied himself, and on which he lectured, were Greek grammar and Greek philology, especially Plato, the study of whose writings was a source of friendship between the professor and the student, who then used to visit Göttingen very often. His natural tendency to assemble around him young men of talent and congenial pursuits induced him, towards the end of 1811, to form a Philosophical Society at Göttingen, of which he was elected president. In 1819 he accepted the offer of an extraordinary professorship of Classical Philology in the University of Marburg. He entered upon his new office with an inaugural dissertation — "De Philosophia Morali in Xenophontis de Socrate Commentariis tradita," Marburg, 1812. Philosophical studies were at that time rather neglected at Marburg, but Disson gave a fresh impulse to them, although he did not remain there more than eighteen months; for in the autumn of 1818 he accepted an invitation as lecturer of Classical Literature in the University of Göttingen, which was always his favourite place, and where in 1817 he was appointed ordinary professor. In his new position he acted in perfect harmony with his philological colleagues Mitscherlich and Wunderlich; and on the death of the latter, in 1819, when F. G. Welcker was appointed his successor, Disson formed a most intimate friendship with him, which was not disturbed by the removal of Welcker to Bonn in 1819, and lasted till Disson's death. K. O. Muller, who succeeded Welcker, because of ill health was unable to replace him. An important study and a secluded life had already impaired the health of Disson, but his activity as a lecturer was still very great. His lectures were always filled, and he succeeded in inspiring many of his students with a love of research. The zeal with which he devoted himself to his professional duties and the cultivation of his own mind prevented his
DOING MUCH AS AN AUTHOR; AND ALL THAT WAS PUBLISHED BY HIM DURING THE PERIOD FROM 1815 TO 1825 CONSISTS OF THE PART BE TOOK IN BOECCK'S GREAT EDITION OF PINDAR, AND SOME REVIEWS WHICH HE WRIT ON THE HISTORY OF GREEK LITERATURE. IN REGARD TO ANTIQUITIERS, AND POETS, IN PARTICULAR, DISSEN DIRECTED HIS ATTENTION MORE PARTICULARLY TO ANALYZING THE CONCEPTION OF THE IDEAS, A POINT WHICH HAD BEEN MUCH NEGLECTED BY HIS PREDECESSORS. WITH THE VIEW TO SUPPLY THIS WANT, HE PREPARED A NEW EDITION OF PINDAR, WHICH APPEARED IN 1830, IN 2 VOLS, 8VO.; AND OF WHICH A SECOND EDITION, WITH SOME IMPROVEMENTS, WAS PUBLISHED BY SCHNEIDEBEIN IN 1843. IN THIS WORK DISSEN PROPUNOIS HIS AESTHETICAL VIEWS RESPECTING THE ARTISTIC CONSTRUCTION OF THE POET'S WORK. THE MAIN POINT IN WHICH HE HAS EXECUTED HIS TASK CLEARLY SHOWS THAT DISSEN WAS NOT ONLY A POET, BUT THAT HE HAD ALE CONCEPTION OF THE MANNER IN WHICH A POET SETS TO WORK. HE DISPLAYS GREAT AND LAUDABLE SUCCESS IN BOTH, AND THOS WOULD HAVE BEEN MORE PAINFUL IF APPLIED TO THE WORKS OF A PHILOSOPHER THAN TO THOSE OF A POET. BUT HIS EDITION OF PINDAR IS NEVERTHELESS ONE OF THE BEST THAT WE HAVE.

Dissen's illness was of an aethmatic nature, and about this time had become so much worse, that he was obliged to give up lecturing; but in proportion as his professional occupations decreased, his literary activity increased. Thus he produced in 1835 an edition of Tibullus, with valuable dissertation and notes; and in 1836 an edition of Demosthenes's oration 'De Corona.' The great object of these two publications is the same as that of his Pindar, to establish a mode of interpreting the antients which should not merely explain the language and subject matter of a writer, but the art and manner of his work, and above all, to trace the secret processes in the author's own mind. This mode of treating an ancient author may be very interesting and instructive, but it opens a wide field of speculation, and the results are seldom satisfactory. Immediately after the appearance of his Pindar, Dissen was severely criticised, and among others by his friend Boeckh, which greatly irritated him. His edition of Tibullus is perhaps his best and most satisfactory production; it should not be used without Dissen's 'Supplementum editions Abil published Heyno-Wunderlich,' which he published in 1819. The edition of the oration of Demosthenes contains many valuable remarks on the style and peculiarities of that orator: it is his last production, and appeared only a few days before his death, which took place about the middle of September, 1837. The last few years of his life were a slow process of dying: he died almost imperceptibly, as if he had gone to sleep.

Dissen was never married; but he was supported with paternal care several young men of talent whose fathers had been his friends during their lifetime. He was a man of great sensibility, enthusiastic for everything great and noble, and capable of the most devoted friendship, though in his social intercourse he was sometimes to be misunderstood by others; but this was due to the study of antiquity, for his whole mental faculties were absorbed in his pursuits. Besides the works already mentioned, we must not leave unnoticed an excellent little treatise entitled 'Anleitung für Erzieher, die Odyssen mit Knaben zu lesen,' with an introduction, by the author. This was published, 1839, 8vo. A number of smaller dissertations in Latin and German, together with a selection of the reviews written by Dissen, was published as a collection after his death by his friends K. O. Muller, under the title of 'Kleine Lateinische und Deutsche Schriften, von Ludolf Dissen,' Göttingen, 1839, 8vo. It is preceded by biographical notices written by his friends Fr. Thiersch, F. G. Welcker, and K. O. Muller, from which the above notices are derived.

CHAPTER IV. THE DISTRIBUTION OF ELECTRICITY. By this is signified the densities of the electric fluid in different bodies placed so as to act electrically upon one another, or in different parts of the same body when the latter has been subjected to the electric influence of another.

When a body possesses equal quantities of the opposite kinds of electricity, the fluid may be conceived to be uniformly diffused through it; and two such bodies being placed in contact, will produce no effect on each other, becoming what for the present is to be understood as the fluid particles of like fluids are counteracted by the equal repulsions between the particles of the like fluids. But if a body acquire by any means an excess of either the positive or negative fluid, a mutual action will take place between this body and any other in its vicinity, the fluid particles of different kinds thus being in equilibrium or not.

It was early found that two electrified spheres, equal in magnitude, but of which one was solid and the other a thin shell, acquired precisely equal quantities of the electric fluid; and hence it was inferred that such acquired fluid existed only in the space between the surfaces of two electrified bodies. This conclusion was afterwards confirmed by Franklin on a charged Leyden jar with interior and exterior coatings, which could be removed and replaced at pleasure; and those of Coulomb, in which, by a proper arrangement of rings, it was possible to determine with great accuracy the amount of charge that could be stored on a charged body when none could be obtained from the bottoms or sides of holes sunk in it to certain depths, sufficiently prove that the electric fluid exists in a stratum on the surface or rather within the body at an infinitely small distance from the surface.

If a sphere, charged as above supposed, is placed in contact with another in which the fluids are in equilibrium, a mutual action between the spheres will take place; the effect of which will be that the fluid particles of opposite kinds in both spheres will have their equilibrium disturbed, and equal quantities of both kinds will flow to the surface of each: the density of the fluid or the thickness of the stratum at either surface being different in the circumferences of circles at different distances from the point of contact.

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applied. The half lenses were fixed in separate portions of a frame, and, on turning a screw, they could be moved in contrary directions on the plane of section, thus causing a separation of the two images of an object: one of the portions of the frame carried two indices with verniers, and the extent of the movement could be read on a scale attached to a bar, which was graduated on the other portion: thus any small angle, such as that which might be subtended by the diameter of a planet, could, by placing the images of the disk in contact with each other, be measured on opposite sides of the zero of the scale. The movement affecting the position of the telescope; and thus it might be used as a position micrometer.

It is uncertain whether or not Ramsden executed such an instrument, but one exactly similar to it was made by Mr. Diddel. An improved micrometer of a like kind is made by Mr. Jones, who divides the third eye-glass of a telescope into equal segments, and causes them to move on the plane of section by means of a screw consisting of two parts, one of which is made hollow, and having both exterior and interior threads, the other part turns within it: thus the half lenses move by equal quantities in opposite directions at the same time.

The stem of the screw carries a graduated circle, on which, by an index, the movement of the two images of the object is measured. An instrument which may be considered as a divided eye-glass micrometer, and which is usually called a 'dynameter,' was constructed by Ramsden for the purpose of determining the diameters of the objects viewed in a microscope by means of a micrometer. The instrument consists of the diameter of the pencil of light at the eye-glass, in order to compare it with the diameter of the object glass. The instrument, which has subsequently been improved by Mr. Diddel, may be divided into two main parts: the one, a round, or spiral, for measuring the distances. The divided lens is that which is nearest to the eye, and the semi-lenses may have equal quantities of motion in contrary directions communicated to them by means of a double screw on the same stem; the threads on one part of the screw have their distances from one another double the distance of the threads on the other part. On the screw is a graduated circle, by which, on bringing in contact the two images of the pencil of light, the diameter of the latter is measured.

(Pearson's Practical Astronomy, vol. ii. sec. 11 and 33.)

Mr. Airy, the astronomer royal, has very recently communicated to the Astronomical Society a paper containing investigations of the distances and focal lengths of the eye-lenses of a telescope under the condition that (the third lens from the eye being that which is divided) the prismatic dispersion of light arising from the pencil falling on the segments at parts where their surfaces are inclined to the optical axis may be neglected, and that the magnifying power of the telescope obtained. This discovery will greatly improve that species of micrometer, particularly since the focal length of the fourth glass, or that which is nearest to the eye, is arbitrary; and since, by taking the magnifying power of the telescope may be varied by merely cutting that eye-glass, the achromatism remaining undisturbed.

DIVIDING ENGINE. Under the word Graduation, F. C., is a brief notice of the machine constructed by Ramsden for the purpose of graduating sextants and circles for nautical or astronomical purposes; and it is intended here merely to describe the principal improvement which has since been made in that kind of machine. In Ramsden's engine the circle carrying the instrument to be graduated was made to turn round by means of a perpetual screw, the teeth of which worked in corresponding notches cut in the edge of the circle: the screw was caused to turn on its axis by a cat-gut band passing several times round a cylinder of the same size as the original circle, and so the instrument was pressed down by the foot, and allowed to rise, when the foot was removed, by the unbending of a spring connected with the cylinder. In the machine now to be described, which was the invention of Mr. Airy, on which is carried, and of which an account is given in the 'Transactions of the Society of Arts,' for 1831, the circle has a more steady motion, and it possesses the means of being adjusted, so that the inequalities produced by the wear of the parts may be obviated.

A cylinder D, which turns on a horizontal axis, and has on its outer surface a spiral projection bb like a rectangular thread of a screw; this enters between the projections a, a, &c., and the distance between the two turns of the spiral is rather greater than the breadth of one of those projections.

On the ring of the circle C, extremities (the projections a, a, &c., is a groove in which enters an endless cat-gut band GH; on each side of the frame, at the end A of the latter, this band passes over a fixed pulley c and under a moveable pulley from which is suspended a weight K; it then passes through a groove cut at d, and below the frame, in the section dd.

Four pillars, of which MM are two, rising from the rectangular frame AB, support a stage which carries the tool for cutting the divisions on the instrument to be graduated. The apparatus by its surfaces: cutting-tool is connected with the stage is formed with joints so as to allow the tool to be moved up or down, or in the direction of a radius of the circle C, but neither to the right nor left of that radius; and there is a contrivance for determining the length of the lines of division.

By moving one end of a lever at the opposite extremity of the frame AB, a bar, ff', which is attached at one end to that lever, gives motion to a catch, or click, so as to cause a ratchet-wheel to turn on its axis, and thus give the requisite movement to the cutting tool: the other extremity, ff', of the bar, by turning a lever on a horizontal axis containing within it the axle of the cylinder D, allows a catch, or click, to turn a ratchet-wheel on the same axle, in the same manner as above; and thus a small projection b is removed a little way from its position when in contact with one side of a projection a.

Moving then the first-mentioned lever back again, a spring, which had previously pressed against the cut-gut band on the circumference of C, is drawn off; and thus one of the weights, K, by drawing down the band and pulley above it, gives a small movement to the circle C, and consequently brings the sides of a projection a again in contact with the side of the spiral, at which the bar ff' is applied to the lever on the axle of D, the catch may pass over any required number of the teeth of the ratchet-wheel; and thus the circle C may be turned through any angle consistently with the values of the divisions intended to be cut.

Through each of the projections a, a, &c., passes a steel screw, whose ends appear in the above cut; and through the spiral thread bb pass a number of steel screws, whose ends also appear. The right hand extremity (in the diagram) of each of the former screws is ground quite flat and perpendicular to the length of the screw; while the left hand extremities of the screws in b b are turned in the form of hemispheres; and, after every movement of the circle C and of the spiral D, the machine is held in a state of rest by the abutment of the hemispherical end of one screw against the flat end of the other.

The original divisions on the circle C are made on silver studs cast into its surface; and the screws passing through a, a, &c., are so adjusted, by means of their capstan heads, that if
be end of a screw in 55 is in contact with the screw in any one of the threads in, a complete revolution of the spiral in may bring the end of the screw in the next projection a in contact with the same screw in the spiral. The corresponding movement in the circle is equivalent to the interval between two of the original graduations; and the movement is very similar when divisions coming successively to a wire in a microscope.

DIVISION OF EMPLOYMENTS, in political economy, is an important agent in increasing the productiveness of labour; and there are no parts of a man’s nature that are more capable of being appropriated to the service of his own advantage. As Adam Smith has observed, a man is essentially disposed to do what will be most beneficial to himself, and this is the fundamental principle of his whole philosophy.

1. This division of employments is the result of the natural necessities of society. It is not the work of some social or political body, but is the work of each man for himself. The division of employments is the result of the natural necessities of society.

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First, his unlimited selling, or division of employments as leading to the invention of machinery, but passes over its utility in using machinery effectually, when invented. Every part of a large machine requires workmen whose business it is to work in union with its peculiar movement. So distinct are these various processes—so diverse their character—that in all large manufactures there is an extensive vocabulary of names by which operations working in the very same fact are distinguished. Without such a subdivision of peculiar employments the most ingenious machinery would be useless: and while machinery multiplies distinct operations of labour, these are, in their turn, essential to its efficacy.

To determine the origin of a division of employments to the 'trucking disposition' of mankind—to their 'propensity to truck, barter, and exchange one thing for another' (b. i. c. ii.). This love of barter however is only a secondary cause: men have no natural taste for it, but use it as a means of getting purchases, coats, shoes, and various things at once, which they could obtain them without the trouble of barter, they would unquestionably not follow barter as an amusement, any more than they would work if they could get what they wanted without labour. So far then, from the trucking disposition of men being the cause of a division of employments, it would appear that a division of employments is rather the proximate cause of commerce. For if all men worked in the same manner and produced the same things, there would be nothing to exchange. But since the diversity of the natural talents and the production of one commodity, the whole of which they cannot consume, they must exchange the produce of their labour with others, who have been producing objects which they desire to possess. This is an intelligible origin of barter and commerce—consistent with the natural propensities of mankind, and not requiring for its support the strained hypothesis that men have an innate disposition to truck. But a division of employments, like barter, is itself but a secondary cause of the exchange. The real original cause of all forms of industry—the desire of mankind to possess various enjoyments which are only to be gained by labour.

But while, by means of exchange, employments are thus subdivided, the labour of many men is most efficiently combined in producing particular results. The combinations of industry for one object are often truly wonderful, while the employments of those who are really co-operating with one another are so distinct, that they are wholly unconscious of it. Each is the cause of the employment of the other, and no better used than he can be. But each individual would be unable to make the same article for himself. He would be a hindrance to the production of others' articles. He would only be a添枝加叶, a hindrance.

When this state of things has been once established, men avail themselves of all the natural advantages of their several positions, and apply themselves to the production of those commodities for which they have peculiar facilities. In one country minerals can be drawn from the bowels of the earth in unlimited abundance; in another the fruits of the earth ripen upon its soil by the agency of a climate peculiar to that country, and that soil is as fertile as the clay of Nysa. The inhabitants of these countries naturally seek to develop the resources of the earth which are within their reach. They labour efficiently and produce abundance of well-timed and highly productive employment, which they are enabled to exchange for other things which they cannot produce themselves, but which they desire to enjoy: and thus a division of employments, by the aid of an extended commerce, distributes over the whole world the advantages of soil, climate, situation, and experience, and enables men who have adapted their talents to the circumstances of each country.

Having thus hastily enumerated the several ways in which a division of employments adds to the efficacy of human labour, and increases the enjoyments of men, let us inquire in what manner it is restrained and limited. It may be collected from several of the preceding remarks, that the power of distributing men into particular employments must be limited by the extent of the market in which the produce of their labour may be exchanged. When there are no means of exchanging, men must provide everything for themselves that they require; and there is no further division of employments than that which necessarily results from the use of simple instruments of the several arts, and from the employment of men who have adapted their talents to the circumstances of each country.

In a populous city, on the other hand, trades are almost indefinitely subdivided. And why is this? Solely because of the extent of the market. In one case men must take care of nothing but hats; he could not gain a livelihood, and therefore he sells coats, smock-frocks, shoes, and all kinds of drapery—everything, in fact, which the people round about him are likely to buy. In the other case, there is so large a demand for hats, that a single individual could not supply the whole, and therefore each shop needs his hat-maker, and on one shop, in which nearly every kind of trade is carried on. In a populous city, on the other hand, trades are almost indefinitely subdivided. And why is this? Solely because of the extent of the market. In one case men must take care of nothing but hats; he could not gain a livelihood, and therefore he sells coats, smock-frocks, shoes, and all kinds of drapery—everything, in fact, which the people round about him are likely to buy. In the other case, there is so large a demand for hats, that a single individual could not supply the whole, and therefore each shop needs his hat-maker, and on one shop, in which nearly every kind of trade is carried on.
example, who are said to have been thrown out of employment by the extension of machinery. That they have been reduced to great distress is certain; but in their employment there was nothing to unfix them from engaging in power-loom weaving. On the contrary, the transition from one employment to another would have been distinctly natural, if they preferred their independent life to the discipline of a factory, and for that and other reasons persisted in continuing in their old trade. In the mean time thousands of agricultural labourers, whom the conditions of life had so disinclined, flocked into the manufacturing districts, and readily learned their new business. This example, therefore, instead of sustaining the objection, proves that a division of employments does not disable men, so much as might be expected, from employing their labour to other pursuits whenever a sufficient inducement attracts them. But any interruption or change in the ordinary course of industry is necessarily productive of temporary suffering to the working classes, from whatever cause it may arise; and an alteration in the forms of applying labour is but one out of many such causes. Yet much as this evil must be deplored, it is a satisfaction to know that it is only occasional, temporary, and partial in its operation, while the permanent welfare of mankind is promoted by all those means which render industry most productive and multiply the sources of human enjoyment. Another objection to a minute subdivision of employments is, that it reduces vast masses of men to the condition of operative labour, and deprives them thereby of their chief inducement to labour:—the want of leisure and the boredom of inaction. This objection, however, is not supported by experience. Agricultural employments are not less subdivided than trades and manufactures; but no one will contend that the farm labourer is ordinarily more intelligent than the operative, nor that his morals are decidedly superior. In comparing their relative condition, we shall be led into error if we confine our attention to the influences of a division of employments. In the lower departments of labour the work is rarely of a kind to enlarge the understanding, whether it be the manufacture of several revolutions of one and the same machine; or in either case the greater part of a man's time is engaged in his daily work. It is therefore the circumstances by which he is surrounded, rather than to the nature of his work itself, that we must generally refer his condition. In thinly-peopled countries there may be comparatively little division of employments, and in populous cities the condition of division, for reasons already explained, is carried very far. In the one case the intercourse of persons with each other is very limited, and combined with the variety of society; the other case persons are crowded together, and brought into continual intercourse. These opposite circumstances produce different results for good and for evil. The intelligence of mankind is unquestionably increased by extended intercourse, and diminished by solitude; and at the same time the one is more liable to corruption. In large cities they are exposed to more temptations—they are under less restraint; and above all, they have, almost universally, higher wages, which enable them to indulge their propensities more freely. Much of the intellectual disparity of rural and town populations might be removed by an efficient system of education, by which men would be better qualified to observe and reflect upon the objects by which they may be surrounded, and great would be the moral influences of education in rendering high wages innocuous, by offering liberal sources of recreation to the operative, more attractive than the temptations of vice.

But to all objections it may be answered, that a division of employment is productive of a revolutionary change. The growth of wealth is the necessity of a combination of labour with a distribution of distinct employments, for the production of wealth, that Mr. Wakefield has ingeniously ascribed to the origin of slavery, in countries where labour has not been accessible by means of wages. (See to Adam Smith's book i. ch. 1.) Where land is abundant, families naturally scatter themselves over it, and provide for themselves nearly all that they want. More than they want they do not produce, as there is no market; and the growth of capital under such circumstances, is impossible. One man has no inducement to offer to another for his labour; and thus the strongest men, with dominant wills, finding the necessity of combined industry the source of all productive power upon which they depend, would seek weaker neighbours and compel them to work by force. But where land becomes scarce and dear, men are forced into other employments distinct from agriculture; casual gross wages are offered as an inducement to work, and the more wealthy and populous a country becomes, the more extensive must be the distribution of separate employments. To object to a division of employments, therefore, is, no less than to object to the growth of wealth; for as much as wealth cannot be corrected by the application of sound principles of government; many may be attributed to the neglect of the religious and moral culture of an increasing population: but short indeed must be the sight of any man who would seek to correct wrongs by employing to a civilized state the rude expedients of barbarism. (Adam Smith's Wealth of Nations, book i. chapters 1, 2, 3, with Notes by M'Culloch and Wakefield; M'Culloch's Principles of Political Economy, &c.)

DOBERAN is a market-town in the grand-duchy of Mecklenburg-Schwerin, situated in 54° 5' N. lat. and 12° E. long. It had a church so early as the year 1164, and in 1171-73 Prince Friedrich built a church and convent. The convent was peopled by a great number of Cistercian monks from Brunswick; but in seven years it was plundered by the Wends, or Vandalis, and seventy-eight monks were massacred. Prince Henry Boris I. laid the foundation of a new church for the convent, which were restored in 1186, and in 1259 the church was consecrated. Extensive landed property was granted to the convent, and though it was totally destroyed by lightning in 1291 and not thoroughly restored until 1314, it continued to flourish for upwards of a century. Pilgrims came from distant countries, even from Spain, to see the numerous relics in the church. But the Reformation put an end to the prosperity of the convent. The duke John Albrecht secularised it in 1529, and added its extensive possessions to his domains. Dobberan suffered very much in the Thirty Years War. Dobberan is indebted for its present thriving condition to the foundation of an establishment for sea-bathing in 1793. This was the first of the kind in Germany. A long time was occupied in preparing the celebrated and much frequented watering-place. The baths are about three miles from the town. A good road, bordered with trees, leads to the baths, through a fine country and plantations of oak and beech. The bathing-house, as it is called, is only thirty paces from the coast of the Baltic, from which it is supplied with sea-water by pipes and pumps. The building is 166 feet in length, and contains every accommodation for warm and cold bathing, shower-baths, doches, &c. The baths are open every day from April to October. Dobberan is situated in a pleasant valley, and the surrounding country is very agreeably diversified. The town contains 3000 inhabitants. Among the public buildings the most interesting is the church, unquestionably the finest specimen of the Gothic style in Germany. It was dedicated to St. Peter's church at Rostock. It contains many monuments of the dukes of Mecklenburg, and a great number of paintings and statues. The stained-glass windows are much admired. There are two relics belonging to the grand-duke, St. Peter, and various buildings for the accommodation of visitors to the baths, who are generally about 1600 in the season. All the bathing establishments are the private property of the grand-duke, and are managed on his account. The visitors are chiefly from the neighbouring states of the North of Germany and from England.

A singular custom, called the Helliger Dam, or Holy Dam, extends from the bathing-house to the village of Behlwech; and extends also to distant miles from 60 to 100 feet broad, and 16 feet high. This has been cast up by the Baltic, some say gradually; but there is a tradition that it was cast up in one night, perhaps by an earthquake. It is entirely composed of boulders of different sizes and of a great variety of beautiful colours.

(G. Hempel, Mecklenburg; Brockhaus, Conversations-Lexicon.)

DOBSON, WILLIAM, was born in the parish of St. Andrews, Holborn, in 1610. He was a very distinguished painter; and succeeded Van Dyck in the favour of Charles I., who used to call him the English Tintoretto. Vertue records some interesting particulars respecting Dobson. His father was a linen-draper of good fortune; but by the misfortunes of poor circumstances, his son was apprenticed to Mr. Peake, afterwards Sir Robert Peake, painter and picture-dealer, who
kept a shop at Holborn Bridge; but he learnt more, according to R. Symonds, of Francis Ceyn, a German, who stood also in great favour with Charles I.

Sir Robert Peake set Dobson to copy pictures for him, and exercised the same profession in his shop-window. The copies were seen by Vandyke, who, on his way to Snow Hill, and having made inquiries for the artist, he found him at work in a poor garret, whence he took him and introduced him to the king. After the death of Vandyke, Charles I. appointed Dobson to paint portraits, to which he was probably brought for debt, from which he was released by a Mr. Vaughan, whose portrait he painted, and he considered it his best work in that class.

He did not long enjoy his liberty: he died in London in 1646, aged only thirty-six, and was buried at St. Martin's-in-the-Fields.

Dobson painted portrait and history equally well, and his portraits are generally considered so excellent, that he has been termed the English Vandyke, to whom he was but little inferior in this branch of art, and his reputation was univalved by that of any English painter until the appearance of Sir Joshua Reynolds. There are several excellent historical pictures by Dobson in various parts of England. There is a Beheading of John the Baptist at Wilton, in which the expression of near nature is so good, that even in Surrey, the seat of the earl of Arundel, there was a Woman taken in Adultery, with several figures, the heads being portraits, and among them was the poet Cowley; at Blenheim is Fredericus Augustus, Duke of Saxony, with his family, a picture, says Walpole, equal to anything he had ever seen by Dobson. Walpole mentions several other family pieces, and many portraits with one or more figures, of which he particularly praises one at Drayton, in Northamptonshire, of Henry Montant, earl of Peterborough, in armour, with a page holding his horse and an angel giving him his helmet. Walpole says further, 'Dobson's wife, by him, is on the stairs of the Ashmolean Museum at Oxford; and his own head is at Oxford, and is the most perfect and noble head I have ever seen. He was the first artist to adopt the system of requiring half the payment of a portrait at the commencement of it; be did it to reduce the number of his sitters to within a practicable limit.'

DODD, THE REV. WILLIAM, LL.D., was born in 1729, at Bourn, in Lincolnshire, of which place his father was vicar. In 1745, he was admitted a scholar of Clare Hall, Cambridge, and took his bachelor's degree with reputation in 1750. Soon afterwards he removed to London, where he contrived an independent income. In 1758, he received priest's orders from the Bishop of London; and from this time he continued to obtain a succession of small prebends in the church, holding, in the latter part of his life, two chapels in London with a rectory and vicarage in the country, and supporting an ecclesiastical income of eight hundred a year.

His character as a popular preacher, and as a man of letters, aided by his ambitious courtship of persons of rank, procured for him patronage of a big order. He was one of the first chaplains in attendance on the queen, to whom he was presented; and, in 1763, he was intrusted with the education of Philip Stanhope, afterwards the famous Earl of Chesterfield. During all this time his literary activity was great and varied. In February, 1777, he was arrested on a charge of having for the gratification of his passion for gambling, pawned a bond for four thousand pounds, of which he had obtained payment. He repaid the money, but was brought to trial and convicted. He was executed on the 27th of July, 1777. The workmen who cut it, were 'A New Book of the Dunciad,' published anonymously in 1750; and the blank verse poem, called 'Thoughts in Prison,' which was composed in the interval between his conviction and execution.

Among the prose works are many sermons, and the well-known 'Reflections on Death,' 1765. A work of another character is his 'Beauties of Shakspere,' in which, besides a number of Essays, the Sonnets of our national Poet are reprinted, and the Antient and Modern Commentaries on his Plays are interspersed with many criticisms. These, like Dodd's other works, are fluent and tasteful rather than original or vigorous. Indeed some of them are mere plagiarisms. It is said that just before his death he had entered on negotiations for publishing an expensive edition of Shakspere's works; and that the desire of raising money for the engraving of the plates has been assigned as one of the reasons for committing the forgery.

DODWELL, EDWARD, F.S.A., was a man of fortune, and was educated at Trinity College, Cambridge. He left the University in 1800, and from that time till his death in May, 1852, he mostly resided abroad, and occupied himself in searching connected with the earlier antiquities of Greece and her colonies. The first results of his investigations and studies in this field was to give to the world in 1819, in two quarto volumes entitled 'A Classical and Topographical Tour through Greece during the years 1801, 1802, and 1806.' This learned and accurate work was followed in 1821 by a folio volume of 'Views in Greece, from Drawings by Edward Dodwell, Esq.,' containing thirty coloured prints, accompanied by short descriptions in French and English, from a collection of rare and valuable views of ancient and modern monuments, monuments, and architectural objects and natural scenery. In the summer of 1830 Mr. Dodwell brought on a severe illness by fatigue and long exposure to the sun while engaged in seeking for the situation of some ancient cities in the Peloponnesus, and from this he never completely recovered. He left on his death a very large collection of drawings; from which a folio volume of topographical plates was published at London, in 1834, under the title of 'Views and Descriptions of Cyclopian or Pelasgic Remains, in Greece and Italy; with Constructions of a later period;' from Drawings by the late Edward Dodwell, Esq., F.S.A., and member of several foreign academies; intended as a Supplement to his Classical and Topographical Tour in Greece in 1819. Of the whole work, 650 plates were printed.

The subject of the early architecture called Cyclopian (or sometimes Titanics) had been slightly discussed by Dodwell in his 'Tour,' and it had engaged much of his attention in the last years of his life; he had been in correspondence about it with M. Petit Rady of Paris and other learned persons, and it was his urgent request to the person to whom he bequeathed his drawings, by whom the last-mentioned volume was afterwards edited, that the subject of which it contains should be published. The descriptions by which the plates are accompanied are extremely brief.

(Ed.) Preface to the Views of Cyclopian Remains; by R. Dobwell's Son.

DOG-WOOD. [Corylus, C. S. C.]

DOLOMITE. This rock, having the aspect and general geological history of limestone, but composed of carbonate of magnesia united to carbonate of lime, usually atom to atom, occurs as a part of the oolitic system of the Alps and Apennines, and of the German Juralk; and it is perhaps proper to call by the same name the crystallized magnesian limestone of Nottinghamshire, Derbyshire, Yorkshire, and Durham. The best example of this English dolomite is at Bolsover, in Derbyshire, from whence the stone is taken to build the New Houses of Parliament. From the manner in which this rock occurs along the Lake of Lagoone, and other parts on the south side of the Alps, in direct contact, or more frequently a peculiar resemblance, to the Magne and Caucidian rocks, Buch inferred that dolomite was a metamorphic limestone, altered by absorption of magnesian vapours yielded by volcanic action. There is much to recommend this inference. In Britain the stone is generally found along lines of fracture and along the sides of mineral veins; and these cases appear to enter into Von Buch's explanation. But the broad magnesian limestones of the North of England are certainly due to original crystallization together of the two carbonates already named in the papilinate limestone, and the remains of organic remains. In the Alps and in Franceon its aspect is very picturesque.

DOMAT, or DOUMAT, JEAN, a distinguished French geologist, was born at Clermont in Auvergne, July 29th, in the year 1625. He connected himself with the brilliant circle of literary recluse at the Port Royal among whom hi
reputation stood high both for jurisprudence and ethics. He was a very learned man, and has had a large share of his contemporaries' history. He was in the confidence of Pascal, attended him on his death-bed, and was intrusted with many of his papers. His great systematic work on the civil law appears to have long existed and been perused by his friends in MS. before its publication. Some fragments of the work composed by Louis XIV., Domat received a pension, and took up his abode in Paris, where he received encouragement from the kindness of D'Aguerreau, then conseiller d'etat, through whose patronage he obtained for his law book a place in the first class. He has found the way to notice. Domat married Mademoiselle Blondel, by whom he had thirteen children—a circumstance deemed worthy of particular commendation in France. He held the office of Avocat du roi at Clermont. He died at Paris on the 14th of May, 1796, and he must be said to have ended his days in extreme poverty. In his works he stands pre-eminently above all the jurists of his age, and acquired a reputation throughout Europe that has hardly been subsequently reached by any of his countrymen. His work 'Les Lois Civiles dans leur ordre naturel, suivies du Droit Public' appeared anonymously in 1689, and is said to have been for some time attributed to Delaunoy, Professor of Jurisprudence in the University of Paris—a statement scarcely reconcilable with the alleged importance of the work while in MS. The author's method of dividing the subject is, by first treating of the rules of law in general. This branch of the work is almost of an ethical character. The division of the public and private law, as having an foundation in religion, or some other reason connected with morals or religion, is the main feature of the work, and in this it adopts the system which was afterwards more elaborately carried out and applied to a larger number of subjects by Montesquieu. The substance of the work is divided into five books and a prologue. In the former books, the law is subdivided into the law of contracts and the law of successions. The public law is divided into government, official and ecclesiastical arrangements, crimes, and procedure civil and criminal. This has been one of the works of the year in France, generally in two volumes, for the use of Frenchmen, it does not include the provincial peculiarities of tenure, but is nearly an echo of the Roman law purified of matters peculiar to Roman habits and customs, and has been a book for England as well as France. In 1792, it was translated into English by William Strahan, 'with additional remarks on some material differences between the civil law and the law of England,' 2 vols., folio. This translation is the most extensive systematic work on the civil law in the English language. Domat paid great attention to the law merchant, and it is believed that this translation has been of extensive service in keeping the mercantile law in general, and the admiralty and consular systems of England in unison with these laws and consequently with the practice of the rest of Europe. Domat's work used to be in high esteem in Scotland before the study of civil law was neglected at the Scottish bar. A posthumous work by Domat, 'Legum Delictus, ex Legum Digestorum et Codicis,' was published at Amsterdam in 1763, 4to.

DOMICILE. In the Roman law Domicile (Domicium) was defined to be that place which a person 'makes his family residence, and principal place of business; from which he does not depart unless some business requires: when he leaves it he considers himself a wanderer, and when he returns finds himself no longer abroad.' (Cod. lib. 10, tit. 40 (39), 1.) Similar definitions of the term are given by modern jurists.

The law of domicile depends on the concurrence of two elements—1st, residence in a place; and, 2nd, the intention of the party to make that place his home. Domicile cannot be established except by animo et facto, that is, actually and in intention also. It is sometimes not very easy to determine in what place a person actually has his domicile. It is obviously a question depending upon the evidence in each particular case, which is of course capable of every variety both in nature and degree. The evidence as to the place of residence can be obtained directly from the party, or indirectly from the party having to do with him. In many cases, the party has to be gathered from circumstances yet more difficult to come to a conclusion upon.

The following rules appear to comprise the generally-adhered definitions of the subject—

1. The domicile of the parents is the domicile of the child.

2. The domicile of a married person is the domicile of the husband, if he is a citizen of the same country; and, if he is not a citizen of the same country, then his domicile is the domicile of the wife, if she is a citizen of the same country; and, if she is not a citizen of the same country, then his domicile is the domicile of the last place of domicile of the wife; and, if she is not a citizen of the same country, then his domicile is the domicile of the last place of domicile of the wife.

3. The domicile of a married person is the domicile of the husband, if he is a citizen of the same country; and, if he is not a citizen of the same country, then his domicile is the domicile of the wife, if she is a citizen of the same country; and, if she is not a citizen of the same country, then his domicile is the domicile of the last place of domicile of the wife; and, if she is not a citizen of the same country, then his domicile is the domicile of the last place of domicile of the wife.

4. The domicile of a married person is the domicile of the husband, if he is a citizen of the same country; and, if he is not a citizen of the same country, then his domicile is the domicile of the wife, if she is a citizen of the same country; and, if she is not a citizen of the same country, then his domicile is the domicile of the last place of domicile of the wife; and, if she is not a citizen of the same country, then his domicile is the domicile of the last place of domicile of the wife.

5. The domicile of a married person is the domicile of the husband, if he is a citizen of the same country; and, if he is not a citizen of the same country, then his domicile is the domicile of the wife, if she is a citizen of the same country; and, if she is not a citizen of the same country, then his domicile is the domicile of the last place of domicile of the wife; and, if she is not a citizen of the same country, then his domicile is the domicile of the last place of domicile of the wife.

6. The place where a man resides is, for a great many purposes, to be considered his domicile, and, prima facie, is to be taken to be so till other facts establish the contrary.

7. Every person of full age, who removes from one place to another with the intention of making the latter his place of residence, immediately constitutes it his domicile.

8. The domicile of origin must be considered, in every case, to prevail over all others except the domicile where the party is domiciled at the time of the suit. The domicile of origin is the domicile where the party was born, and which he has never left, and which has not been afterwards made the residence of another person.

9. The domicile of origin is the domicile where the party was born, and which he has never left, and which has not been afterwards made the residence of another person.

10. The place of domicile is the place where the party was born, and which he has never left, and which has not been afterwards made the residence of another person.

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29. The domicile is the place where the party was born, and which he has never left, and which has not been afterwards made the residence of another person.

30. The domicile is the place where the party was born, and which he has never left, and which has not been afterwards made the residence of another person.

31. The domicile is the place where the party was born, and which he has never left, and which has not been afterwards made the residence of another person.

32. The domicile is the place where the party was born, and which he has never left, and which has not been afterwards made the residence of another person.

33. The domicile is the place where the party was born, and which he has never left, and which has not been afterwards made the residence of another person.

34. The domicile is the place where the party was born, and which he has never left, and which has not been afterwards made the residence of another person.

35. The domicile is the place where the party was born, and which he has never left, and which has not been afterwards made the residence of another person.

36. The domicile is the place where the party was born, and which he has never left, and which has not been afterwards made the residence of another person.
may be or be sued in them. In Scotland, when the subject of dispute is within the jurisdiction of the courts, an action regarding it may proceed there, and any one who has property with the subject matter may bring an action to enforce the extent of that property. But actions of personal status, as for divorce in establishing a marriage, &c., can only proceed when the parties have established a domicile there by residence for forty days.

(On one subject of Domicile, see Story’s Commentaries on the Conflict of Laws, c. iii.)

DOMINIS, DE MARCUS ANTONIUS, an Italian theologian and natural philosopher, was born, in 1566, of an ancient family of Dalmatia; and, having been educated in a college of the Jesuits at Loreto, he completed his studies at the university of Padua.

The progress which he made in the sciences was so satisfactory that the persons in authority at the university used their influence to induce him to enter the order of Jesuits; to this he appears to have consented; and, while passing his novitate, he gave instruction in mathematics, physics, and eloquence. At the same time he employed his leisure in the study of theology; and it was then that he composed his work entitled ‘De Raddia Visus et Lucis in Vitrâ perspectiva et Iride,’ which was published at Venice by one of his pupils, in 1611.

The routine of a college life not suitting his taste, De Dominis quitted Padua; and, on the recommendation of the Emperor Rudolf II., he was appointed a professor of astronomy at the University of Prague. After four years he was made archbishop of Spalatro; but, while holding this dignity, he became embroiled with the pope (Paul V.) by taking a part in the disputes between that pontiff and the emperor over the endowment of the establishments in Bohemia. On this occasion he threw out a censure on the conduct of the former; and he further gave offence by rashly entering upon the delicate subject of reforming the manners of the clergy.

Being eager of an inclination in favour of the Reformed religion, he found it convenient to consult his safety by resigning his archbishopric, and retiring to Venice: this was in the year 1615, and in the following year he came to England, where he was experienced a foretaste of persecution from James I. The king appointed him to the deanery of Windsor: at this time he composed his work entitled ‘De Republican Ecclesiastica,’ the object of which is to show that the pope has no supremacy over other bishops; it is in two parts, of which one was published in 1617, and the other in 1620, both in London: the work was much esteemed at the time, but is now scarcely remembered. He also published a sermon which he preached in 1617, in the chapel belonging to the Mercers’ Company; and, in the following year, a work entitled ‘Sunt et Dei Christiani Iudaei qualitati quæ scapendo la Santa Chiesa.’

De Dominis appears to have been restless and inconsistent; for, after a few years, he expressed a wish to return to the bosom of the Catholic church. He then married to the pope (Gregory X.Y.) a promise of pardon, he set out for Rome. Soon after his arrival, some intercepted letters gave indications that his repentance was not sincere; and he was, in consequence, committed to the castle of St. Angelo, where, after an imprisonment of a few months, he died, Sept., 1624.

Being convicted, after his death, of heresy, his body was disinterred and burnt.

De Dominis has the merit of being the first who assumed that the rainbow was produced by two refractions of light in each drop of rain, with an intermediate refraction from the back part of the drop; and he verified the hypothesis by receiving the ray of light from a globe of glass exposed to the sun in the same manner as the drops of rain are supposed to be situated with respect to that luminary. He knew nothing of the different refrangibilities of the rays of light; and he conceived that the colours were produced by the different forces with which the rays strike the eye in consequence of the different lengths of path described within the drop; by which he supposed that they retain more or less of the original impulsive force. He erred also in supposing that the rays which formed one of the bows came from the upper part of the sun’s disk, and those which formed the other from the lower.

DON, DAVID, was born at Forfar in Scotland, in 1800. His father was proprietor of a nursery and botanic garden in this place, and is well-known as having been an acute prac- titioner in the cultivation of the nursery business in his native country with great success. When David was still a young man his father was appointed to the charge of the botanic garden at Edinburgh, and the knowledge which David then possessed of botany attracted the notice of Mr. Patrick Neill and other gentlemen connected with the garden, and they procured for him the means of attending on some of the classes in the University of Edinburgh, and on Sunday evening, he attended in Edinburgh, and again opened his garden in Forfar. David afterwards procured a situation in the establishment of Messrs. Dickson of Broughton, near Edinburgh, where he had the care of the finest collection of plants in Scotland. In 1819 he came to London, where he was received into Mr. Lambert, who bad at that time a large collection of plants. He was soon appointed by Mr. Lambert to be his librarian and curator, and lived entirely in his house.

One of his earliest publications was the description of a number of species of plants which were either entirely new, or had only been found in a few localities where they had been collected by his father and others in Scotland. It was entitled ‘Descriptions of several New or Rare Native Plants, found in Scotland chiefly by the late Mr. George Don of Forfar.’ It was published in the third volume of the Memoirs of the Wernerman Society of Edinburgh. This work was a valuable contribution to our native botany. He shortly after published in the thirteenth volume of the Transactions of the Linnean Society ‘A Monograph of the genus Saxifraga.’ On account of the varying characters of the various organs of the plant, this genus has always presented many difficulties in its investigations. This account of the species of the genus gained for him a reputation as a botanist. In 1822 the office of librarian to the Linnean Society became vacant, and he was appointed to that post. In this position he had great opportunities of improving his knowledge of botany. The collections of plants from various parts of India, which he turned his attention to that part of the world, and in 1828 he described publications of species of plants in Nepal under the title ‘Prodromus Florae Nepalensis,’ 12mo. Almost every volume of the Transactions of the Linnean Society after his appointment as librarian contains papers by him on various departments of systematic botany.

On the death of Professor Burnett, in 1836, he was appointed to the chair of botany at King’s College, London, a position which he retained an extremely long time. He was much beloved by his pupils: time was never made an object when he bad the advantage of his class in view. The same urbanity of manner and liberality in imparting all he knew distinguished him in his position at the Linnean Society. As a lecturer, however, he failed in expressing himself with perspicuity and facility.

The following is a list of his published papers in the Transactions of the Linnean Society:—


Description of Cowania, a new genus of Plants; and of a new species of Callistemon, vol. 16.

Description of a new genus (Logchospermum) belonging to the Natural family of Plants called Scrophulariacese, vol. 16.

On the Origin and Nature of the Ligatele Rays in Zinnia, and on a remarkable multiplication observed in the parts of fertilization of that genus, vol. 16.

Descriptions of the new genera and species of the class Compositi, belonging to the Flora of Peru, Mexico, and Chili, vol. 16.

On the plant which yields the Gum Ammoniacum, vol. 16.


On the modifications of Estivation observable in certain plants formerly referred to the genus Cinchona, vol. 17.

Remarks on some Balsam-trees, vol. 17.

Descriptions of five new species of the genus Pinus, discovered by Dr. Coulter in California, vol. 17.

Descriptions of Indian Gentianases, vol. 17.

Descriptions of the Genera of the Natural Family of Plants called Coniferae, vol. 17.

Description of a new genus of Plants (Catephractorae) belonging to the Natural Family Bignoniaceae, vol. 18.

Descriptions of the Indian species of Iris, vol. 18.


A Monograph of Streptopus, with the description of a new genus (Prostis), vol. 18.

The following is a list of his papers published in the Memoirs of the Wernerman Society of Edinburgh:—
Descriptions of new Plants from Nepal in the Herbarium of A. B. Lambert, Esq., vol. 3.

Illustrations of the Natural Family of Plants called Mela
tomaceae, vol. 4.

A Monograph of the genus Pyrola, vol. 5.


The following papers were published in the 'Edinburgh New Philosophical Journal':

Observations on Philadelphia and Granatce, two new families of plants belonging to the Flora Peru-

viana, with remarks on its affinities, vol. 2.

Observations on the Cow-troo of the Caracas, and on the culture of the Nutmeg, vol. 3.

Remarks on the irritability of the Stigma, and on the origin and nature of certain parts of the fruitation in Pinus Larix, vol. 4.

On the general presence of Spiral Vessels in the Vegetable Structure, vol. 6.

Descriptions of the genera Columella, Tovaria, and Francoa, vol. 6.


On the characters and affinities of Darwinia, Brunfelsia, Baccharis, Argyla, Eczemocarpos, and of a Plant improperly referred to the latter genus, vol. 7.


On the anomalous structure of the leaf of Rosa Berberifolia, vol. 8.

A Monograph of the family of Plants called Cunoniaceae, vol. 9.

On the characters and affinities of certain genera chiefly belonging to the Flora Peru

viana—various papers, vol. 10, 14.

Descriptions of some new species of Malesherbia, Kage-


On the characters and affinities of the genus Codon, vol. 15.

On the connexion between the Calyx and Ovarium in cer-

tain Plants of the order Mela
tomaceae, vol. 15.

Some remarks on the Plant which yields the Casscarilla

Bark, vol. 16.


On the characters of certain groups of the class Personate,

vol. 19.

These numerous works are sufficient proof of his industry,

and they have a real value. Don's knowledge of plants was

much greater than his appreciation was ready and

e xact. He was not, however, fully alive to the importance of

studying plants in their morphological relations, and many of

his papers are open to criticism on this ground. His con-

stitution was robust and strong, but at the end of 1840 a malig-

nant tumor appeared on his lip, which, although removed at

first, speedily reappeared, and terminated his existence on the

8th of December of the same year.

(Precisely. Linnanean Society.—Don's Works.)

DONELLOUS, HUGUES, a law-

yer, was born at Chalon-sur-Saône, in France, in 1527.

He is said to have been idle in his youth, and an ane
dote is preserved, according to which he was frightened into di

geneous by his father to have him brought up as an assis-

tant to a swineherd. He studied literature at Tournoi

and jurisprudence at Toulouse, and subsequently at Bourges, where he took a degree at Doctor of Laws, in 1551.

He sided with the latter and was proscribed at Bourges, and continued to do so till the massacre of St. Bartholomew, in 1572.

He had embraced the opinions of the Huguenots, and,

and drawing to be involved in ruin with others of his persuasion,

by his father to have him brought up as an assistant to a swineherd. He studied literature at Tournon and jurisprudence at Toulouse, and subsequently at Bourges, where he took a degree at Doctor of Laws, in 1551.

He sided with the latter and was proscribed at Bourges, and continued to do so till the massacre of St. Bartholomew, in 1572.

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He sided with the latter and was proscribed at Bourges, and continued to do so till the massacre of St. Bartholomew, in 1572.

He had embraced the opinions of the Huguenots, and,
all cases alike, the architrave mouldings forming the jamb of the door bear a standard fixed proportion to the width of the aperture or door itself, which last generally fills up the entire opening, except where what answers to a modern French window is left between the door and the lintel of the doorway, as in the Temple of Vesta at Tivoli, that of Hercules at Cosa, and the Pantheon at Rome, in all which that space was filled in with open or lattice work in metal, for the admission of air and light, whereby a door and window over it were united into one composition. The two last-mentioned examples are further remarkable, as instanting the mode resorted to for enlarging the doorway to the proportions required by the rest of the design, in most increasing the aperture in the same degree, namely, by filling up the space between the architrave dressings and the door by antae or pilasters, as is shown in the article Doors, vol. i. p. 86.*

In Gothic architecture similar contractions of the aperture of doors and windows; for or, as it may more properly be termed in that style, any requisite degree of extension could be given to the general framing of a doorway by merely increasing the depth of the splay within which the door was placed, and the number of the shafts or other mouldings enclosing the opening; by this means, what would else have been a comparatively insignificant feature, was rendered an important and highly ornamental one. Even in the most magnificent portals, and in the frontispieces of the larger churches, in the Gothic or Pointed style, the doors themselves are usually of moderate size, and the aperture is besides frequently divided into two by a central pillar or shaft; whereas very spacious and lofty doors would have been attended with the inconvenience of exposing the interior too much, whenever they were opened. Little judgment, therefore, and not much more knowledge of the style itself was shown in making the entrance-doors of Fonthill Abbey of the preposterous height of thirty feet, dimensions which would have been loathy to excess even for a gateway, except such a one as the beautiful Erpingham Gate at Norwich.

In Gothic doorways the side splings and the arch or arch-mouldings above may be enlarged or increased to almost any extent, and that without producing heaviness, or looking like exaggerated decoration. In many instances the width of the splays or dressings around the opening is equal to the width of the opening itself, and in some the former even exceeds the latter; and this breadth of splay, should it be observed, constitutes a marked distinction between doors and windows in the Gothic style; for though the apertures of both kinds strongly resemble each other in general shape and design, the latter do not admit, under any circumstances, of anything like a similar enlargement of their external dressings. Never is a small window attempted to be made a principal and ornamental feature by means of a deep splay filled in with decorations; never is a large one placed within a wide and deeply-recessed opening. In the medieval buildings the respective parts of a doorway generally do to each other.

Nor is there such a difference of treatment—so fortunate in itself, inasmuch as it conduces to esthetic variety—a merely arithmetical one, for the accumulated opportunities which the Gothic window is not a mere gap in the wall, standing in need of external dressings to render it an ornamental feature; on the contrary it furnishes its own decoration, and the larger the window the more numerous the mouldings, and the more complex the tracery, consequently, all the more rich is the design of the window. Another difference between Gothic doorways and windows is, that in the former the doors themselves are sometimes square-headed, the apertures being carried forward above the tympanum, or space between the opening and the arch, is usually filled in with sculpture. A third difference between doors and windows—at least to doors in the Perpendicular style—lies, that for the doors the general design is formed into a square-headed composition, and surrounded in its upper part by a series of external weather-mouldings termed a label; and although labels are a very general, not to say universal, accomplishment to windows in the Tudor or perpendicular style, they are not found on doors. Thus the tympanum, or space between the opening and the arch, is usually filled in with sculpture. The architrave mouldings forming the jamb of the door bear a standard fixed proportion to the width of the aperture or door itself, which last generally fills up the entire opening, except where what answers to a modern French window is left between the door and the lintel of the doorway, as in the Temple of Vesta at Tivoli, that of Hercules at Cosa, and the Pantheon at Rome, in all which that space was filled in with open or lattice work in metal, for the admission of air and light, whereby a door and window over it were united into one composition. The two last-mentioned examples are further remarkable, as instanting the mode resorted to for enlarging the doorway to the proportions required by the rest of the design, in most increasing the aperture in the same degree, namely, by filling up the space between the architrave dressings and the door by antae or pilasters, as is shown in the article Doors, vol. i. p. 86.*

We take this opportunity of correcting an awkward mistake in the cut of Box and the figure as represented are each, whereas they ought to be only five, the entire width of the doorway being not forty-eight but twenty-four feet

P. C. S. No. 92
Corporn zukommenden electrischen Kraft in einem Systemati
vorstellig gemacht," 4to, Nürnberg, 1774.

DORÉMA, a genus of plants belonging to the natural order Umbellifera. It has an ovoidy cup-shaped
disk; 4 distinct pelliform primary ridges near the middle, and alternat-
ing with them 4 obtuse secondary ridges, the whole enveloped in wool; vitte 1 to each secondary ridge, 1 to each primary
ridge; and 4 to the commissure, of which 2 are very
small.

D. ammoniacum, a glaucous green plant, with a peren-
ial root, large leaves 2 feet long, somewhat hippocrate,
the pinnae in 5 pairs, the leaflets inciso-pinnatifid, with oblong
margins when dry or sappy; the petiole 5 to 6 inches long
and 2 to 3 inches broad, the petiole very large
downy and sheathing at the base; the teeth of the calyx acute
membranous minute, the petals ovate, reflexed at the point.
The fruit elliptical, compressed, surrounded by a broad flat
edge. This plant is a native of Persia, in the plains of Xer-
dekhast and Kumisha in the province of Jark; and near the
town of Jerusha in very dry plains and gravelly soil, ex-
panded to an ardent sun. This plant is one of those which
yields gum ammoniacum, but it is probable that there are
several species of plants which yield this as well as the
other gum resins of the order Umbellifera.

(Lindley, Flora Medica)

DORÉY, P. LEON, D'NIÉCAS, a distinguished French
designer and engraver, was born at Paris in 1637. He
was the son of Michel Doriguy, who married Vouet's daughter,
but his father died when he was very young, and Nicolas was
educated as an advocate. His taste however led him into
printing, and he at length went to his brother Louis at Rome, who
was a painter and engraver, and put himself under his tuition. He lived twenty-eight years in Italy,
developing his time chiefly to etching and engraving, and he
was one of the first of the French technical engravers in his style, being inferior to Girard Audran alone.
His works are however very hard, though they are drawn with
great vigour and abound in expression, and his bold heavy
lines appear to have been executed with extreme ease; but
there is no delicacy of light and shade or tone in any of
his works.

Dorigny engraved many celebrated Italian paintings during
his long stay in Italy, including three of the best pictures in Rome: the Transfiguration, by Raphael, in 1705;
the Taking down from the Cross, by Daniele da Vellota, in 1710;
and the Lume Man healed by St. Peter, by Cigoli: he en-
graved also the Gallery of Cupid and Psyche after Raphael.

He became acquainted at Rome with some English gentle-
mans, who came to visit France with the intention of engraving the cartoons of Raphael. He arrived in England in
1711, and commenced his task in the spring of the following
year: Queen Anne had given him a room in Hampton Court, and permission to work. The prints were
frayed by subscription at four guineas the set. The prints
were, with the assistance of Charles Dupuis and Claude
Dubosc, finished April 1, 1719, when he presented two complete
sets to George I., who gave him a pension of 100 guineas, and
knighetted him in the following year. As his sight at length failed him, he determined to desist from further prac-
tice, and in 1723 he made a sale of his drawings, and in 1724
returned to Paris. His drawings were sold for 300L., at the
sale of which the drawings at Fontaine brought 52 guineas, and a lot of 104 heads and other studies from them, 74.

These heads were afterwards engraved by various French
artists, and published with some other studies by John Boy-
dell, under the title 'The School of Raphael, or the Student's
Guide to Expression in Historical Painting; illustrated by
examples engraved by Duchoche and others, under the inspec-
tion of Sir Nicolas Dorigny, from his own drawings after the
most celebrated Heads in the Cartoons at the King's Palace.

D'ORONCECUM, a genus of plants belonging to the natural or-
chidaceous family, the suborder of the Seneconidae, and the section Seneconiae. It has the florets of
the ray ligulate and pistilliferous; those of the disk tubular,
with both stamens and pistils; the involucros hemispherical, of
2 or 8 rows of equal scales; the pappus pilose, wanting in the
ray. The species are deciduous herbaceous plants. Two
are natives of South Brazil.

D. pardalineh, with coriade denticulate leaves. It has
a stem from 2 to 3 feet in height, erect, solitary, hollow, and
hairy. It is a rare plant, and found in damp and hilly woods
and pastures. It has its specific name from dardes, a tiger,
because it has a distinct smell, on account of which it
have been made of the plant for the purpose of destroying
wild animals. With the species of Arnica, and other plants of
the order it has the common name of Leopards' Bane.

D. plantaginiferum, the British second species, has ovate
leaves, and figures in odour and habit similar to the above,
but of the same height as the last, and its flowers are also yellow. D. scorpioides, D. caucasicum, D. austricasum, and D. pardaline-
ches are natives of the continent of Europe.

(Koch, Flora Germanica; Balling, Manual of Botany.)

DORTMUND, the capital of a circle of the same name in
the government of Arnsberg, in the Prussian province of Westphal-
ian, is situated in 51° 30' N. lat. and 7° 27' E. long.,
in a very pleasant fertile country on the banks of the Emscher.
It is an old-fashioned hill-town, and surrounded with a
wall with five gates. There are four Lutheran churches and
one Roman Catholic, three hospitals, and a gymnasium
(illustrated, founded in 1548, a private lunatic asylum, and
a hospital for consumptives. It was formerly a part of the
Hanseatic League, had the privilege of coinage money,
and exemption from duties of customs in the whole
Empire. It was the seat of several tribunals, and of the chief
ministry offices of the Post office, the War office, the Wease
and the Pihne. The inhabitants, who are about 7000, are
manufactures of linen, woollen, and cotton, nies, tobacco, and
vinegar, great breweries, and an extensive trade in corn and colonial
productions. In 1802, the town was allotted as an indemnifi-
tion to Nassau-Dic, and placed in possession of the
duchy of Berg, when it became the capital of the department of the
Ruhr: in 1818 it was transferred to Prussia.

(Hassel, Die Preussische Monarchie; Stein, Geogr, Lexicon;
Reinhart, Lehrbuch; Müller, Wörterbuch des Preussischen Staates.)

DOSSI, DOSSO and GIOBATTISTA, two celebrated
Ferrarese painters of the early half of the sixteenth century.
They were born about 1460-1490, in Dozzo, near Ferrara,
and first entered the school of Lorenzo Costa, after leaving
whom they studied together six years in Rome, and five years
in Venice. Though they always worked together, they were
constantly disputing: Giobattista, the younger, was deformed,
and his disposition was the type of his body; he was only
educated to the brush, and for his admirable strength of
great skill in landscape and in decoration, but no skill in
the human figure. Dossio, on the other hand, was a master in the
figure, and Giobattista was always employed by Alfonso I.

The elder brother, Dossio, was sent by his father to a seminary
at Modena, representing the dcofs of the family of Este,
which, according to Vasari, Pordenone was commissioned
by Ercole to execute, but he died in 1540, by poison it is alleged,
shortly after his arrival at Ferrara for the purpose: Vasari
ments the two Dossi with unjust depreciation. They are
praised and enumerated by Ariosto among the other great
painters of Italy and the immortal artists of Greece; after
enumerating the latter, Ariosto says (Or. Par. xxiii. 2)—

"Quel che fuma' a nostri di, o modo e
Rapallo, Andrea da Zoppolo, Marco, Dossio, Dun Dossio, o qual chi a per scule e colora.
Sta le moria e Domenico di Seguso; di
Botticino, Raphael, Titian, etc."

Dossio painted the portrait of Ariosto, and made illustra-
tions to the Orlando Furioso; he painted also the head of
Ariosto in a picture of Paradise on the ceiling of Ferrara,
and of those in the palace and in San Francesco at
Modena, representing the docs of the family of Este,
which, according to Vasari, Pordenone was commissioned
by Ercole to execute, but he died in 1540, by poison it is alleged,
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Dossio painted the portrait of Ariosto, and made illustra-
tions to the Orlando Furioso; he painted also the head of
Ariosto in a picture of Paradise on the ceiling of Ferrara,
DOU

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DOU

has much of the hardness of the early Italian schools. Douce
served his brother seven years: he died about 1560.

(Frizzii, Guida di Ferrara; Lanziti, Storia Pictoria, &c.;
Valery, Voyages in Italia.)

DOUCE, FRANCIS, was born in 1762. He was the
younger son of Thomas Douce, who was one of the Six
Clerks of the Privy Council of Scotland.

To his father's property, which was very considerable, he
was bequeathed by his elder brother, and the rest was left
to himself and his sisters. Francis Douce's share was about
500l. in money and ground-rents of houses, besides the endowments of
his brother Edward, which were made in 1755. His temper
did not suit him, and he himself was very irritable,
and they lived together uncomfortably. They seem to
have had no children. A very large addition was made to his
property in 1829, by Nollekens, the sculptor, who made him
one of his executors, and left him nearly one-half of the
fortune which he had accumulated. [Nollekens, P. C.]
Douce was a Fellow of the Antiquary Society, and was in habits
of constant intercourse, both personal and by correspondence,
with almost all the leading antiquaries of his time. He was a
great collector of scarce books, prints, coins, medals, and
all kinds of curious antiquities. He died at his residence in
Gower Street, London, March 30, 1834.

In connection with the 'Antiquarian Society,' of London,
the book was roughly treated by some of the reviews, and the author was
greatly offended. He also published, about the beginning of
1815, the 'Dante's Dialogue on Death,' exhibited in coloured
Engravings on Wood, with a Dissertation on the several Representations
of that Subject, but more particularly of those ascribed to
Macabæus and Hans Holbein, by Francis Douce, F.A.S.,
Esq. 8vo. London. The substance of the dissertation had
appeared about forty years before, in illustration of Holland's
etchings, published by Edwards, of Pall Mall, London. The
engravings, of which there were forty-nine, were executed by
Bonner and Byfield, the best two engravers on wood
then in London. These are the only designs of that genre published
separately. He has done essays in the 'Archaeologia,'
and there are many communications by him to the 'Gentleman's
Magazine.'

Douce was a mere antiquarian. As critic on Shakespeare,
his remarks are of little value when true, and they are fre-
quently erroneous, though sufficiently arrogant. As an illus-
trator of antient manners, he has been more successful.
The largest amount of money he bequeathed to two
friends, but not to himself; in order, as he himself used to say,
to several of his antiquarian associates. His printed books,
prints, drawings, illuminated manuscripts, coins, and medals,
he left to the Bodleian Library, Oxford. His miscellaneous
antiquities he left to Dr. Meyrick, of Goodrich Castle, Wales.
In writing for the 'Antiquarian Society,' he directed to be
enlosed in a strong box, and sealed up, and given to the British Museum, with this inscrip-
tion on the box, 'Mr. Douce's Papers, to be opened in the
year 1854.' The British Museum refused to accept the box
on those terms, it was then to be given to the Bodleian Li-
brary. He will contain another curious direction—'I give to
Sir Anthony Carlisle 200l, either to sever my head or to extract
my heart from my body, so as to prevent my return to vitality.'

(Goodwin, 8vo.)

DOUGLAS, DAVID, was born at Scone, in Perthshire,
in 1798, where his father was a working mason. He
received a plain education at the parish school of Kinnoull,
and was early placed as an apprentice in the garden of the earl
of Mansfield at Scone Palace. As a lad he was remarkable for
his fondness for books and the study of plants. In the winter
he devoted his evenings to reading, and in the summer to
making botanical excursions for the purpose of collecting the
plants which he was permitted to live at Valleyfield, the seat of Sir Robert Preston, Bart., whose
garden was then celebrated for its choice collection of exotic
plants. Here he was treated by the head-gardener, Mr.
Stewart, with great kindness; he procured him access to
Sir Robert's valuable botanical library. From Valleyfield he
removed to Glasgow, where he was employed in the botanic
garden of the university. His intelligence attracted the
attention of Dr. (now Sir William) Hooker, who was the pro-
fessor of botany at Glasgow, and he made him his companion
in his botanical excursions for the purpose of collecting ma-
terials for his 'Flora Scotica.' Dr. William Hooker
was recommended to the Horticultural Society of London as
a botanical collector, and in 1833 he was sent to the United
States, where he procured many fine plants, and greatly
increased the collection of fruit-trees in the possession of the
society. In 1836 he was sent by the Horticultural Society
to explore the vegetable productions of the country adjoining
the Columbia River, and southwards towards California. The
vessel in which he went out touched at Rio de Janeiro, where he
received a quantity of genera, and plants, and bulbs. In the
course of his voyage round Cape Horn he shot many rare
and curious birds. He visited the island of Juan Fernandez,
which he describes as 'an enchanting spot, being fertile and
delightfully wooded.' Here he sowed a quantity of garden-
seed, with the intention of offering to 'add to the collection of a second Robinson Crusoe, should one appear.'
He arrived at Fort Vancouver, on the Columbia River, in
April, 1826. During his journey he sent home from time to
time large numbers of beautiful plants, with seeds and dried
specimens. The latter are now existing in the herbarium of
the society at Chiswick. Of the genus Pinus he discovered
several species of gigantic size, one of which has been named
after himself, 'P. Douglasii.' In the spring of 1827 he went
from Fort Vancouver across the Rocky Mountains to Hudson's
Bay, where he met Captain (now Sir John) Franklin, Dr.
Richardson, and Captain (now Sir George) Back, returning
from their second overland arctic expedition. With these
travellers he returned to England, and acquainted him with the
results of his researches. Shortly after his return he was
elected, free of expense, fellow of the Linnean, Zoological,
and Geological Societies. He remained in London two years,
and sailed again for the Columbia River in 1829. He after-
wards went to the Sandwich Islands, where he had remained
some months when an accident put an end to his existence.
The natives of the Sandwich Islands are in the habit of
making pits, in which they catch the wild bulls. In one of
his expeditions he accidentally fell into one of these
pits, in which an infuriated animal was already trapped.
The animal fell upon him, and he was found dreadfully mutilated
and quite dead. This occurred on the 12th of July, 1834.

Of modern botanical travelers, Dr. Douglas was one of the
most enterprising and successful. Almost all the new hardy
plants of our gardens were introduced by him. To him we
are not only indebted for many valuable timber trees, for nu-
umerous species of the beautiful genus Ribes, and other orna-
tmental shrubs; but the favorers of species—the<br>
Clarkius, Penstoneum, Cenothera, and Lupines, were almost
all first collected by him. A list of all the plants collected
by him would occupy too much space, but an idea of the
value of his labors may be formed by the following enumer-
ation of the number of species commonly growing in our gardens,
which are the result of his various voyages—

<table>
<thead>
<tr>
<th>Family</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ranunculaceae</td>
<td>Four species</td>
</tr>
<tr>
<td>Berberis</td>
<td>Two species</td>
</tr>
<tr>
<td>Rheum</td>
<td>One species</td>
</tr>
<tr>
<td>Papaveraceae</td>
<td>Three species</td>
</tr>
<tr>
<td>Cruciferae</td>
<td>One species</td>
</tr>
<tr>
<td>Violaceae</td>
<td>One species</td>
</tr>
<tr>
<td>Sileneae</td>
<td>One species</td>
</tr>
<tr>
<td>Alsinaceae</td>
<td>One species</td>
</tr>
<tr>
<td>Lonicerae</td>
<td>One species</td>
</tr>
<tr>
<td>Malvaeeae</td>
<td>Two species</td>
</tr>
<tr>
<td>Geraniaceae</td>
<td>Two species</td>
</tr>
<tr>
<td>Leguminosae</td>
<td>Thirty-three species</td>
</tr>
<tr>
<td>Lamianthaceae</td>
<td>One species</td>
</tr>
<tr>
<td>Rosaceae</td>
<td>Twenty species</td>
</tr>
<tr>
<td>Onagraceae</td>
<td>One species</td>
</tr>
<tr>
<td>Loasaeeae</td>
<td>One species</td>
</tr>
<tr>
<td>Portulaceae</td>
<td>One species</td>
</tr>
<tr>
<td>Grossulaeae</td>
<td>Fourteen species</td>
</tr>
<tr>
<td>Saxifrageae</td>
<td>Two species</td>
</tr>
<tr>
<td>Convolvulaceae</td>
<td>One species</td>
</tr>
<tr>
<td>Compositae</td>
<td>Eleven species</td>
</tr>
<tr>
<td>Lobeliaceae</td>
<td>Two species</td>
</tr>
<tr>
<td>Ericaceae</td>
<td>Four species</td>
</tr>
<tr>
<td>Polemoniacae</td>
<td>Fifteen species</td>
</tr>
<tr>
<td>Hydrophyllaceae</td>
<td>Eight species</td>
</tr>
<tr>
<td>Solanaceae</td>
<td>One species</td>
</tr>
</tbody>
</table>

3 & 2
Scrophulariaceae
Twenty-seven species
Loasitae
Two species
Pruinaceae
One species
Sporoae
One species
Nyctaginaceae
One species
Polygoneae
One species
Garruceae
One species
Coquelucchiniæ
Eight species
Iridaceae
Two species
Hemerocallidæ
Two species
Arthophalææ
Four species
Lilaceae
Eleven species
Valerianæ
One species
Of these, 53 are woody plants and 145 herbaceous plants. This
dried collection of Californian plants alone consists of about
800 species, but these were only a part of his extensive
herbarium.

(Gardener’s Magazine, vols. xi. and xii.; Companion to
the Botanical Magazine.)

DOUMA THEBACIA. [Doom, P. C.]

DRABA, a genus of plants belonging to the natural order
Crassulaceae, the suborder Latschete, and the tribe Alyssinæe.
It has an oval or oblong pouch, slightly convex, the seeds
many in each cell, not margined, in two rows, the filaments
simple. The species are perennial or annual branching
herbs, with linear oblong or ovate leaves, yellow or white
flowers.

D. ervaæ, common Whitlow Grass, has a leafless scape,
flabellate above, lanceolate acute attenuated leaves, hairy
below, the petals deeply clenched, the pouch oblong,
shorter than the perianth, and the styles are opposite.
It is said to be an annual, or a biennial plant;
ornamenting old walls and dry banks in the spring, before
other flowers make their appearance. It is found throughout
Europe, and is most abundant in Great Britain. It is the
aspect of Dracaena Drabæ.

D. aizoon, Evergreen Whitlow Grass, has naked smooth
scapes, linear acute keeled stiff ciliated leaves, the style as
broad as the hairy pod, but one-half shorter. It is a native of
Bavaria, Austria, Hungary, Transylvania, and the Carpathian
mountains, particularly on Mount Gobolincs, and the
average sides of the mountains, where it is often very
numerous.

D. oizodes has a leafless glabrous scape, with linear, rigid,
acute, keeled, glabrous, ciliated leaves, the stamens as long as
the slightly notched petals, the style elongated. It is a native
of gravelly soils in almost every country of Europe. It is a
rare plant in Great Britain, and has been found on rocks and
walls at Pennard Castle, near Swansea. The other British
species are D. repens, a rare plant found on mountains in
Scotland; D. inca, also a mountainous species, and D.
mountana, found only on Mount Gobolincs, and the
average sides of the mountains, but it is a rare plant in Great
Britain.

Above sixty species of Draba have been described. They
are all insignificant plants, inhabiting the temperate and colder
parts of the world. They are not very cultivated, but are
adapted for rock-work. They are apt to drop off in winter
when exposed, and the best way to preserve them is to keep
them in pots as other alpine plants. They grow best in a
mixture of sand, loam, and peat, and the pots should be well
drained with potash.

They may be propagated by dividing the roots or by seeds.

(Blattington, Manual; Don, Gardener’s Dictionary.)

DRACONIUM (from ²drakôn, a snake, because the stem is
shaped like the skin of a serpent), a genus of plants
belonging to the natural order Aracaceae. It has a cymbiform
spathe, with a cylindrical spadix, quite covered with herma-
phroditic flowers, the perianth 7-9-parted; 7-9-stamens, with
oring, 2-celled, openers, opening at the apex, and distinct from their
filaments; the ovary 2-3-celled, each cell containing one pendulous ovule; a
1-3-seeded berry; seeds without albumen.

D. polypodiium has a flower resembling a small peach,
producing a 2-celled fruit, with long styled spotted petals
resembling the skin of a snake. The spathe is large, of a
purple colour, very deep inside, hooded, acute, and appearing
after the leaves have withered. It swells so powerfully on
first expanding that the leaves have been known to fall from the
stems. It is also said to excite the nerves of hearing,
and even induce a state of catalepsy. It is a native of Guiana,
Surinam, and other parts of equinoctial America, where it is
called Labarris, and regarded as a remedy against the bite of
the serpent. The flowers or fleshy stalks resemble in colour.
Its use in this respect is doubtful, but its powerful
action on the system might render it available in the treatment
of many diseases. There is a species of Dracoonium in India,
called by Assiatics by the same name, which is a valuable
remedy in asthma, and is used in hemorrhoids.

The Dracoonium fulidum of Linnaeus, the Skunkweed and
Skunk Cabbage, has been placed in the United States and is
dedicated to the genus Sympplocarpus. It differs from Dracoonium
in its ovaries being 1-celled, and in its spathe being cucullate.
It emits a powerful odor. When the tubers are dried and powdered,
they are used as an antispasmodic. It has been
recommended in asthma and chronic bronchitis, also
in certain cases of hysteria, drapery, and epilepsy.

(Lindley, Flora Medica.)

DRAIN TRAPS [Seewers, P. C, p. 319; Buildings,
P. C. S.]

The contrivances to prevent the escape of foul
air from drains, but to allow the passage of water into
them. They often fail to produce the intended effect, and
great expense is often incurred in attempting to remedy the
wrong place. ‘The drains smell, we shall have rain,’ is a
common expression, but few inquire why drains seed
forth their peculiar intimation of a change in the state of
the atmosphere. It has become the practice to trap drains
where they lose the house in order to prevent the escape of
air from the sewer, so that a large quantity of air is enclosed
in the drain between these large traps and the smaller ones,
at the sinks in the house. Now this air being liable to expansion
under the pressure of the atmosphere, and become
water, occasionally displaces the very small column of water in
the sink-traps, and escapes into the house, to the serious annoyance
of the occupants of the house. The sink-traps are
brought to the highest part of the drain so that the foul air
may escape at the other extremity of the pipe where it can pro-
duce no inconvenience.

DRAPEY [Seewers, P. C.]

DRAMATIC LITERARY PROPERTY. [Copy-
right, P. C. S.]

DRAVER. [Bill of Exchange, P. C.]

DREBBEL, CORNELIUS VAN, was born at Alkmaar,
in Holland in 1621. He is chiefly distinguished by being
the inventor of the thermometer; or, at least, by sharing
that honour with Santorio. His instrument, which is said
to have been first used in Germany in 1621, consisted of a tube of
glass containing water and connected with a bulb contain-
ing air: by the expansion and contraction of the air, in
sequence of the variations of temperature, the column of
water was allowed to rise or fall in the tube; and thus the
height of the column, being measured by a scale, served as an
indication of the temperature.

Drebble also discovered the means of producing a bright
scarlet dye for woollens and silks; and, according to Beck-
mann, he communicated the discovery to Kuffer, a dyer, at
Hamburg, in the year 1650. The process was
afterwards introduced into France by the persons who estab-
lished the Gobelins manufacture, the objects of which were
celebrated for the brilliancy of their scarlets. It has been
assured that he was also the inventor of the application of
an eye-scope; but this is probably without foundation, though
he may have made some improvements on those instrum-
ents.

The reputation which Drebble acquired during his life is
less due to his useful discoveries than to a pretended know-
ledge of the causes of many natural phenomena; few persons,
in an age of ignorance respecting physical science, being able
to impugn his claim to such knowledge. The emperor
Rudolph II. granted him a pension, and Ferdinando II. made
him a present of a house when the emperor ascended the
throne of Austria; he was imprisoned in that country, and, but for
the interference of the king of England, James I., he would have
been executed. Drebble spent the rest of his life in this
country; and it is said that, on his arrival, he was presented to
the king by a glass tube which exhibited the phenomena of a
lightning, thunder, and rain, with the sun and planets in perpetual
motion; he is also said to have contrived a boat which could be
rowed under the surface of water, and in which a person might
reside without artificial light. He died in London, in the
year 1654.

Drebble wrote, in Dutch, two works which were after-
wards translated into Latin and French: one of these is on
the Nature of the Elements, the Winds, Rain, &c.; and the
other, a work on minerals, with the manner of obtaining them
from minerals, vegetables, &c.

DREDGING-MACHINES are machines employed for
decouping and clearing away deposited matter from the beds
navigable rivers, canals, harbours, and basins; dredging: the term applied to such operations in common with the somewhat similar 'fishing for oysters.' 

Some machines employed for this purpose may be compared to ploughs, harrows, or great shovels, used only to loosen the silt or deposit, preparatory to its removal either by the plant itself in the pincers, or by the process of slicing. Others not only detach the sand or silt from the bottom, but also bring it above the surface of the water and discharge it into a vessel in which it may be removed to be made use of as ballast; or, when it is not wanted for this purpose, to be emptied into deep water without doing any mischief. Boats or barges for the latter purpose are frequently made with one or more large funnel-shaped openings in the bottom, through which their contents may be discharged by simply releasing a kind of trap-door.

One of the simplest contrivances for performing this operation is that known as the spoon dredging-machine, which consists of a strong ring or hoop of wrought-iron, partially edged with steel, about two feet or rather more in diameter, attached to the end of a pole thirty or forty feet long, and carrying a large bag of bullock's hide perforated with a number of small holes. This apparatus is connected by ropes and tackle with a vessel, and is attached to a contrivance which can be manoeuvred in such a manner that the steel edge of the hoop cuts into the soft bottom, and scoops a large quantity of silt into the bag, which is then drawn up to the surface. The work is not only a great deal easier, but much more economical, than the practice of dredging by means of a sluice, in which case the quantity of silt which is carried away would be enormous; and the vessel would be emptied into deep water without doing any mischief. Barges or barges for the latter purpose are frequently made with one or more large funnel-shaped openings in the bottom, through which their contents may be discharged by simply releasing a kind of trap-door.

Pierre Drevet, the son, was born at Paris in 1697, and was a complete master in his art already in his thirteenth year, when he executed a plate of the Resurrection of Christ, after David Teniers, which, as the artist of the design and execution, is equal to the works of any of his contemporaries.

In his twenty-sixth year he produced his masterpiece, the full-length portrait of Bosseau, after Rigaud, in which every part of the design and execution was adapted for history, and the substance and material of each is easily and clearly distinguished—feet, draperies, wood, the various ornaments—all have a peculiar and characteristic style of execution. He executed several other portraits of nearly equal merit. His works, in the opinion of Dou, was more adapted for history than for portrait, as being extremely laboured; it drew the attention from the subject to a large part of the parts, and destroyed the unity of effect. Some of his last works are executed in a more style. He engraved exclusively after French masters, but his works are not numerous. He died at Paris in the same year as his father, 1739.

(Watetot, Dictionnaire des Arts, &c.; Huber, Manuel des arts de la Societé de l'Art, &c.)

DRIF. [District P. C.; Diluvial Formation, P. C. S.]

DRILL. To what is given on the subject of drills under BORING INSTRUMENTS, P. C. S., p. 225, we may add a refor- mulation of the apparatus for raising a water-well, as described by Mr. Morgan Evans, and described in the 'Transactions' of the Society of Arts, vol. liii. part i. pp. 85-87, which offers peculiar facilities for boring holes in confined situations, where there is neither a sufficient discharge for a steam-engine, nor a drill could be applied; the necessary pressure being supplied through the medium of a screw actuating upon any fixed point which can be found or temporarily applied over the hole, while the rotary motion is given, in cases where a bow cannot be used, by a fixed lever-handle, with a rack and pinion, to provide for its retrogression between each cutting stroke.

DROKERO. [Salluzzo, P. C.]

DROSERA (from ḍροσες, ḍrōses, dew), a genus of plants belonging to the natural order Droseraceae. It has a calyx deeply 5-cleft; 5 petals; 5 stamens; 3-5 valves. The species are herbs inhabiting bogs and mossy swamps. The leaves are furnished with reddish glandular hairs, which discharge from their point a vivid red fluid. Insects are often caught upon these hairs, and hence they have been supposed to be irritatible, and to resemble those of the Dionna musci- pula or Venus's Fly-trap, a plant belonging to the same order.

D. rotundifolia, common or round-leaved Sun-dew, has orbicular spreading leaves, hairy pedicels, erect peduncles, seeds with a loose chaffy coat. This plant is a native of Europe, in boggy places especially, where the Spagnum grows. It is easily cultivated, and an excellent plant for the garden. It is an arid and caustic plant, and has been supposed to cause rot in sheep. It curdles milk, and has a reputation for removing corns, humours, and warts. When distilled with a stimulating spirit it procured which was formerly much used as an excitant.

Two other species, D. longifolia and D. anglica, are natives of Great Britain. The first is a common bog-plant, but the latter is only common in the British Islands. About forty species of this genus have been described. They have been found in boggy places in all parts of the world, except in the extremities of heat and cold. They are all singularly beautiful, and worthy of cultivation. They thrive best in small pots, which can be placed in the open air, and earth, and sphagnum should be planted on it; the Drosera should be planted in the moss, and the pots placed in pans of water. The New Holland and Cape of Good Hope species are not very suitable for the table. They may be propagated by seeds, but foreign plants should be brought over in cases, for which purpose those of Mr. Ward are admirably adapted.

(Don, Gardener's Dictionary; London, Encyclopaedia of Plants.)

DRUMMOND, CAPTAIN THOMAS, was born at Edinburgh, in October, 1797, the second of three sons. His father died whilst he was an infant; his mother removed to Musselburgh, where she resided many years, devoting herself entirely to the education of her children. Her whole life was expressed in the warmest manner his obligations to his mother, and attributed much of his success in after-life to her intelligence and vigilance. He was early entered at the High School of Edinburgh, and there formed an acquaintance

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with Professors Playfair, Leslie, and Brewster, and also with Professors Wallace and Jardine, whose pupil he more especially was.

In February, 1818, he was appointed to a cadetship at Woolwich. His mathematical abilities soon made him conspicuous, and he was moved from the sixth to the fifth academy without the usual examination, and passed with such remarkable rapidity of advancement that he was at the end of the fourth and third, that is, at Christmas of the year in which he joined the academy, the second academy.

Much of his success was doubtless to be attributed to the admirable preliminary education he had received, but much also to a combination of determination, a vigorous and well-regulated mind he brought to bear on all his subjects. To this it was probably due that he never became exclusively a mathematician, but advanced equally in all the various branches of study, being at that time, as he continued through life, distinguished for general knowledge and for aptitude to seize on information of every kind. His mathematical character at Woolwich has been thus well and justly sketched by his friend and master, Professor Barlow:—"Mr. Drummond by his amiable disposition soon gained the esteem of the masters under whom he was instructed; with the mathematical masters in particular his reputation stood very high, not so much for the rapidity of his conception as for his steady perseverance for the original and to the point view of the different subjects that were placed before him.

There were among his fellow-students some who comprised an investigation quicker than Drummond, but there was none who ultimately understood all the bearings of it so well. While others, in a jigger with a difficulty found with a rather difficult demonstration in the conic sections, he supplied himself on an entirely original principle, which at the time was published in Leybourne's Mathematical Repository, and was subsequently taken to replace that given in Dr. Hutton's 'Course of Mathematics,' to which he had objected. This apparently trifling event gave an increased stimulus to his exertions, and may perhaps be considered the foundation-stone of his future scientific fame. After leaving the academy he filled the position of his intercourse with his mathematical masters, with whom he formed a friendship which only terminated in his much lamented death.

During his preliminary and practical instruction in the special duties of the Engineer Department, his talent for mechanical combinations became conspicuous, one of which is thus described by his contemporary and friend, Captain Dawson, to whose information this notice is largely indebted:—"The various inventions to which the English Royal Artillery owe their value and power, all the modern inventions of determination of resistance, &c., were actually planned by Drummond himself, to consider the subject, and he made a model, like a man-of-war's gig or galley, sharp at both ends, and cut transversely into sections for facility of transport, that would prevent it from being damaged in any one part; each section was perfect in itself, and they admitted of being bolted together, the partitions falling under the thwart or seats. The dockyard-men to whom he showed it said it would row better than any boat except a gig, and it was light, and capable of being transported from place to place on horseback."

This early period of his career was also largely devoted to the acquisition of military knowledge, partly from the associations around him, and partly from the circumstances of the times. Jomini and Bou-mard were his favourite authors, and often has the morning light surprised him in deep discussion on the details of Waterloo and the strategy of the recent campaigns.

At Chatham, the practical and varied applications of scientific knowledge brought by Colonel (now General) Pasley to the aid of military science, offered the highest attractions to a mind like Drummond's. During the period of his service at Chatham, his military of years led him to obtain leave for the purpose of visiting the army of occupation in France, and attending one of the great reviews.

Before he joined at Chatham he had served a short time at Neagh, in the province of Ireland, and when he completed he was stationed at Edinburgh. The duties there offered nothing to engage his attention, relating merely to the charge and repairs of public works; but he was happy in being again thrown among his family and friends, and more in the opportunity of putting into practice the training he had received in which he delighted, at the college and classes, and among the scientific society of his native city. He found the duties however so trivial, and the prospects of the service so dist
single station, and for a short time on a very few days; the
lamp, the instrument was at first believed, and the elements which
had been called into play soon suggested the more perfect
instrument. From a calculation, of which the variables were
the relative position of two stations and that of the sun, a
happy step led to an instrument by which the problem
might be solved. Mr. Bumah's original design consisted of
the line between the objects, connected with one to be directed on the
sun and carrying a mirror; such accordingly was the first
heliostat of Drummond; its mechanism is described in the
paper already referred to, by Colonel Colby. To this
lamp, it was used successfully in the first season of the trigo-
nometrical operations in Ireland. It was originally intended
to give this instrument a divided circle, by which its direction
could be fixed; but as this was not effected, a theodolite was
necessarily employed, and a correction constructed for the
fact that if a theodolite were used, a more simple and less costly
heliostat might be adopted. This accordingly was devised
by Mr. Drummond before the second season; the direction
being effected contrary to the theodolite, instead of being,
as before, dependent partly on the theodolite and partly on
the adjustments of the heliostat. The telescope of the heliostat
now became useless, and it remained a simple mirror move-
able in two directions, i.e. on a horizontal and on a vertical
axis, which the gaze was moved, in a position of the Sun
determined by a sextant. One single soldier is sent with a
heliostat to some remote mountain or island, with tolerable
certainty that its reflection will be seen as soon as the sun
shines after it reaches it. [DUMMOND'S LIGHT, P. C.S.]

In the autumn of 1824 Colonel Colby made a general
reconnaissance of Ireland for the purpose of fixing on the mode
of survey, the choice of stations for the great triangulation,
and the most fitting place for a base. He selected Mr. Drum-
mond to accompany him on this tour. The Plain of Magilli-
gan was selected, and the station was next directed to
a fitting apparatus for the measurement.

Colonel Colby's long experience bad shown him the defects of
the apparatus formerly employed, and he boldly devised
one altogether new, in which compensating expansions were
to be provided. The construction of the instruments required long and careful
experiments, the charge of which was confided to Mr. Drum-
mond; and so far as was necessary to prepare the instruments for
use in the field, they were performed by him or under his
direction. It occurred to him that mice, which had then
recently been recommended by Sir David Brewster for pen-
dulum rods, might be applicable to this new purpose. Colonel
Colby allowed experiments to be tried on that substance, but
these were necessary to show whether the action of the
light had decreed the idea. The apparatus was completed according to Colonel
Colby's original plan, and successfully used in the base at
Magilligan. In the measurement Mr. Drummond was again
employed, and whenever Col. Colby was absent on other
duty the charge of the operations devolved on him.

At this period of invention and improvement which pre-
ceded the commencement of the survey of Ireland, Mr.
Drummond gave some consideration to the barometer, an
instrument which had been so long neglected. He had not
then received so much attention as it has since. His
favourite construction was the sphion, and he made
one with his own hands, which performed remarkably well;
but he was not in possession of various modes of reading
which have since been discovered. In the line of
Forlin's point, as now applied with a moveable scale by
Newman, leave nothing to be desired, at least for the lower
levels, and he devised a singular mode of biasing a reflected
image of the surface, a ghost, as he called it; but he arrived
no permanent or practical result, and at length abandoned
the subject from conviction, to use his own words, that
the errors to which the barometer was liable from causes beyond
control, were greater than the quantities he had been dealing
with. His researches on light, and his intimacy with Pro-

Drummond was a man of the first order in his science,
and the number of his correspondents was increased by his
athropec, and other philosophical instruments of more
or less practical utility; among others, Wollaston's thermo-
barometer; indeed, at this period so active was his mind and so
content with his application, that scarcely an instrument ex-
isted that he did not examine and apply to useful purposes;
and, among other experiments and records and recorded
them, till a calamitous storm destroyed these
and all its contents together.

A severe illness which Mr. Drummond contracted from
exposure during the Irish survey compelled him to return
to Edinburgh, where he was unable to devote himself to study,
but he had taken much pains to perfect his light, and he now
began to revert to the idea that he had early formed of adapting
it to lighthouses. In this he was freely permitted by the
business of the discovery. It has been stated to us of
him that during the following winters: the experiments he made,
with their success, are detailed in the 'Philosophical
Transactions' for 1830.

The operation of Trinity-House placed at his disposal
a small lighthouse at Purfleet; and the brilliant effect of the
light as seen from Blackwall, where, at a distance of ten miles,
it was sufficiently strong to cast shadows, made it an object of
very general interest.

Here perhaps may be proper to notice the erroneous
ground on which Mr. Drummond has received credit for the
line light. He has by some been called the inventor or dis-
coverer of this, and when it is found to have been known
before, he is by others accused of piracy. He never claimed
the chemical discovery of Dr. Davy, but he had in 1812,
out of a lecture on the subject, and it is known that the
color microscope had been exhibited several years before
at the London Institution, and probably at other places, by
the light of lime burnt under the mixed gases. Mr. Drum-
mond's merit was in rendering practically useful a second
experiment,—by devising a means of procuring and using
without danger agents so turbulent as the mixed gases,
making the apparatus sufficiently portable and simple to be
employed in the circumstances of exposure required, for
the survey, and, perhaps more than all, for the happy idea of using
this minute sphere of concentrated light as the radiating
focus of a parabolic mirror.

But the original intent of the lamp, its application to lighth-
houses, presents difficulties which have yet to be overcome.

The abstraction of Mr. Drummond's attention to the moment
when he was nearest to success, must, so far as the light is con-
cerned, be considered matter of regret; with its projector it
may perhaps be of more use before the next season at
sooner or later be directed to render it available, and the
Drummond light may yet cheer the home-bound mariner from
the Skellig or the Tuskar.

Mr. Drummond lived on terms of intimacy with Mr. Bel-
deed Kcr who was employed in the preparation of the
details relating to the Reform Bill, and by him was men-
tioned to Lord Brougham, then the Lord Chancellor, as a person
eminently qualified to superintend the very laborious opera-
tions of that Board. He was at last appointed to superin-
tend the boundaries to the old and the new boroughs.
Lord Brougham was previously well acquainted with his
talents and attainments. Mr. Drummond, on the recom-
mandation of Lord Brougham, was appointed to this commission,
not however without some scruples, many of his
colleagues, who doubted much as to the propriety of putting
at the head of so important a department a young lieutenant
of the Engineers. He bowler more than justified the expec-
tation formed for him by his conduct.

We shall not enter into any detail of his labours; it is
sufficient to state that whatever he did met with the most
complete approbation of the ministers of the day.

When the Reform Bill was passed, Mr. Drummond
returned to his duties on the Board, and the House of Lords
for giving an account of the base before adverted to, when
he was again called into public life by being appointed Lord
Spencer's private secretary. On the dissolution of the
government, he received a pension of 300L a year, obtained for him by Lord Brougham, his constant friend.

This was made rapidly in Ireland; he much distinguished himself in the report on railways in Ireland, being at the head of the Commission. We shall not attempt to trace his labours as a politician or on the railway commission, but his talents and industry were admitted by all his contemporaries. His labours were incessant at his duties, and probably hastened his death by his continued application. This took place April 15, 1840, 'in the plenitude of mental power and maturity of knowledge, beloved by his private and esteemed in public.' No better indication of his character can be given as an upright and virtuous man, when it is stated that Lord Spencer wrote to the person who states this, that it was 'one of the most pleasing recollections of his life that he made him acquainted with Drummond.' And whilst this article was passing through the press, Lord John Russell, in the House of Commons, adverted to a celebrated remark of Mr. Drummond's when in Ireland, that property had its duties as well as rights, and he was proud to name him as his ever-to-be-lamented friend. Soon after his death there was a subscription for a statue, which has been executed at Rome, to be placed in Dublin.

(See Mem. in Paphos connected with Duties of the Royal Engineers.)

DRUMMOND'S LIGHT. The difficulty of distinguishing the stations chosen for the angular points of the triangles in a geodetical survey, when those stations are many miles asunder, renders it necessary to have recourse to illuminations every night; and the late Sir William Drummond, one of the Royal Engineers, invented a heliostat which reflected the sun's rays in sufficient abundance to render the station which was to be observed visible.

This was a sort of a rectangular form and mounted on a stand with joints by which it could be fixed at any angle with the horizon. On the stand was a telescope which was capable of being moved horizontally, with the mirror, and directed to the distant station, while another telescope was directed to the sun. The adjustments of the mirror were such that, when the telescopes were directed, as has been said, the face of the mirror reflected the rays of the sun on the distant station, and illuminated it sufficiently to render a mark there visible in the telescope of the theodolite by which the required angle was to be taken.

When it was required to observe the angles subtended between distant stations at night, the white or blue lights were first employed in this country; the materials being fixed, at the station, at times agreed upon by the parties engaged in performing the operations: Argand lamps, with parabolic reflectors, were used by the French, and subsequently by the English geodists; but a light which Captain Drummond obtained was more elegant, and required any one of the others. This is produced by placing a ball or disk of lime, about a quarter of an inch in diameter, in the focus of a parabolic mirror, at the station to be rendered visible, and directing upon it, through a flame arising from alcohol, a stream of oxygen, by means of a technical apparatus. The cistern containing the alcohol is supported on a stand, behind the reflector, and is connected by a tube of copper with the lower part of a hollow stem supporting the upright wire at the top of which is fixed the ball of lime on a level nearly with the cistern: the spirit ascends in the stem, and afterwards, through three or more tubes, to the ball. The vessel containing the oxygen gas is connected, by a flexible tube, with an orifice in a cylindrical box on the same stem, from which it passes through the stem to the cistern, and by tubes to the ball, after passing with friction through three small cylinders. The whole apparatus is attached to a stand which carries the mirror; and adjustments are provided by which the inclined plane may be placed exactly in the axis of the mirror. The intensity of the flame is from sixty to ninety times as great as that of an argand burner, while the expense is only about ten times as great. The lime made from chalk is preferred to any other; and such is the brilliancy, that stations separated 100 miles from each other have been very distinctly visible even in very hazy weather.

Captain Drummond suggested in a paper which was printed in 'the Philosophical Transactions' for 1830 (p. 385) that burning lime should be employed for lighthouses; and he proposed that, instead of alcohol, hydrogen gas should be employed with the oxygen gas. The gases are to proceed from separate vessels, or gasometers, and enter a chamfer through a series of small apertures: the united gases are then to pass through two or three pieces of wire gauze, and issue in two streams against the ball or disk of lime. To prevent the latter from catching fire, a water jacket is made to revolve once in a minute; and in order to keep up a constant light, it is proposed to have an apparatus by which a number of balls may be successively made to fall in the focus of the mirror.

A light of this kind may also be employed as a signal in determining the difference between the longitudes of stations.

Drame, a genus of plants belonging to the natural order Rosaceae, and to the tribe Dryasæ. It has the calyx 6-8-lobed, and when it is made up of numerous small nuts, tipped with the persistent hairy styles, which are straight at the extremity, and aggregated on a dry receptacle; the seed ascending. The species have been called Dryas alba subalpina, with the stipules minute to the sides of the petals.

D. octopetala has crenate-serrate oblong leaves, the sepals three or four times as long as broad, more or less pointed, the base of the calyx semicircular. This plant has white flowers, with a woody prostrate stem and simple leaves, a very pubescent beneath. It is a native of Alpine districts of Europe, and is found on the mountains of Scotland and Ireland, and in Yorkshire in England.

D. mooræ has crenate-serrate oblong leaves, the sepals twice as long as broad, and blunted and rounded at the end, the base of the calyx truncate and nearly flat. This species has only been found at Ben Bulben, in Sligo, and has been recently described by Babington in the 'Annals of Natural History.' It is a native of Greenland, and two natives of North America. They are all evergreen prostrate plants. When cultivated they thrive best in a border of peat soil. They may be propagated this way into Perennial beds. They may be also planted in pots as other Alpine plants.

(Babington, Manual of British Botany; Don, Gardener's Dictionary.)

DROPSYS, the name given by Olivier to a genus of numerous coleopterous insects of the family Clericeræ. The type is the Dessermes curaticulatus of Geoffroy, a little black sluggish beetle, not uncommon in Europe in the neighbourhood of watery places. Fabricius changed the name of this genus into Porrusæ. It includes fourteen species, of which seven are American and seven European. The same Dryops was applied by Fabricius to another genus of Coleoptera, of which the Dæmeræ semorana, a black insect, was the type. Changes of this kind are highly censurable, increasing as they do the confusion arising from a complicated synonymy.

DUAæÆR, or DuæÆR'NUS FRANCOIS, a French lawyer, was born about the year 1509. His youth was chiefly passed abroad. He showed great profusion of his professional education from conversation with M. Budè, Maître des Réquêtes at Paris, to whose children he was employed as tutor. He afterwards taught law at Bourges, where in his old age, as defender of the established religion, he suffered the extreme controversy with Cujacius, then in his youth. This dispute, of a kind so frequently exhibited when a rising genius invades old settled principles, was conducted with so much animation between the factions, headed by these two lawyers, that it was compared to a civil war. Cujacius acknowledged that to the exertions he had to make in this controversy he owed much of his subsequent legal knowledge and critical discrimination.

Duren died at Bourges in 1553. His works were published in six volumes in 1530, and in 1551 a new edition, with corrections, was published in three volumes. There have been subsequent editions. Some of his minor works are published in the 'Tractatus Tractatus.' There is a Memoir of him in Taisand's 'Les Vies des plus célèbres Jurisconsultes.'

DURÉN, the historic name of the old painter of Siena, and one of the earliest of the Italian painters, was born in or near Siena, in the latter half of the thirteenth century. He signed himself Duccio, or Mag. Duccius; Buoninsegna, or Segna, was the name of another painter, which may be the same; he was living in 1298. There are some of his works in the Siena Academy.

Duccio was the school of Siena what Cinque having was to that of Florence. His active career was probably begun about 1295 and about 1316; he was mentioned in the Sienese archives of 1285, when he may have been about twenty-five or thirty years of age; and he is mentioned also as late as 1311, when he completed his great work, the celebrated altarpiece of the cathedral, which he commenced in October, 1298. This
picture was the most extensive production of its class in its time, and cost, including gold and ultramarine, about 3000 florins, an immense sum. Ducelo's portion, however, was small, though probably enough: it was only sixteen perce or seven years, the principal or that facing the people, are represented in large figures the Madonna and child, surrounded by saints and angels and the four patron-s of Siena; on the other side is a story of unrecorded date; sensibly; in the exposition of Christ, in figures about six inches high, all executed with great skill and surprising care, but in the Byzantine style of design. It was removed from the altar in the early part of the sixteenth century to give place to a tabernacle, and was afterwards in two, and the halves were placed in the choir where they still remain.

There are other works by Ducelo extant; but Rumohr has shown Vasari's statement respecting him and the pavement of the cathedral of Siena to be incorrect. The first mention of the pavement in the archives is in 1446, more than a century after the death of Ducelo. Vasari's account of him is altogether worthless. Vasari states that he was the artist of some of the decorations of the pavement, and he was the inventor of the pavement, which is a meteor.
formed in Paris under Poureury. The office of prosector as well as the chairs of the professors were given by concours; for although Dupuytren was a professional man, he was placed first on the list. His emolument was barely sufficient to keep him in health. During his need he was visited by Saint Simon, who, after stating to him his views of society, with no intention of embroiling himself with its necessities, but Dupuytren refused it. In 1801 he contended with M. Dumeril for the position of chef des travaux anatomiques, which he lost by one vote; but a few months after, Dumeril having been appointed to a professorship, the post was given to Dupuytren.

Up to this time morbid anatomy had only been pursued in the same manner as descriptive anatomy. Little had been done towards regarding the appearances of bodies after death as they are the circumstances of surgical operations, and the work recorded by Bartholin, Bonet, Manget, Morgagni, and Lienhard, had never been systematised, nor any general principles deduced from them. Dupuytren saw this, and devoted himself with ardour to pathological anatomy. He however determined to connect this branch of inquiry with surgery. The results of his labour were not however published by himself, as indeed very little that he has done has ever been, but appeared in a work by M. Marxaud, entitled 'Essai sur les rapports de la Chirurgie et de l'Anatomie,' which was published in France, 1805. In this work the organic unions of the body are distributed into species, genera, orders, and classes; and although the work contains many errors of observation, and much hasty generalisation, it must be regarded as a successful effort towards forming a science of morbid anatomy.

In 1803 Dupuytren took his degree in the faculty of medicine. On this occasion he wrote a thesis on some points of anatomy, physiology, chemistry, and pathological anatomy. 'Le Théâtre de l'anatomie, dépourvu de signes et de simulations. The principal subjects were, the structure of the various canals of the bones, the use of the lateral ligaments, the nature of the chyle, and on the nature of the morbid formations filled false membranes. It was published in Paris in 1804. The same year a society was also constituted in the faculty of medicine for the purpose of discussing and publishing papers on medical subjects. From 1804 to 1821 this society published seven volumes, under the title 'Bulletins de la Clinique Médicale de Paris de la Société établie dans cet endroit,' 8vo. The bulletins were drawn up by Merat and Dumeril, and contain a great number of reports and memoirs which had been communicated to the society by Dupuytren. Among the most important were papers on the influence of organic lesions on health; a description of several monstrous creatures; description of two children, one a dwarf, the other a giant; and on the cause of death in drains and fosses d'âmes. The result of his researches was the construction of drains, etc., so as to secure a more perfect ventilation, and thus the frequent occurrence of death amongst the workmen has been prevented. In his researches on this subject he was assisted by Thénard, who was then his intimate friend. Thénard also assisted him at this time in some researches upon the nature of diabetes mellitus. Although the surgeon and the chemist arrived at no satisfactory conclusions with regard to this disease, they observed and recorded many important facts. The result of their investigations was published in the 'Bulletin' for 1806.

The same year, 1803, a vacancy having occurred in the office of assistant-surgeon at the Hôtel Dieu, Dupuytren was a candidate. This office was given to Dupuytren after examination by public concours. In 1811 Sabattier died, who had long filled the chair of surgery with the highest reputation. The concours for this place took place in 1812, when Dupuytren was the only candidate. The examination consisted of written replies to certain surgical and anatomical questions, a defence by each of the candidates of his own particular positions, operations upon the dead body, and a thesis. Dupuytren was successful. The subject of his thesis was躺在. The paper was presented by Dupuytren was published in Paris, with the title 'De la Lithotomie; Thèse présentée au Concours pour la Chaire de Médecine opératrice,' 4to. In 1815 he was transferred to the chair of clinical surgery, which he held till his death. In 1818 he was advanced to the post of senior surgeon to the Hôtel Dieu.

Although it would be difficult to point out a single department of surgery or morbid anatomy on which the views, opinions, and observations of Dupuytren are not known, yet he has left no record of those in works written by himself. During the twenty years, however, in which he held the office of professor and surgeon at the Hôtel Dieu, not a single memoir was published in the various French medical periodicals, and many courses have been also published in the English medical periodicals. A collection of them has also been published in France, under the title 'Lesons Orales de Clinique Chirurgicale, faites à l'Hôtel-Dieu de Paris, par M. le Baron Dupuytren, recueillies et publiées par une Société de Médecins,' 1832, 8vo. This work extended to nine volumes, and comprised many of the most important of surgery. His views on morbid anatomy have been fully given by Boche and Sassen in their great work on medico-chirurgical pathology, entitled 'Nouveaux Éléments de Pathologie Médico-chirurgicale,' published in 1826, 2 vols. The work is the result of a collaboration of Brechet and Royer-Collard, and the 'Médecine Opératoire de Sabatier' of Sassein and Beguia, the surgical and pathological views of Dupuytren have found faithful reporters.

The improvements introduced by Dupuytren in the treatment of surgical diseases were always founded on his great anatomical and pathological knowledge, and modern surgery owes much of its success to his exertions. One subject to which he turned his attention was artificial anus, and he produced one of the first cases of this nature which was entirely successful. On this subject he presented a Mémoire from his own hand to the Académie Royale de Médecine. It was published under the title 'Mémoire sur une Méthode pour ouvrir et former les Anus artificiels.' Besides the papers before referred to, the following subjects on which he wrote are amongst those which have distinguished him both as a pathologist and surgeon;—on the Nerves of the Tongue; on the Messe of the Vessels and their relations to the systematisé, the influence of the Eighth Pair of Nerves on Amputation of the lower Jaw-bone; on the Ligature of Arteries; on Fracture of the Fibula; on Congenital Dilatations; on Retraction of the Fingers.

In the department of practical surgery he was eminently successful; he possessed almost entire control over his feelings; and, with great anatomical knowledge, accuracy of perception, and perfect steadiness of manipulation, his operations were regarded as the most successful of the surgical staff of the Parisian hospitals. His presence of mind never forsake him; and the difficulties and accidents which must sometimes occur in operative surgery were always made subservient to the instruction and guidance of the pupils. During his career as an operative surgeon he performed many important operations, amongst these is the enterotome, with which the operation for artificial anus is performed, and which has rescued many victims from the grave. Other instruments of his invention are—a double, closed bistoury, for the bilateral operation for bone growths on the limbs; a category of the embrocation of cases of hemorrhage; a porte-ligature, and others.

His performance of his duties, as surgeon and clinical teacher, was remarkable. Although he had one of the largest private practices in Paris, his expenses were such that his largest fortune ever made by a medical man, he never neglected his public duties. He spent from four to five hours every morning in visiting his patients at the Hôtel Dieu, performing amputations, making post-mortem examinations, giving moral instruction, and In consultations. Every evening he returned to the hospital at six, for the purpose of visiting the worst cases and performing urgent operations. These severe duties he never interrupted, even during sickness, and when several operations in this painful state was, however, at last told upon his constitution, and in November, 1833, he first gave symptoms of decay. On the fifth of that month he was seized with a slight attack of apoplexy, which lasted only a few days, and was followed by a paralytic condition, as well as an inclination of the mouth towards the right side. He still continued his duties at the Hôtel Dieu; but his friends at last persuaded him to make a journey to Naples. He remained in that city till May 1834, when he returned to Paris. He was again seized with a pain in the heart, and had to return to Naples. He died on the 8th of the same month. He retained his intellectual faculties to the last, and, aware of his approaching end, wished that the medical papers might be read to him the evening he was bitten. 'In conclusion, he observed, 'that he might carry the latest news of disease out of the world.' He however repudiated the suggestion that he was a sceptic in religion, and received, previous to his death, the last sacrament of the Roman Catholic Church.

In his will he left the bulk of his enormous fortune, amount-
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ng to 280,000 francs; to an only daughter. He also left 200,000 francs for the purpose of endowing a chair of pathological anatomy. This sum being found larger than was necessary to cover the circumstances. The position, however, which had been appropriated to maintaining, in connection with the chair, a museum of pathological anatomy, which is called the Musée Dupuytren. He left his body, to be carefully examined, to his two friends M. Brousse and Cruveilhier, who performed a minute autopsy of the post-mortem examination. He was buried in the cemetery of Père la Chaise, on the 10th of February. The funeral was attended by all the professors of the faculty, and deputations from the Academy of Medicine, and the literary and medical clubs in the city, which were represented by students from the church to the tomb. Orations were deliv-

erl upon by M. Orfila, M. Bouilland, M. Royer-Collard, and Tessier.

But Dupuytren will ever be remembered as a chevalier and a brilliant operative surgeon, it is not on this that his reputation rests. It was the scientific character that he gave to his clinical instruction that placed him far above those who had preceded him, and which led to the cultivation of surgery upon principles founded on physiological and pathological inquiries, rather than on rules founded on the practice and authority of previous writers. If he has left no great works by which to judge of the value of his labours, he has yet raised up a society, the happiness of whose members is always the business of living unknown,—a sentiment not a little singular, as coming from those who are supposed to be impelled to generous exertion by the hope of honourable distinction for their names,—a sentiment however which seems to be acted upon by some of the pupils, who become ever more anxious to identify their own names with their works. Of those eleven designs four obtained the greatest prize, and are published in Detournel's collection of 'Les Grands Prix.' After this, though the friendship between Pierre and Thibaud continued unabated, they ceased to practise in concert with each other. In fact Durand practiced scarcely at all during the latter and greater portion of his life, for he was appointed to the professorship at the École Polytechnique, which he held for four years, gave himself up almost entirely to its duties, and to the self-imposed task of providing works of instruction for the pupils, and also the profession in general. Of these the most celebrated was a 'show-book,' the 'Recueil et Famille des Edifices de tous Genres,' 1800, consisting of eighty-six plates of oblong or double folio size, and forming a sort of historical gallery or museum of architecture. Yet though interesting as facilitating a general view of the subject, and affording a comparison of different buildings drawn to the same scale, its real usefulness is by no means so great as it at first seems. Notwithstanding the size of the volume, which is such as to render reference to it very inconvenient, there are so many different subjects upon which different pupils may be asked to give a different plate on a different scale, and some of them so small, that they might have been larger even on a duodecimo page. In other respects, too, they are far from being shown satisfactorily, there being seldom more than a general and elevated view of the whole. Even with this collection of little more than a compilation of all the most celebrated, consequently the most generally known buildings. Thus, without being sufficiently popular in form and subject for the mass of the public, the work is too general in its treatment for professional study except as a synopsis of the subject, and a sort of catalogue raisonné.

The new edition now in the course of publication will be improved by the addition of several new plates, but they consist for the most part of subjects taken from other books. For the Life of Kleenue, and other architects, but, rather strange to say, there is not among them all a single example from any living or recent English architect. The 'Recueil' itself contains no text, but Le Rouge's 'Essai sur l'histoire Générale de l'Architecture' was published as an accomplishment to it in a separate octavo volume. Durand's other work, the 'Précis des Leçons d'Architecture,' 2 vols. 4to, is generally considered a valuable one of its kind, yet has been objected to as seeking to establish formal rules instead of taking the ideas from true art. Accordingly, though greatly commended by some, his 'internal system' of laying out a plan by first dividing the whole of it into a number of squares, determined by the rules of metres, and the rest of the work having been scouted by some as a dull and plodding process, calculated only to produce wearisome monotony of arrangement, and to cramp instead of stimulating imagination. There is another publication by Durand entitled 'Partie Graphique des
Cours d'Architecture,' sec. 4th, Paris, 1821. He died at
This, in the neighbourhood of Paris, December 31st, 1824.
DURAND, NICHOLAS. We notice this other French
architect of the same name, because he is said by Nagler to
have been the father of the preceeding, although he does not
state that circumstance while stating of him whom he places
as his son, the last-named Nicholas. But as all other
accounts agree in making Jean the son of a shoemaker, there
can be little doubt of Nagler's having fallen into a mistake:
which being the case, we hardly know how to trust his account
of the career of Jean.
If the correct he must have lived to a very great age, for though born (at Paris) in 1738,
he was still living in 1824 at Châlons-sur-Marne, but whether
that was just before his death is not said. He was considered
one of the host architects of his time, and built the Hôtel de
l'Assurance in Paris (1779), the Hôtel de Châlons; and at Langres the Hôtel de Ville (1772),
the Hôtel Dieu (1774), and the Dominican Convent, which last
is commended by Wickebing as one of the best buildings of
the period in France.

DURHAM, JOHN GEORGE LAMBTON, EARL OF,
was born at the family seat of Lampton Hall, or, as it
has been latterly called, Lampton Castle, in the bishopric
of Durham, on the 12th of April, 1752. His father was William
Henry Lambton, Esq.; his mother was Frances Villiers, second daughter of George Bussey, fourth
earl of Jersey. The family is said to have possessed its
manor of Lampton ever since the twelfth century, the male
succession of which having been interrupted since that
date. The property was originally of considerable value:
the wealth of the family, arising principally from
coalmines, dates from the time of Major-General John Lambton,
the late Lord Durham's grandfather, who succeeded to the
estate in 1706, and died at the age of eighty-four, in 1754.
He was fourth son (his three elder brothers having all died
married); and so was his father, Ralph Lambton, Esq. The
Lamptons, however, had held an eminent place among
the county gentry from the beginning of the last century; and
either the head or some other member of the family repre-
sented the city of Durham in parliament from 1727 till
the death of the late earl's father, at the age of thirty-three, 30th
December, 1757, after he had held in Commission of
Commons for about three and a half years. The first Lord
William Henry Lambton, who was, like his ancestors, a decided Whig, was an intimate
friend and associate of Charles Fox, and the other leaders
or chief members of his party; and he was also highly popular
with his constituents.

The subject of the present notice, whose mother was
married in 1801 to the Honourable Charles William Wynd-
ham, third son of Charles, second earl of Egremont, and
survived till 1839, on the 12th of November, 1824. At the 1st of January, 1832,
he was married at Gretna Green to Miss Harriet Chol-
mondley, described in the 'Annual Register' as: 'daughter of
the late celebrated Madam St. Alban: and about the same
time he is stated to have entered the 10th Hussars. By Miss
Cholmondley this Lord Durham married, on the 15th of
December, 1832, at the age of seventeen; and his second son,
Lord William Henry Lambton, who was, like his ancestors, a decided Whig, was an intimate
friend and associate of Charles Fox, and the other leaders
or chief members of his party; and he was also highly popular
with his constituents.

Meanwhile, on the vacancy occasioned by the death of Sir
Henry Vane Tempest, Bart., on the 1st of August, 1813,
Mr. Lambton had been returned to parliament for his native
county. He very soon took a part in the proceedings of the
house, but his speeches at that time were not of a
political character. It was not until May, 1814, in seconding an unsuccessful motion of Mr.
C. W. Wynn for an address to the Prince Regent against
the annexation of Norway to Sweden. He continued to sit
for the county, which was returned to the Lambton
name, 1815, and 1818, and was returned at the same
period, 1820, 1823, and 1825. In 1816, he was returned for
the county of Shropshire, which he continued to represent
until his return to the former county in 1825.

He was a member of the Whig party, and consistently voted against the Reform
Bill; but in 1832 he was returned for the county of
Shropshire, which he continued to represent
until his return to the former county in 1825.

In the summer of 1833 Lord Durham was dispatched on a
special mission to Russia, with the object of inducing the
emperor to soften the severity of the proceedings against
the unhappy people who had been engaged in the late Polish
Rebellion. His mission was successful, and it is well
known that he was never able even to mention the
word Poland to the emperor. From the time of his return
he acted as his deputy, and was continually
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DURBERG, the celebrated salt-mine, is in a mountain, in the duchy of Salzburg, a league from Hallein, 1067 feet above the city: it yields annually 800,000 cwt. of salt. This discovery dates since the year 1215, and its employment is a great number of men.

There are also salt-works at Dürbergen, in the Prussian duchy of Saxony, three leagues from Merseburg. The mine at Dürbergen is mentioned in 1798, but Dürbergen belonging to it, was purchased in 1760 by Prince Xaver, who, at that time had the administration of the electorate of Saxony. The works are very extensive, the buildings being 6000 feet in length, and 1000 in breadth, as a machine, &c. These works being situated in that part of the kingdom of Saxony which was ceded to Prussia by the treaty of Vienna, May 18, 1815, a convention was concluded with Prussia in 1819, and renewed in 1828, by which 170,000 cwt. of salt are to be annually delivered to Saxony, and it is stipulated that the works yield annually 6000 lasts of salt, weighing 4000 lbs. each, besides a considerable quantity of salt for manure.

Erich Brockhaus, Conversations Lexicon; Stein, Geographisches Lexicon; Hirschschlamm; Müller, Wörterbuch des Französischen Staates.

DUTY. (Right, C.)

DYER, GEORGE, was born in London, March 16, 1755. He was educated at Christ's Hospital, where, when his standing in the school gained him access to the library, he acquired that taste for extensive reading which produced the works which will preserve his name: he was at the school from the age of seven to nineteen. While at school he was much noticed by Dr. Askew, physician to the hospital, at whose table he was a frequent guest, in company with much of the distinguished part of the literary world. It is worth note that this singular specimen of a simple mind and want of knowledge of the world around him had very early compelled the attention of society. In 1774 he entered at Emmanuel College, Cambridge, and took the degree of B.A. in 1778. After being for a time usher at a free grammar school, and several others, he re- turned to his former connexion; but, in the family of his friend Robinson, the dissenting minister, as tutor to his children and pupil of their father. He had by this time become a dissentor himself. Of the Life of Robert Robinson, and Robinson, which Dr. Parr said that it was one of the best specimens of biography Carl Linnaeus has ever written, he officiated for some time at Oxford as a dissenting minister, of the Baptist persuasion; but after relinquishing this duty, and again residing for some time in Cambridge, he finally settled in London in 1792. From that time till 1830 his life was employed at first as a reporter in the House of Commons (which occupation he abandoned after two months' trial of it), afterwards as a private teacher, finally in various literary undertakings presently mentioned; and at the last-named date his eyesight gradually failed, and at length he became totally blind. He died at his chambers in Clifford's Inn, March 2, 1841.

Dyer was a poet, a scholar, and an antiquarian, deeply versed in books and their history. As a poet he attracted notice, but not fame; contemporary histories of living authors call him a 'pleasing poet,' 'of considerable genius,' &c. phrases the meaning of which there is no mistake. As a scholar he edited some plays of Euripides and an edition of the Greek Testament; but he is best known as editor, joint editor, of Valpy's combination of the Delphic, Biont, and Variorum editions of the Classics, in a hundred and forty-one volumes, in which all the original matter and addenda are taken from the best editions of antiquarian, his principal works are—'History of the University and Colleges of Cambridge,' 2 vols. 8vo. London, 1814; 'Privileges of the University of Cambridge,' 2 vols. 8vo. London, 1815; 'Theatrum Scotiae,' in 10 vols., containing the characters, statutes, &c., the second being a supplement to the history; and in connection with these, 'Academic Unity,' 8vo. London, 1827, being a translation with additions of the 'Dissertatio Generalis' in the second work. Dyer published many other works of less note (a list of which is in the possession of the second volume of the 'Privileges,' &c., just mentioned), and was a large contributor to the magazines.

Dyer was a man of a remarkable simplicity of character, and not only remarkable, but remarkable as a record that in a singular manner. His friend Charles Lamb (so well known under the signature of Elia), and who, in the London Magazine for October, 1826, had called him 'the gallant and single-minded Dyer,' seems to have been in want of matter for December, until he remembered that he had a friend on whose good-nature no amount of reliance was too great. Accordingly, in an article headed 'Amicus Redivivus,' he describes one G.D., with such allusions as made identification easy enough, as walking into the New River in a day or two's absence, a thing which G.D. himself always denied with as much good faith as his chronicler could have wished. Some years before, in the same magazine this wicked Elia had made a supposed meeting with G.D. in a library at Oxford the subject of another anecdote, to the effect that the complacency of his friend was made the subject of many a good joke; such for instance as the following, which seems to have
been that worst of all jokes, the true one: 'D. commenced life, after a course of hard study in the "house of pure Emaus,"' which was a great favorite at that time, with a salary of eight pounds per annum, with board and lodging. Of this poor stipend, he never received above half, in all the laborious years he served this man. He tells a pleasant anecdote, that when poverty, starting out with a pound, he met a man, against the modesty of his nature, to hint at arrears, D. — would take no immediate notice; but, after supper, when the school was called together to evensong, he would never fail to introduce some instructive homily against poverty, and the consequences of the holes occasioned through the desire of them, ending with "Lord, keep thine servants, above all things, from the heinous sin of avarice. Having food and raiment, let us therewith be content. Give me no more, for I am full."

Thus, two things sounded like a doctrine full of Christian prudence and simplicity, but to poor D. was a receipt in full for that quarter's demands at least.' Mr. Dyce was as angry at these articles as it was in his nature to be; and took his revenge by informing the public, in a note to the postscript at the end of the "Privelege," &c., that the facetious Elia never was at Oxford.

'What, however,' he continues, 'he says of G. D. and his pursuits there is funny enough, when not too complimentary.'

'The history of Cambridge is rather a sketch than a history; but it is the sketch of a man who had all the reading necessary for writing the history: and it may be added that the materials for the early annals of the university are very defective. Though it gives a good idea of its manners and customs, it is to be wished that he had made more specific references to them in the body of the work. But it will be found, on examination, to be the work of a very honest man; for to this character he has a most unimpeachable title. That a bibliographer, whose whole life had been passed in libraries, and all whose enjoyments lay in antiquarian research, should never have acquired so much of the habit of minute description as to put the dates to his own list of his own works, will not surprise those who are acquainted with the early antiquaries. Nevertheless, the 'History of Cambridge' is a very important addition to what existed on the subject: and nothing but the opportunities of a Wood will surpass it.

It is said that Mr. Dyce left Memoirs of his own life, which, considering the extent of his acquaintance with the literary men of the commencement of this century, will probably, if ever they should be published, be a useful addition to the sources of biography.

DYNAM. In estimating the effect of mechanical labour, it is desirable to have some idea of a simple unit well fixed in the mind. All who have studied know how much advantage there is in referring every kind of pressure to weight, and measuring it by the weight which will balance it. Thus if one ton of weight will carry a ton into a certain position, we have no difficulty in substituting an appropriate force to the weight for the recoil of the spring at the point of application. It is equally convenient to arrive at a distinct notion of a steam-engine, without the assistance of machines. But it may not at first be so apparent that the thing is practicable. Nevertheless, the theory of dynamics contains the means of showing that all the effects of a given power are convertible in the following manner. Exclude friction and useless resistances, and suppose that a steam-engine, for instance, will expand a certain quantity of fuel in raising a ton through a hundred feet, no power being thrown away. Suppose also that the same machine, with the same fuel, will completely expend the power of that fuel in raising a certain weight a thousand times its length. Then, if a machine could be constructed which acts by the descent of a weight, and draws wire without any loss of power, the descent of a ton through a hundred feet would just be sufficient moving power to draw out the cylinder just mentioned to a thousand times its length. We do not of course mean to say that such freedom from loss of power exists. If, for example, a certain quantity of fuel were made to raise water by a steam-engine, and the water so raised fell a hundred feet, the fall would only amount to a certain that the water would not grind so much corn as the steam-engine itself directly applied to that purpose. But this arises from useless increase of resistances, and from badness of adapting the mechanism of a steam-engine to make all the water in a full cylinder to do its utmost effect upon a wheel. But what we say is, that were it possible to make adaptation perfect, there exists in the water raised exactly the same capability of grinding corn that there is in the fuel which raised the water.

This being the case, we may consider any machine as simply applied to raising a weight, and look upon the work done by the steam as the power expended to raise the height to which it would be raised by the weight raised.

The steam-engine will raise a double weight to the same height as the same weight to a double height. Accordingly, the product of the number of pounds raised, and the number of feet to which it is raised, is a relative measure of the quantity of power. About the consumption of the cylinder in horse power, it requires to raise 70 pounds through 20 feet; what comparative expenditure will raise 120 pounds through 210 feet? The product 70 x 20 or 1400 is to the product 120 X 210 or 25200 as 1400 to 1500, or the engine for raising 120 pounds is 10 times as powerful as the one for raising 70 pounds. This engine requires 18 times the power of the first. Whether it shall be done by 18 engines, or by an application of 18 times as much power to one engine, is merely a question of adaptation.

We can convert the above relative measurement into an absolute form by assuming as a unit one pound raised through one foot: let this be called a dyno, or dynamical unit.

Thus in the first job above mentioned, there are 1400 dynos of work to be done. Whether it be considered as 1400 pounds raised through one foot, or one pound through 1400 feet, or 100 pounds raised through 14 feet, &c. &c. matters nothing: it is 1400 times as much work as one pound raised through one foot. And in general, dynos are to pounds raised as 1 to 1. This is the ratio determined for the engine by our engineers to signify 550 dynam in a second: a steam-engine which can raise one pound through 860 feet in every second is said to be of one-horse power.

This term was introduced by French writers, who called the effect of a cubic metre of water expenditure of force through one metre, a dynamie or dynamic. Dr. Whewell ('Mechanics of Engineering,' Cambridge, 1841, 8vo, p. 150) proposed to naturalise the term dynam as applied to our most convenient unit, the pound and foot.

It is for want of a distinct notion of this kind that many persons fall into the error about force and its effects, which lead them to construe perpetual motions. But independently of this, there is great practical utility in having a simple name for a quantity of work done, independently of all incidental circumstances; for something which should allow us a proper expression for the result of an effort of fuel or other generator of force without the necessity of describing a particular mode of using the force. Watt was really the first who assumed, as a dynamical unit, the simple notion of one pound raised one foot: but he did not venture on a name, though the now common term, the duty of an engine, first used by him, has reference to the number of such simple units. It may be asked why it was that Professor Davis Gilbert, in his paper On the expediency of assigning specific names to all such functions of simple elements as represent definite physical properties (Phil. Trans., 1827), proposed to give a name to the expenditure of force through which they are raised by the term efficiency. But he did not go further, and assign a name to the unit of efficiency. This simple step, which is of more importance in the propagation of clear ideas than many persons will think it to be, is due to the French writers.

DYNA/METER. [Divided Eye-Glass Micrometer, P. C. S.]

DYNO-MOMETER. [Spring-Balance, P. C. S.]

DYSIDICE. A tribe of pentaceros cephalopodicae insects, founded on the genus Dysidica of Linnaeus. It now includes the following genera:—Palaebia, Malua, Copoptoma, Esnector, Agabus, Tybus, Copometra, Achilia, Hydrocopum, Dyntidae, Agelast, Cephalos, Anistrocerum, Lapidipes, Notaris, Hydrocepthus, and Siphon.

The insects composing these genera are almost all oval and flattened in form. They are very variable in size, some being very minute, others several inches in length. They are protected with a hard and rather grand cornicous covering, and elated. They are all aquatic insects, and organized for swimming, though at the same time capable of flying through the air with facility. They live in fresh water, and swim with great rapidity, chasing the water insects, and taking them with their anterior feet. Although capable of existing for a long time under water, they are obliged to ascend at intervals to the surface to breathe. This they effect by remaining quiet, when their bodies, specifically lighter than the surrounding
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dennial, rise to the surface obliquely, their heads downwards, so
that the extremity of the abdomen, at which the stigmata of
the tracheae are situated, is exposed to the air on reaching the
surface. At night they fly from one pool to another, and
hence are sometimes met with in places flooded by temporary rains.
The larvae of the Dytiscidae leave the water and bury in the
earth before changing into pupae. Thus they are at first
aquatic insects, next terrestrial, and in their final stage am
phibious.

The typical genus Dytiscus has engaged the attention of
Dr. Aube, who enumerates ten European, one African, and
six American species.
EAR-TRUMPET, an instrument employed to aid defective hearing, by collecting and concentrating the waves of sound, so that they may impinge upon the tympanum with increased force.

From what is stated under SPEAKING-TRUMPET, P. C., p. 321, it will be seen that there is some difficulty in distinguishing, in early notices of acoustic instruments, such as were intended to be applied to the ear, to assist in collecting sound, from such as were employed in aid of the voice, to enable a speaker to produce articulate sounds in such a manner as to insure their transmission to a considerable distance. To a certain extent indeed such instruments may be employed for either purpose, some speaking-trumpets being so formed that, if applied to the ear, they would act as hearing or ear-trumpets.

The experiment of Kircher, referred to in the above-mentioned article, appears to belong rather to the history of ear-trumpets than of speaking-trumpets.

The common ear-trumpet is a conical tube of metal, the larger end of which expands like the mouth of a trumpet, while the smaller end, mounted on a high, straight, or curved, metal or conical tube, may be compared to the vibrations of sound collected at the wide end direct to the tympanum. The smaller end is frequently curved, in order that it may be applied properly to the ear while the mouth is directed towards the speaker. A small ear-trumpet in front of the deaf person using it. For the sake of portability, ear-trumpets are frequently made in two, three, or more portions, sliding within one another, somewhat in the same manner as the tubes of an opera-glass.

Various other instruments are employed in aid of defective hearing, some of which are much more convenient, and others more powerful, than the ordinary ear-trumpet. Among those supplied at Dr. Scott's repository for acoustic instruments in the Strand, London, we may mention the outside, a little scroll-like instrument, which may be compared to a shell, formed of gold, and worn in the ear, so that nothing but the expanded mouth is visible; ear-cornets, which are small instruments, made of various shapes and sizes, somewhat resembling a French horn or a musical trumpet in appearance, applied to the ears and held in their place by slender springs, which may be compared in their action to the sides of a spectacle-france; speaking or conversation tubes, which are flexible elastic tubes of India-rubber and silk, kept open by spiral wire springs, and terminating at one end in what may be termed an ear-piece, and at the other in an open bell-shaped vessel which is held before the mouth of the speaker; and table somphers, which are very powerful acoustic instruments, consisting of a revolving trumpet-shaped cow, mounted on a pedestal, which may be placed upon a table, is capable of being turned towards any part of the room where conversation may be going on, and of communicating the sound through a fluted tube which is a continuation of the cow, the ends of these tubes are employed for such a purpose, their effect is greatly increased by making them of a tapered or conical shape. One ingenious instrument of the ear-trumpet kind is made in the form of a walking-stick. Another, which is held so as to reflect sound into the ear, is styled the ear-conch, and may be termed an auxiliary ear. It is formed of a kind of metal peculiarly sonorous, and plated. The commoner kind of acoustic instruments are made of tin-plate, japanned; but the better class are somewhat finer, and composed of brass or ging-metal, which is considered the best metal for the purpose.

Hobert (Engineer's and Mechanic's Encyclopedia, vol. i. p. 468) quotes an opinion from Dr. Morrison, of Aberdeen, that that end of an ear-trumpet which is applied to the ear should be made of metal; whereas the other end, which is the ear, but should be large enough to include the whole of the external ear. This opinion is said to be sanctioned by the experience of the gentleman referred to, who, having been deaf for many years, found himself restored to hearing when the shell of his ear-trumpet was made of blocktin, on the proposed plan, answer beyond his most sanguine hopes.

EARLE, JOHN, was born at York about the year 1601. Being a pupil of Eton and of the Bishop of Durham's Church College, he was afterwards, in 1620, admitted as a probationary fellow on the foundation of Merton College. He took the degree of Master of Arts in 1634, and that of Doctor in Divinity in 1642. About 1631, when he was proctor, he was appointed chaplain to Philip earl of Pembroke, who was then chancellor of the university, and lord chamberlain of the king's household. The earl presented him to the rectory of Bishopstone in Wiltshire; and to the same influence probably he owed also his appointment to be chaplain to the Duke of Sandys, and chancellor of the cathedral of Salisbury. Of all these sinecure appointments he was driven by the civil wars. After the battle of Worcester he fled from England, and, meeting Charles II. at Rouen, was made his chaplain and clerk of the closet. Earle remained abroad during the whole exile of his master. Immediately on the Restoration he was made dean of Westminster. In 1669 he was consecrated bishop of Worcester, whence he was translated in the next year to the see of Salisbury. He continued to attend much at court; and on the breaking out of the plague in 1665, he accompanied his master to Oxford, where, in University College, he died on the 17th of November in that year. His tomb stands near the high altar of Merton College Chapel. Bishop Earle was a zealous collector of engravings, and left in the British Museum his rich collection of engravings, and engravings on wood. He made many transcriptions of the notices of Kircher, as well as notices of the author's own lifetime, the eighth edition appearing in 1650. This volume was several times reprinted with additions, and contains notices of the author's life and of his other works, with several English poems of his, and specimen of his Latin. Except these little pieces, and the Microcosmography, he published nothing but a Latin translation of the Icon Basilik: 《Eikon Basilikos》, by Emperor James Carol, in this muse Zeromini et Sedelpini, Hagen, 1649, 12mo. Wood mentions as his an unprinted Latin translation of Hooker's 《Ecclesiastical Polity》, which however has not been seen by any one in modern times. Earle's 《Microcosmography》 is one of the best, as it was one of the most popular, among the brief sketches of character and manners which were so abundant in our literature for a century after the middle of Elizabeth's reign, and which, receiving the addition of narrative matter, were transformed, in the beginning of the eighteenth century, into the little novels of the Spectator and other periodical works.

EARLHAM, RICHARD, one of the most distinguished English engravers of the eighteenth century, was born in the early half of that century, and, according to Bryan, was still living in 1810. A few foreign works speak more definitely of the when and whereabouts of Earlam's birth, but they are at variance in stating the same period. When Earlam was a native of Somersetshire, others that he was born in London about 1728. The dates of his works, which are very numerous, range between 1760 and 1790. As a mezzotinto engraver Earlam has never been equalled; his historical and other figure pieces in this manner are excellent, but some fruit and flower pieces, after Van Os and Van Huyssen, are of unrivalled beauty and effect. Earlam also executed many etchings and imitations of chalk drawings, the principal of which are the engravings by Libor Vercarmen, published as reproductions, consisting of a series of fac-similes from the original sketches of Claude Lorraine, in the possession of the Duke of Devonshire. He engraved from a great variety of masters, English and foreign, as Corego, Ann. Carracci, Domenichino, Guardi, Quentin, Carlo Dolci, Lavinia Fontana, Jan, Matsys, Hemskerken, Teniers, Snayers, Rubens, Vandyck, Rembrandt, Vanderwerf, Velazquez, Menge, Zoffany, Reynolds, Zoffany, Zoffany, Loobergh, West, Wilson, Gainborough, Jo. Wright, and hundreds of others.

Among his masterpieces are—The Royal Academy, after Zoffany; Lord Heathfield, after Reynolds; and the Iron Forge, after Wright. There is a list of his principal works in British Museum Catalogue of Painters and Engravers.

EASTER. (The) (1840) One of those which are made remarkable by Easter Sunday being kept in direct line with the statement made in the act of Parliament (24 Geo. II. cap. 72), by which it is the first Sunday after
the full moon which happens upon or next after the 21st day of March: and if the full moon happens upon a Sunday, Easter Day is the Sunday after.' The act which makes this statement is not in a manner clear. It speaks of the Gregorian calendar, and the tables constructed from them. According to the rules and tables, Sunday, March 23rd, is Easter Day of 1845. But the full moon is on this very day, and it is supposed that to keep the Easter Day of 1845, Easter Day ought to have fallen on the 30th. The error arises from a mistake and an omission in the act of Parliament: Easter was never determined by the day of the 'full moon,' but by the 'fourscore day of the moon,' which words originally designated the interval between the new and full moon. Moreover, the moon of the calendar is not the moon of the heavens, but an imaginary moon in advance of it, contrived for reasons we shall presently mention.

This was simply a dispute as to the method of dating Easter, and of the reformulation of the calendar, as may explain the discussions upon this subject: referring for fuller information to an article 'on the Ecclesiastical Calendar' in the Companion to the Almanac for 1845: and to some supplemental information in the same work for 1846. The last time the discussion occurred was in 1818, at which period we cannot ascertain that the true explanation was given by any one.

When it next happens, the same misunderstandings will be referred to in this article cited. The whole question of whether Parliament be altered in the mean time, or works of reference be made to contain an account free from the usual errors.

In controversies which agitated the Christians of the second century respecting the observance of Easter depended upon two questions: first, whether the feast was to be a version of the passover, to be kept on the fourteenth day of the moon, or an anniversary of the Resurrection, to be kept on the first day after the full moon in its fifteenth, if the matter the full moon was to be predicted. The details of this dispute do not affect us here, except in one point. It seems clear that towards the end of the second century, the Metonic cycle of nineteen years was frequently introduced into the reckoning. It is the peculiarity of this cycle of 19 years (Periods of Revolution, P.C.; the explanation in Metonic Cycle, P.C. is insufficient), that the new and full moons return to the same days of the month, generally speaking; that if, for instance, a full moon falls on the 10th of March in any year, it is most likely to fall on the same day in nineteen years, and certainly on the 9th or 11th, if not on the 10th. The astronomers, and all who predicted celestial phenomena for common use, used this Metonic cycle; several modern writers on ecclesiastical history speak as if the Christians had invented the cycle of the golden number, which is only the Metonic cycle with its commencement altered. But it is material to notice that all countries upon which Greek civilization had found its way, had their new and full moons predicted by this cycle.

The Nicene Council (A.D. 325) attempted to bring about a general usage in keeping Easter. What is left of this council shall in this article give little weight, and twenty examples. Whether those canons which now exist are the genuine work of the Nicene Council is nothing to our present purpose, for they do not mention Easter at all: nor should we have noticed them here, had we not seen them cited by name in reference to Easter, to give, as it were, an impression that the council had laid down rules on the subject in a definite form. All their interference in the matter, as far as it can be collected from the earliest historians of the council, Socrates and Theodoret, contained the sentiment that Easter was to be kept on the Saturday, or the following day of the passover. The question then is, whether that the council simply decreed that the former should adopt the usual practice of the latter. St. Ambrose, in the next generation, in a letter written A.D. 386, says that the council had determined to keep Easter on the Sunday following the passover, which they had named Enneodecadierna. That is, Ambrose was not astronomer enough to know that both the thing and the name had been current even in elementary works for hundreds of years before the council. In this, as we have acknowledged, he had had followers; indeed, the necessity of accounting for the cycle of nineteen years in some way, and the want of knowledge of its astronomical history, caused the council to adopt the Metonic cycle, to the chagrin of the Nicene bishops, and thence to infer that they paid a very particular attention to the astronomical part of the settlement of Easter. But in fact their object was merely to separate from the Jewish passover; as long as this point was gained, they did not seem to have thought it necessary to interfere, even as regards the East, with those differences of astronomical method, which they do not even mention, though they could not be ignorant of them. And this is not the point to which we are referring. The point is more; the Easter Festival was well known, and that from the time of the Nicene Council little or nothing more is heard about celebrating Easter on the fourteenth, instead of the Sunday after, while the disputes about the astronomical method of Easter recommended itself almost immediately, and lasted for centuries.

Eusebius of Cesarea, the historian, informs us in his life of Constantine that he had presented to that emperor a treatise on Easter, where the mystic character of that festival was explained; apparently a purely theological work (De Scriptori. Eccles.) mends this statement, and informs us that Eusebius was the author of the cycle of nineteen years. Bede and others have copied Jerome, and Clavus (see see see Clovis) in the same line of teaching, and have more clearly explaining a statement of Ambrose to the same effect. Now Ambrose mentions no such thing; and meeting with the statement of Jerome since we wrote that article, he does not, and what Clavus has supposed are quoted one of the contemporary saints, and wrote down a discussion from the other, a supposition which would explain what must otherwise be called a disingenuous proceeding. Hence comes the current story that Eusebius and others were appointed by the council a committee to superintend the drawing up of the rule.

Shortly after the Nicene Council, there were disputes about the proper cycle for Easter. It is unnecessary here to note the various cycles which were proposed. It was not till the time of Pope Hilarius (A.D. 463) that the cycle of nineteen years obtained a permanent footing. This pontiff employed Victorinus of Aquitaine to correct the calendar, and Victorinus actually constructed the cycle of 532 years, or 28 Metonic cycles. When Dionysius Exiguus (A.D. 529) altered the mode of reckoning, and abandoned the Diocletian era in favour of what was supposed to be the year of the birth of Christ, be adjusted the mode of reckoning employed by Victorinus accordingly, and the cycle of the latter has ever since been called Dionysian. From the time till that of the Gregorian reformation the rule was strictly observed, no disapprobation producing anything but written arguments. So that the Nicene Council neither succeeded, nor were the dates incorrect, while they were nothing more than destroying, among the great bulk of Christians, what was called the quartadeciman heresy, the opinion that Easter was to be kept on the fourteenth day of the moon. The settlement in the council or astronomical question is the work of Hilarius and Victorinus. Not but that these reformers considered themselves as fulfilling the intentions of the Nicene Council: in fact all parties, after the council, made it their authority; all dissenters assumed theirs to be the Nicene faith in this matter; and even the commander of the British Parliament has been defended by supposing it to be the true intent of the assembled bishops in the fourth century.

The assumption of the so-called Dionysian cycle involved two errors. The Julian year being too long by about a day in 130 years, threw the vernal equinox back by a day in that time: while the rule of the cycle supposed that the equinox remained fixed on the 31st of March. Again, the cycle of nineteen years, which supposed 255 lunations to fill up that time exactly, was wrong in a manner which caused the new moons of the calendar to advance a day in every 300 years. The consequence was, that by the time of Pope Gregory XIII., in 1582, the spring was behind the equinox, and the month March, while the calendar new moon generally fell on the fourth day following that of the real new moon. These errors were obvious enough to every astronomer. Sarcrofran and Roger Bacon pointed out in the thirteenth century that the former says they must be borne on the authority of the council; the latter strongly recommended Pope Clement to make an amendment, and gave a reformed plan which is perfectly good. He had, and where he got it from we cannot guess.
the length of the year more correctly than any of his predecessors. Cardinal and Regiomontanist, in the sixteenth century, pointed out the necessity of a change. Stiffler, Pitius (who proposed the plan afterwards adopted with the leap years), Paulus Fossumonionis (of Bologna), and others in the sixteenth century, wrote in advocating the change. The Council of Trent sanctioned an alteration, and referred the details to the see of Rome. A plan was presented to the pope by the relatives of one Aloysius Lilio, deceased, who had occupied himself with the subject. This plan was approved, and in 1577 a particular was forwarded to princes and universities throughout the Catholic world, stating the nature of the intended alterations, and inviting suggestions. The Jesuit Clavius \([\text{Clavius, P. C.}]\) was the person, or the principal person, to whom the conception of the scheme was intrusted. His treatise, \(\text{De aequatione et harmonia mundi,}\) published, dated February 24th, 1581, abolishing the old calendar, giving a general description of the new one, and announcing that it would be fully explained in a forthcoming work. Clavius published this work, namely, \('\text{Romani Calendararii a Gregorio XIII., Pont. Max. restituti Explicatio,'}\) et al., Rome, 1689; and it was reprinted in the folio collection of his works. He has nothing here to do with the alteration of the style, but only with that relates to Easter. This calendar had to undergo several severe attacks, particularly from Joseph Scaliger, Moselius, and Vieta (\(\text{Vieta, P. C.}\)). But these of course produced no effect against established authority, nor, in truth, ought they to have done so in this instance. The calendar answers its purpose exceedingly well, and is, astronomically speaking, better than it was supposed to be by Clavius himself.

Referring for a full description of the details to the article \('\text{Companion to the Almanac,'}\) we shall give a slight account of the plan. Clavius held that astronomical considerations to be secondary in importance to the general notions of his predecessors and contemporaries. One of these was, that it was not desirable ever to keep Easter on the same day as the Jews keep the Passover. To avoid this, he uniformly lessens the moon's age by a day, taking care, as much as possible, that all the necessary errors of the imperfect cycle shall have the same effect, namely, that of lessening the moon's age, or, throwing the moon forward. Accordingly, his new moons are seldom on the same day, generally one or two days in advance, about as much of one as of the other, and sometimes even three days in advance. It is therefore very important to remember that the moon of the calendar is not the moon of the heavens, and not even the mean moon of the astronomers. So that in the act of parliament, instead of the full moon (being the fifteenth or sixteenth day) of the heavens (the first day being that of new moon), should have been read the fourteenth day of the moon of the calendar. There is evidently a comparison of errors: the day on which the moon, which begins for the most part one or two days after the moon of the heavens, is of course generally the fifteenth or sixteenth day of the moon of the heavens.

The current lunisolar cycle may be described as follows:—Neglecting the preceding arbitrary alteration, which may be made once for all when everything else is done, there are two things to be provided for. First, the defect of the cycle itself, the error which is to advance the new and full moons by a day in about 1300 years; Clavius took it to be eight days in 2500 years, and accordingly he allowed one day for seven periods of 300 years, and then one day for a period of 400 years, as we shall presently see. Next, the abandonment of these leap years in every four centuries, which, though necessary for keeping the equinox at or about one day of one month, would destroy the efficiency of the cycle of nineteen years. There are then two shifting, as it were, as necessary corrections in the alternations of the moon's age at certain periods (we are now speaking only of the calendar moon). We shall now give a set of cycles, resembling that in \(\text{Easter, P. C.,}\) from which we shall be able to make the shifts apparent, and to connect them with the above-mentioned necessary corrections. The tables of this frontier were not given by Clavius himself, but were published in England, we believe, by Lord Macclesfield, at the time of the discussions preceding the alteration of the style in 1752.

In the first column are the days of the month, from March 1 to April 25, and Easter may fall on any one of those days except the first. In the second column are the dominical letters, explained in \(\text{Dominical Letter, P. C.,}\) and which can be found by the table there given. In leap-year, take the second letter of the year in finding Easter. Then follow certain columns, each of which has a heading to show to what years it belongs. Thus, the column headed 1700-1800 belongs to all years from 1700 to 1899, both inclusive. These columns contain the nineteen golden numbers variously disposed. Every year has its golden number found thus: add 1 to the year and divide by 19; the remainder, or 19, if there be no remainder, is the golden number.

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Take the first of these columns, namely 1582-1699. Opposite to April 8 is written the number 15. This means that, from 1583 to 1699, whenever the golden number is 15, the fourteenth day of the calendar moon is the 8th of April. And so in like manner throughout these columns, and the golden number is found opposite to the day and the fourteenth of the calendar moon when that number occurs. Thus from 2600 to 2899, the fourteenth of the paschal (calendar) moon is always on the 2nd of April whenever the golden number is 26.

Let us now suppose the first column constructed. It is contrived, as before noticed, so as to make the calendar full moons follow the real ones. To keep this up, whatever alterations must be made in a cycle adapted to the real moon, the same must be made for the calendar moon. As far as 1699 no alteration is requisite, for Clavius does not make the first alteration on account of the incorrectness of the cycle, til 1800, and the year 1800 is leap-year in the Gregorian calendar as well as in the old one. The reader must remember that the cycle of nineteen years is one in which every fourth year is leap-year. As soon as 1700 comes, we have a fourth year which is not leap-year, so that the day which would have been called February 28 is called March 1, and so on. Each golden number then is written on one place lower from 1700 to 1899: though it would better have represented the reason of the change if each day of the month had been written one place higher. The same thing takes place at 1800, but here Clavius put the moon back a day, so the calendar moon a day older, to correct the accumulated error of the cycle. But the previous step makes the calendar moon, at any given day, a nominal day younger than it would otherwise have been. These two changes do not affect each other at all in 1600, and the cycle continues unaltered till 1899. At 1900 the first change is repeated; but 2000 is leap-year in the new calendar, and therefore no change is then requisite. And again, though 2100 is not leap-year, yet as 300 years have elapsed, the correction for the fault of the cycle is introduced.
at the same time with that for the abandoned leap-year, and the two destroy each other's effects, as before. This column then is good till 2199. The next column is now easily explained: but in the next one to that, or 2400-2499, we begin with a year in which the correction for the cycle is made without being destroyed by that arising from abandoning leap-year. That is, the moon, on any given day, is to be a day older than it would otherwise have been. The numbers must then each be put back a day, which is seen to be done. In this manner, if it be remembered that beginning at 1800, then seven following corrections of the cycle are made at the end of periods of 300 years each, and then one at the end of 400 years—the reader would be able to construct farther cycles for himself, if it were not for one peculiarity which we now notice.

At the bottom of the columns it will be seen that there are in one or two places numbers which do not rise or fall with the rest. This was a sacrifice of uniformity to the desire of preserving one characteristic of the old calendar, namely, that the fourteenth of the calendar moon never fell on the same day of the month as one or two epochs which were within nineteen years of each other. This would have happened sometimes, owing to the corrections above described; and Clavius took a very simple method of avoiding it, which is explained in the article already cited. The effect of his method is to produce the slight departure from uniformity of alteration above noted.

It will thus be seen that in the calendar which is now in use, one, two, or even three days of error have not (provided the moon was made too young, not too old) been thought of so much consequence as either ease of calculation, or attention to existing dates upon the subject. Of this we entirely approve, and agree with Clavius in asserting that any rule which is fixed would be better than diversity of usage.

To find Easter by the preceding table, first find the golden number, and then the dominical letter. [DOMINICAL LETTER, P. C.]

Take the proper column, and find out the day or position to which the golden number stands. Go on from that day to the next following day which has the dominical letter opposite to it: that day is Easter Sunday. For example, take 1847. Add 28 to 1847; the remainder is 6, the golden number. The dominical letter found in the article cited is C. In the column 1700-1899, we find 6 opposite to March 30, which is the fourteenth of the calendar moon.

The next C is opposite April 4, which is Easter Sunday.

Again, to find Easter in 2384. Divide 2385 by 19, and the remainder is 10, the golden number. The dominical letter (the second) is G. In the column 2300-2399 the 10 is opposite to April 7, and the next G is opposite to April 8, which is Easter Sunday.

The dominical letter may be found by a short calculation, as follows.

I. Add one to the given year.
II. Take the quotient of the given year, divided by four, neglecting the remainder.
III. Take 16 from the centurial figures of the given year, if it can be done.
IV. Divide III. by 4, neglecting the remainder.
V. From the sum of I., II., and IV., subtract III.
VI. The remainder of V., after division by 7, is the number under the dominical letter in F E D C B A 4 3 2 1 0

But if the year be leap-year, it is the second dominical letter which is thus found.

As instances, take 1847 and 2384, as above given.

1. 1848 2835
2. 2281 2989
3. II. 506 7 2
4. IV. 0 1
5. V. 2073 2975
6. VI. 1584 

The above is for new style; for old style proceed as follows. To the number of the year add its quotient when divided by 4, and 4: the remainder, after division by 7, is to be used as the VI. of the preceding rule. Thus for 1683, we have

395 4

7)1892

395 Rem. 1. DOMINICAL LETTER F

The cycle for Easter-day, old style, is given in the article EASTER, P. C.

The sole authority on the subject of the Gregorian Calendar is, of course, Clavius, the authorised contriver of it, or at least the person to whom the other details of the Revised See (if indeed any of them took any share in the execution of the plan) instuted the explanation of it. In his work already mentioned, he has given all the results for every year from 1600 to 6000: he thinks his rule will be correct enough as far as 8000. On the mathematical part of this and other information will be found in Delambre's 'Histoire de l' Astronomie Moderne,' and Lalande's 'Astronomy.'

With regard to the faulty explanation in the act of Parliament, we find that the act copied literally won the label Common Prayer. In this work it appeared for the first time in 1682, directly after the conviction which met at the Restoration of the monarchy had made the alterations mentioned in Liturgy, P. C. The explanation was therefore added by this convocation. Supposing the calendar moon to be spoken of, it would have been correct if the second clause had been omitted. For the calendar full moon is always the fifteenth day, and it is clear that 'the Sunday after the fourteenth, or the next Sunday if the fourteenth fall on Sunday,' is the same thing as 'the Sunday after the fifteenth, or the fifteenth itself, if it be Sunday.' Finding definitions of Easter by the fifth, in the second of the two ways just mentioned, to have occurred in times anterior to the Restoration, we suppose that the explanation of 1682 was the result of a confusion of the two.

EASTER-DUES. [OFFERINGS, P. C. S.]

EASTERN EMPIRE. [ROMAN EMPIRE, P. C. S.]

ECENTRIC THINGS, (Provided.)

ECCLESIASTICAL COMMISSIONERS FOR ENGLAND.

On the ground that it was 'expedient that the fullest and most attentive consideration should be forthcoming about ecclesiastical duties and revenues,' a royal commission was issued, dated 4th February, 1835, to consider certain commissioners, and directed them to consider the state of the several dioceses in England and Wales, with reference to the amount of their revenues and the more equal distribution of episcopal andDeanery property, and the necessity of attaching, by commissary, to bishops' benefices with cure of souls; and the commissioners were further directed to consider also the state of the several cathedral and Collegiate churches in England and Wales, with a view to the recreation of such benefices as may render them conduite to the efficacy of the Established Church; and 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.

The commissioners were the archbishops of Canterbury and York, the bishops of London, Lincoln, and Gloucester, the Lord Chancellor, Mr. Peel, and Robert Peel, and several members of the government, with other laymen. A change in the cabinet having occurred a few months afterwards, a new commission was issued on the 8th of June, 1835, for the purpose of substituting the names of members of the new cabinet.

The four Reports presented by the commissioners were respectively dated 17th March, 1835, and 4th March, 20th May, and 24th June, 1835. A fifth Report was prepared but it had not been signed when the death of King William IV. occurred, and it was presented as a parliamentary paper (Sess. 1835 (66), xvii. 9).

The First Report related to the duties and revenues of bishops. The commissioners recommended various alterations of the boundaries of dioceses, the union of the sees of Gloucester and Bristol, the union of the sees of Bangor and St. Asaph, and the erection of sees at Ripon and Manchester. They omitted the sees of England and Wales at 148,875l., but from the unequal manner in which this revenue was distributed, the income of one-half of the bishoprics was below the sum necessary to cover the expenses to which a bishop is unavoidably subject; and to remedy this, and to wear out things, and not to be away with commissaries and diminishing the motives for translations, they recommended a different distribution of episcopal revenues.

The Third Report also related to episcopal matters.

The Second and Fourth Reports, and the draft of the Fifth Report, related to the cathedral and collegiate churches and the state of the clergy.
to parochial subjects. They recommended the appropriation of part of the revenues of the cathedral and collegiate churches, and to provide funds for non-resident prebends, dignities, and officers, and that the
proceeds in both cases should be carried to the account of a fund out of which better provision should be made for the cure of souls.

The Commissioners stated in their Second Report that they had prepared a bill for regulating pluralities and the residence of the clergy; and in 1838 an act was passed (1 & 2 Vict. c. 106) relating to these matters.

On 1st August, 1838, an act was passed (6 & 7 Wm. IV. c. 77) which established the ecclesiastical commissioners as one body politic and corporate, by the name of the "Ecclesiastical Commissioners for England." The number of commissioners incorporated was thirteen, of whom eight were ex-officio, namely, the archbishops of Canterbury and York, the bishop of London, the lord chancellor, the lord president of the council, the first lord of the Treasury, the chancellor of the Exchequer, and such one of the principal secretaries of state as might be nominated under the sign manual. There were five other commissioners, of whom two were bishops; and these five were removable at the pleasure of the crown. The laymen who were appointed were required by the act to subscribe a declaration as to their being members of the Church of England and Ireland by law established.

By an act passed 11th August, 1840 (3 & 4 Vict. c. 113), the constitution of the Ecclesiastical Commission was considered by increasing the members before ex-officio members, and by other alterations. In addition to the members constituted ex-officio commissioners under the act 6 & 7 Wm. IV. c. 77, the following were by this act also appointed:

- All the bishops of England and Wales, the deans of Canterbury, Carlisle, and Winchester, the two chief justices, the master of the rolls, the chief baron, and the judges of the Prerogative and Admiralty Courts. By this act the crown is empowered to appoint four, and the archbishop of Canterbury two byname as commissioners in addition to the three appointed under the former act.

Under the former act the commissioners were removable by the crown; but now each commissioner continues a member of the corporation so long as he shall well demean himself in the execution of his duties. Lay members are required as before to subscribe a declaration that they are members of the Established Church.

Five commissioners are a quorum at meetings of which due notice has been given. The chairman, who has a casting vote, is the commissioner present first in rank; and if the rank of all the commissioners present be equal, the chair is to be taken by the senior commissioner in the order of appointment. Two of the episcopal commissioners must be present at the ratification of any act by the common seal of the corporation; and the only two ex-officio commissioners, or his representations, are to be referred to an adjourned meeting. The commissioners may summon and examine witnesses on oath, and cause papers and documents to be produced before them.

The act (6 & 7 Wm. IV. c. 77) empowers the ecclesiastical commissioners to prepare and lay before his majesty in council such schemes as shall appear to them to be best adapted for carrying into effect the recommendations contained in the five Reports already mentioned, with such modifications or variations as to matters of detail and regulation as shall not be substantially repugnant to any or either of those recommendations. The king, by an order in council, residing the commissioners, or appointing for their places others into operation. This order must be registered by the diocesan registrar of the diocese within which the place or district affected by the order is situated, and it must also be published in the London Gazette. A copy of all the orders issued during the preceding twelve months must be presented annually to parliament within a week after its meeting. As soon as an order is registered in the diocese, and gazetted, it has the same force as if it had been included in the acts for carrying into effect the recommendations of the Commission.

By special enactments, and by the joint authority of the Queen in council and the Ecclesiastical Commissioners, changes of great importance have been made in relation to ecclesiastical titles and revenues, so far as they relate to Episcopal Dioceses, Revenues, and Patronage. By this act the dioceses of England and Wales, as well as the deaneries already mentioned, have been consolidated into two, two new acts have been created, the patronage of the several bishops has been more equally divided, commendams are abolished, and the revenues of the different sees have been also more equally apportioned. The jurisdiction of the diocesan bishop was also enlarged.

The second act (3 & 4 Vict. c. 113) was passed 11th August, 1840, and is entitled 'An Act to carry into effect, with certain modifications, the Fourth Report of the Commission on Ecclesiastical Titles and Revenues'. But its enactments also comprehend some of the propositions of the Second Report and of the draft Fifth Report. The main subject of the act is the cathedral and collegiate churches, and the application of parts of their revenues to spiritual destitution in parishes. The act made some change in the distribution of dean's and chapters, suspended a large number of canonries, founded honorary canonries, abolished non-resident deans and canons in public patronage; deprived non-residential prebends and other non-resident offices in cathedral and collegiate churches of the endowments formerly attached to such offices. Self-elected deans and chapters are abolished: deans are to be appointed by the crown, and the canons by the bishops. Sinecur rectories in collegiate churches may be abolished, and the patronage suppressed. The profits of these dignities and offices, and sinecure rectories, are vested in the Ecclesiastical Commissioners, and are carried to a common fund, out of which addi-
tions to the public revenue may be made, or the profits of such endowments where such assistance is most required. Thus the act provides that a portion of the proceeds of prebends suppressed in Lichfield Cathedral should be devoted to making provision for the rector of St. Philip's, Birmingham, and for the perpetual curacy of Christ Church in the same town; that the endowments belonging to the collegiate churches of Wolverhampton, Heytesbury, and Middleham should be applied to making better provision for the cure of souls in the districts with which those places are connected; and that all endowments of the collegiate church of Winborne minster should be applied with a like object to the parish of Winborne minister. The act empowers the commissioners to annex the whole or any part of the endowments of sinecur rectories abolished by the act or purchased for the vicarages or perpetual curacies dependent on them, when the extent of the population or the incompetent endowment of such vicarages or curacies may render it expedient. Sinecur prebends may be annexed to benefit with cure of souls. Benefices may be divided or consolidated with consent of patrons. Arrangements may be made for a better provision for the spiritual duties of ill endowed parishes by exchange of advowsons or other alterations in the exercise of patronage. When two benefices belong to the same parish, the income may be differently apportioned with his consent.

A third act was passed 21st June, 1841 (4 & 5 Vict. c. 99). Its chief object was to amend and explain the two former acts. It contains various enactments calculated to carry out the principle of the first two acts as to various regulations and details.

In each of the acts for carrying into effect the recommendations of the Ecclesiastical Commissioners, vested interest was specially protected.

From a return presented to Parliament, it appears that, down to May 1st, 1844, the number of benefices and churches whose incomes had been augmented by the Ecclesiastical Commissioners was 11,759, and those for which the annual augmentation amounted to the sum of 25,779.

There is in Ireland a body styled the Ecclesiastical Com-
mis-sioners, who were appointed under the act 3 & 4 Wm. IV. c. 97 (Church Temporality Act) and are empowered to receive the income of bishoprics in the same manner as the Irish bishops, and to distribute and invest the same.

ECCLASIASTICAL COURTS. Courts in which ecclesiastical law is administered (CANDY LAW, P. C.), and on which the king is usually a nominal and practically never a personal member. It consists of two branches, temporal and spiritual. The king, as temporal head, is represented by the chancellor, archbishop of Canterbury, or other bishops. In spiritual cases, the king is represented by a commissioner for every diocese, who, according to the Act 5 & 8 Vict. c. 97 (Church Temporality Act), are appointed for the purpose of preventing his acting in that capacity. In cases of heresy, blasphemy, apostasy from Christianity, heresies, schisms, ordering admissions, institutions of clerks, celebration of divine service, rights of matrimony, divorces, general bastardy, subordination and right of thistles, obloquies, obloquies.
dilapidations, repARATION of churches, probate of testaments, administration and accounts upon the same, simony, inceot, fornications, adulteries, solicitation of charity, pensions, process of appeals caused by causes of diocesan cognizance, and others (the cognizance whereof belongs not to the common laws of England), the same are to be decided and judged by ecclesiastical judges according to the king's ecclesiastical laws, in the manner as hereinafter followeth.

In July, 1830, a Commission was appointed to inquire into the Practice and Jurisdiction of the Ecclesiastical Courts in England and Wales. The Report of the Commissioners, which was presented in 1831, was signed by the archbishop of Canterbury and three other bishops, the two chief justices, the chief Baron, and several other persons of authority and eminence. This report gives the most correct and authentic account which exists of - 1. The nature of the ecclesiastical courts; 2. Of the course of proceeding in ecclesiastical suits; and 3. The nature of the processes, practice, and pleadings of the ecclesiastical courts. The report in question has been almost solely used in the present article, with such abridgment and slight alterations as were necessary to bring it within the requisite space which could be devoted to the subject.

The ordinary ecclesiastical courts are - 1. The Provincial Courts, being, in the province of Canterbury, the Court of Appeals, and in the other provinces, the Diocesan Court of Common Council, the Diocesan Court of Common Audience, and the Court of Peculiars; and in the province of York, the Prerogative or Testimonial Court, and the Chancery Court; 2. The Diocesan Courts, being the consistorial court of each diocese, exercising general jurisdiction in matters of a general or limited jurisdiction, with the exception of several matters enjoined by the ordinary. Each diocese is divided into several ecclesiastical districts, which are pointed out by the bishop, in certain dioceses, to exercise general jurisdiction, within prescribed limits; and the court or courts of one or more archdeacon or their officials, who exercise general or limited jurisdiction, according to the terms of their patents, or to local custom. 3. There are also Peculiar jurisdictions of various descriptions in most dioceses, and in some they are very numerous: royal, archdeacon, episcopal, episcopal de
decanal, sub-decanal, prebendal, rectoral, and vicarial; and there are also some manorial courts, which exercise testamentary jurisdiction.

The Provincial Courts of the archbishop of Canterbury, and the archbishop of York, are independent of each other; the process of one province does not run into the other, but is sent by a requisition from the court of one province to the local authority of the other, for execution, when it is necessary. The appeal from each of the provincial courts lies to the Judicial Committee of Privy Council; but before the passing of the statute 2 & 3 Will. IV. c. 22, the appeal was sent to the king, and a commission issued under the Great Seal in each individual case of appeal, to certain persons or delegates, to hear and determine the matter in contest. (DELEGATES, Curr. Or, P. C.)

Of the three Archdeaconial Courts of Canterbury, the Arches Court is the first. (ARCHES, COURT OF, P. C.) This court exercises appellate jurisdiction from each of the diocese to the archdeacon, and to the bishop, or to the bishop, in the event of the archdeacon being absent or disqualified, on all cases of ecclesiastical jurisdiction, and may also take original cognizance of causes by letters of request, from each of those courts; and it has original jurisdiction for subtraction of lay-given by wills proved in the Prerogative Court of Canterbury.

The Prerogative Court has jurisdiction of all wills and administrations of personal property left by persons having bona fide, or effects of a certain value, in divers ecclesiastical jurisdictions within the province. A very large proportion, not only of ecclesiastical cases, but of all cases in the county, is a very much larger part of the uncontestted, or as it is termed common-form business, is dispached by this court. Its authority is necessary to the administration of the effects of all persons dying possessed of personal property to the specified amount within the province, whether leaving a will or dying intestate; and from the very great increase of personal property arising from the public funds and the extension of the commercial capital of the country, the business of this jurisdiction is as great as that of any other. In the Prerogative Court, in addition to registering all instruments and proofs in respect of the succession to such property, is become of very high public importance.

The Court of Peculiars, which is the third Archdeaconal Court of Canterbury, takes cognizance of all matters arising in certain deaneries: one of these deaneries is in the diocese of London, another in the diocese of Rochester, another in the diocese of Winchester, and some others, over which the archbishop exercises ordinary jurisdiction, and which are exempt from and independent of the several bishops within whose dioceses they are locally situated.

The province of Canterbury includes twenty-one dioceses, and therein the diocese of Canterbury itself, where the ordinary ecclesiastical jurisdiction is exercised by a commissary, in the ecclesiastical manner as hereinafter followeth.

The province of York includes five dioceses, besides that of Sodor and Man, and the archiepiscopal jurisdiction is exercised therein much in the same manner as in the province of Canterbury.

The Diocesan Courts take cognizance of all matters arising locally within their respective limits, with the exception of places subject to peculiar jurisdiction. They may decide all matter of spiritual discipline; they may suspend or deprive clergy of their benefices and benefices void, pronounce sentence of separation a mensa et thoro, try the right of succession to personal property, and administer the other branches of ecclesiastical law.

The Archdeacon's Court is generally subordinate, with an appeal to the Bishop's Court; though in some instances it is independent and co-ordinate.

The Archdeacon's Courts, and the various Peculiars already enumerated, in some instances take cognizance of all ecclesiastical cases, and in some instances of all matters which are also cognizable before the Ordinary Court; and the jurisdiction is still further extended by the exercise of the jurisdiction of the several peculiar courts, over such cases as are connected with the peculiar; and by the exercise of the jurisdiction of the bishop, in certain dioceses, to exercise general jurisdiction, within prescribed limits; and the court or courts of one or more archdeacon or their officials, who exercise general or limited jurisdiction, according to the terms of their patents, or to local custom. 3. There are also Peculiar jurisdictions of various descriptions in most dioceses, and in some they are very numerous: royal, archdeacon, episcopal, episcopal de
decanal, sub-decanal, prebendal, rectoral, and vicarial; and there are also some manorial courts, which exercise testamentary jurisdiction.

The Provincial Courts of the archbishop of Canterbury, and the archbishop of York, are independent of each other; the process of one province does not run into the other, but is sent by a requisition from the court of one province to the local authority of the other, for execution, when it is necessary. The appeal from each of the provincial courts lies to the Judicial Committee of Privy Council; but before the passing of the statute 2 & 3 Will. IV. c. 22, the appeal was sent to the king, and a commission issued under the Great Seal in each individual case of appeal, to certain persons or delegates, to hear and determine the matter in contest. (DELEGATES, Curr. Or, P. C.)

Of the three Archdeaconial Courts of Canterbury, the Arches Court is the first. (ARCHES, COURT OF, P. C.) This court exercises appellate jurisdiction from each of the diocese to the archdeacon, and to the bishop, or to the bishop, in the event of the archdeacon being absent or disqualified, on all cases of ecclesiastical jurisdiction, and may also take original cognizance of causes by letters of request, from each of those courts; and it has original jurisdiction for subtraction of lay-given by wills proved in the Prerogative Court of Canterbury.

The Prerogative Court has jurisdiction of all wills and administrations of personal property left by persons having bona fide, or effects of a certain value, in divers ecclesiastical jurisdictions within the province. A very large proportion, not only of ecclesiastical cases, but of all cases in the county, is a very much larger part of the uncontestted, or as it is termed common-form business, is dispached by this court. Its authority is necessary to the administration of the effects of all persons dying possessed of personal property to the specified amount within the province, whether leaving a will or dying intestate; and from the very great increase of personal property arising from the public funds and the extension of the commercial capital of the country, the business of this jurisdiction is as great as that of any other. In the Prerogative Court, in addition to registering all instruments and proofs in respect of the succession to such property, is become of very high public importance.

The Court of Peculiars, which is the third Archdeaconal Court of Canterbury, takes cognizance of all matters arising in certain deaneries: one of these deaneries is in the diocese of London, another in the diocese of Rochester, another in the diocese of Winchester, each comprising several parishes;
tion, P. C.), suspension an ingress ecclesi, suspension from office and deprivation.

The canon law has been practised in the ecclesiastical courts as a distinct profession for upwards for three centuries. The residence of the judges and advocates, and the proper buildings for holding the Ecclesiastical and Admiralty Courts, are at Doctors' Commons, the site of which was purchased by some members of this body in 1567.

The jurisdiction of the courts was incorporated in 1768 by a royal charter, under the name of 'The College of Doctors of Laws exercent in the Ecclesiastical and Admiralty Courts.' The proctors discharge duties similar to that of solicitors and attorneys in other courts.

The course of proceeding in these courts is as follows:—

The mode of commencing the suit, and bringing the parties before the court, is by a process called a Citation, or summons. This citation, in ordinary cases, is obtained as a matter of course, from the registry of the court, and under its seal; but in special cases, the facts are alleged in what is termed an act of court, and upon those facts the judge or his surrogate decrees the party to be cited; to which, in certain cases, is added an instruction, that if the party does not appear, or appearing does not show cause to the contrary, the prayer of the plaintiff, set forth in the decree, will be granted. The party cited may either appear in person, or by his proctor, with or without notice to the other party, or he may be commissioned by a proctor, who is then termed a proxy. The proctor thus appointed represents the party, acts for him and manages the cause, and binds him by his acts.

In testamentary causes, the proceeding is sometimes commenced by a caveat, which may be entered by a party interested in the effects of the deceased person, against the grant of probate of will or letters of administration, without notice being first given to him who enters the caveat. This caveat is then sworn to by the party who claims the representation, either as executor or administrator, which is in effect a notice to the proctor who enters the caveat, that he must appear and further steps, if he intends to continue his opposition. Both parties are then assigned by order of court to separate days, and the suit thus commenced, either to try the validity of an alleged will, or the right to administration, either under an intestacy or by a will annexed. [Ad-

ministration, P. C.; Executor, P. C.]

There is another process in testamentary matters extremely useful and frequently resorted to. The executor, or other person who claims the grant of probate of a will or other testamentary instrument, may cite the next of kin, or any other parties interested, under an intestacy or a former will, to appear and propound their objections; they may be admitted by witnesses, and if the parties cited do not appear and oppose the probate, they are barred from afterwards contesting its validity, unless on account of absence from the kingdom, or some other similar reason.

So again, the next of kin, or other parties entitled either to the grant of letters of administration or under a former will, may cite the executor or other person apparently benefited under a suggested will or testamentary instrument, to appear and propound it, or otherwise show cause why probate should not be granted of the suggested will of the deceased, on the ground of his having died intestate, or why probate should not be granted of a former will; and the parties cited, not appearing, are barred from afterwards contesting the will.

But if probate or administration be taken in common form, without citing persons who have an adverse interest, the grant may afterwards be called in, and the executor or administrator cited, and put upon his plea; for the plea, in the common form grant had issued. Again, where no grant is applied for by the person primarily entitled to it, such as an executor, residuary legatee, or next of kin, process may be taken out by any person who claims an interest in the effects of the deceased, without citing the persons primarily entitled to it; the execution is then granted to the estate, or a creditor, but he must call upon the persons primarily entitled to accept or refuse the grant, or otherwise show cause why it should not pass to such person who claims an interest. Or if a person be dead, no interest, where no one has been lawfully entitled to a credit for form grant had issued. Again, where no grant is applied for by the person primarily entitled to it, such as an executor, residuary legatee, or next of kin, process may be taken out by any person who claims an interest in the effects of the deceased, without citing the persons primarily entitled to it; the execution is then granted to the estate, or a creditor, but he must call upon the persons primarily entitled to accept or refuse the grant, or otherwise show cause why it should not pass to such person who claims an interest.

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abandons the suit, or appeals against the rejection, in order to take the judgment of a superior tribunal. When a plea has been admitted, a time, or term probation, is assigned to the party who gives the plea, to examine his witnesses; and the addition is usually to be made within the time fixed by the court in his answers upon oath, to his knowledge or belief of the facts alleged. The defendant may proceed then, if he thinks proper, or he may wait until the plaintiff has examined his witnesses, and then he may make, in like manner, his own plea. This responsive allegation is proceeded upon in the same manner; objections to its admissibility may be taken, answers upon oath be required, and witnesses examined. The plaintiff may, in like manner, reply by a further allegation; and on that, or any subsequent allegation, the same course is pursued.

In taking evidence the witnesses are either brought to London to be examined, or they are examined by commission near their places of residence. Their attendance is required by a 

The examination is by depositions taken in writing and in private by examiners of the court, employed for that purpose by the registrars. The examination does not take place upon written interrogatories previously prepared and known; but the allegation is delivered to the examiner, who, after making himself master of all the facts pleaded, examines the depositions on oath, at the same time, so as to obtain, upon each article of the allegation separately, the truth and the whole truth, as far as he possibly can, respecting such of the circumstances alleged as are within the knowledge of each witness. The cross-examination is conducted by the defendant's known witnesses, and when the deposition is complete, the witness is examined upon the interrogatories delivered to the examiner by the adverse proctor, but not disclosed to the witness till after the examination in chief is concluded and signed, nor to the party producing him till publication passes; and each witness is enjoined not to disclose the interrogatories, nor any part of his evidence, till after publication. In order that the party addressing the interrogatories may be the better prepared for the examination, he may cause the witness to be stated, a designation, or notice of the articles of the plea on which it is intended to examine each witness produced.

The examination and cross-examination of witnesses are kept secret until publication passes, that is, until copies of the depositions may be had by the adverse parties, after which either party is allowed to except to the credit of any witness, upon matter contained in his deposition. The exception must be confined to such matter, and not made to general character, for the party must be prepared to inquire in respect to any objection refer to matter before pleaded, for that should be contradicted also before publication. The exception must also tend to show that the witness has deposed falsely and corruptly; or that the deposition is not by himself admitted, in the same manner as other pleas. They are not frequently offered, and are always received with great caution and strictness, as they tend more commonly to protract the suit and to increase expense than to afford substantial information in the cause. It is always however in the power of the court to allow further pleading in a cause; and if new circumstances of importance are unexpectedly brought out by the interrogatories, the court will, in the exercise of its discretion, allow a further plea for publication. This may also be permitted in cases where facts have either occurred or come to the knowledge of the party, subsequently to publication having passed.

The evidence on both sides being published, the cause is set down for hearing. All the papers, the pleas, exhibits (or written papers proved in the cause), interrogatories, and depositions are delivered to the judge for perusal before hearing the case fully discussed by counsel. All causes are heard proceeding on the ecclesiastical cause, and when the cause is heard, the case is opened by the counsel on both sides, who state the points of law and fact which they mean to maintain in argument: the evidence is then read, unless the judge signifies that he has already read it, and even then if necessary, the whole cause is argued and discussed by the counsel. The judgment of the court is then pronounced upon the law and facts of the case; and in doing this the judge publicly, in open court, assigns the cause to the exchequer or the admiralty, or such other court or authorites on which he decides the matters of law, and reciting or adverting to the various parts of the evidence from which he deduces his conclusions of fact, and thus the matter in controversy between the parties becomes adjudged.

The execution of the sentence, in case there be no appeal interposed, is either completed by the court itself, according to the nature of the case, such as presenting the judgment by letters of administration, or signing a sentence of separation—or remains to be completed by the act of the party, as by exhibiting an inventory and account, by payment of the tithes which are due, or attending such other course as the court enforced by the compulsory process of continuance, significavit, and attachment. The question of costs in these courts is, for the most part, a matter in the discretion of the judge, according to the nature and justice of the case; and the reasons for granting or refusing costs are publicly expressed at the time of giving the judgment.

Attempts were made three centuries ago, to remedy the defects of the ecclesiastical courts. The earliest efforts of this kind were directed to the penal jurisdiction. Some of these jurisdictions extend over large tracts of country, and embrace many towns and parishes; others comprehend several places lying at a great distance apart from each other; and some only include one or two parishes. The jurisdiction to be exercised in these courts is not defined by any general law, and it is often difficult to ascertain to what description of cases the jurisdiction of any particular court extends. The commissioners appointed to revise the ecclesiastical laws, in 1717, under the care of Lord Harley and Edward Law, found that the power of the bishop, in matters of discipline, should extend to all places in the diocese, notwithstanding the exceptions and privileges of Peculiars. In the reign of Queen Anne, it was resolved, or talked of in convocation, that parliament should be applied to, and the bishop and his exempt rites and jurisdictions of what had belonged to monasteries to the diocese. Nothing, however, appears to have been done.

In 1812 Sir W. Scott (Lord Stowell) brought a bill into parliament which passed the House of Commons, but was afterwards dropped in the Lords, which provided that the power of hearing and determining contested causes of ecclesiastical and diocesan organizations should be vested in ecclesiastical courts sitting under the immediate commission and authority of the archbishops and bishops, and not by inferior or other ecclesiastical courts. In 1852 the commissioners appointed to inquire into the practice and jurisdiction of the ecclesiastical courts, recommended a number of important changes in these courts. In 1853 the Real Property Commissioners expressed an opinion in favour of their extensive reform. In the same year a select committee of the House of Commons was appointed to report in which was found that in 1836 a select committee of the House of Lords adopted the same course. From 1836 until the present time several bills have been brought in for amending the ecclesiastical courts, none of which were carried. In 1843 and 1844 the clause in an ecclesiastical courts bill opened the session of parliament in 1842 a measure for the improvement of the ecclesiastical courts was announced in the speech from the throne; but the bill brought in by the government lingered through the session and was finally abandoned. In 1845 and 1846, other bills with the same object were equally unsuccessful. In the session of 1845 Lord Cottenham brought in an ecclesiastical courts bill, which was identical or nearly so with his bill of 1836. It proposed the establishment of a central court in London, to which all bills were to be sent. Surrogates to act in the towns where there are no diocesan courts, and to grant probates where the amount of property is small, but in the counties to be carried on by the bishop and his suffragans in their dioceses. The central court to retain the power of the old courts in questions of divorce. In matters relating to church-rates the bill gave an appeal to quarter-sessions where the rate had been illegally levied; and in that of tithes the power of the ecclesiastical courts is to be abolished; in all others the criminal jurisdiction of these courts, and the power of punishing for defamation, incest, and brawling in churches, was to be abolished. Although approved by the Lord Chancellor and by the Bishop of St. Paul's, the bill of its predecessor, and towards the close of the session it was found impossible to get it passed amidst the crowding of other bills, to which the support of the government was more directly pledged. By a clause in 5 Will. IV. c. 77, which was an act for carrying into effect the Reports of the Ecclesiastical Commissioners of 1835, it was enacted that future appointments in
any of the choral associations in England and Wales (except the Prerogative Court of Canterbury) were not to give a vested interest in any office, nor any claim or title to compensation in case of the abolition of offices.

ECCULIOPHALUS, a genus of fossil Gasteropoda, from the Jurassic limestone of Cheltenham. (Dig., opp. and t. 17.)

ECHINOPHORA (from Gr., a hedgehog, and φορά, in composition signifying 'bearing'), a genus of plants belonging to the natural order Umbelliferae, and to the tribe Smyrnaceae.

ECHINOCALYX (from Gr., a hedgehog, and κάλυξ, a calyx) is a genus of herbs belonging to the family Cacteaceae.

ECHINO'STACHYS, a genus of plants, mostly shrubs, from the Mediterranean region. Its type species is the sea-parsnip, Echinosstachys spinosa, (Portlock.)

ECHINOLAMPAS, a genus of plants, including the two species, the Jersey sea-hedgehog, Echinosstachys spinosa, and the Teneriffe sea-hedgehog, Echinosstachys affinis. The former is a herbaceous perennial, with slender, erect, spinose stems, and heads of small, greenish-white flowers, which are frequently met with at the sea-side. The latter is a shrubby perennial, with a thick, branching stem, and heads of small, yellow flowers, which are also frequently met with at the sea-side. Both of these species are very hardy, and are very attractive when in flower.

ECHINOPHYLLUM, a genus of plants, including the two species, Echino'stachys spinosa, and Echinosstachys affinis. The former is a herbaceous perennial, with slender, erect, spinose stems, and heads of small, greenish-white flowers, which are frequently met with at the sea-side. The latter is a shrubby perennial, with a thick, branching stem, and heads of small, yellow flowers, which are also frequently met with at the sea-side. Both of these species are very hardy, and are very attractive when in flower.

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handed the Jus Praetorium; but in its narrower sense Jus Civile was contrasted, as already explained, with the Jus Praetorium.

The origin of the Roman edictal Law is plainly to be traced to the imperfections of the old Jus Civile, and to the necessity of gradually modifying law and procedure according to the changing circumstances of the times. It was an easier method of doing this than by direct legislation. Numerous modern treatises contain a view of the origin and nature of the Roman Jus Praetorium, though on some points there is not complete uniformity of opinion.


EDWARDS, Richard, one of our earliest dramatic writers, was born in Somersethire in 1623. He was educated at Oxford, in Corpus Christi College, where he was successively a scholar and fellow: he took his degree of Master of Arts in 1647. Removing to Lincoln's Inn, he was made, in the beginning of Elizabeth's reign, one of the gentlemen of the Queen's Chapel, and master of the children there, a post which engaged him in theatrical management. He is first heard of as a dramatic poet in the year 1654-5; and his death took place in 1658. He is generally commended for his dramatic works by Puttenham (no very competent judge), who sets him down as one of the two best writers in comedy and interlude, we learn the names of no more than two of his dramas. One of these, 'Palamon and Arcite, or the Chorograph,' may slide before the modern eye, as a most excellent comedy of two of the most fairest and free, Davenant and Pithias,' was printed in a black-letter 4to. in 1571, again, in black-letter, 4to. 1582, and is included in the first volume of Dodwell's 'First Play.' Edwards also wrote some of the poems inserted in 'The Paradise of Dainty Devices,' 1755, reprinted in the 'British Bibliographer,' and a death-bed poem, called 'Edwards' Soul-Knell.' His name is interesting as belonging to one of the rude founders of our drama; but his works in that line are insatiable. The same is true of his political and undramatic details, offers little that can attract any but the student of literary antiquity. 'The serious portions,' says Mr. Collier very justly, 'are unvaried and heavy, and the lighter scenes grotesque without being humorous.'

EFT. The terms Eft and Nest are almost indiscriminately to all the species of lizards which are found in the British Islands. The word lizard is evidently formed from laceris, and is comparatively modern. Eft and Newt are the same Saxon words. Eft seems to be more usually applied to the land animals, one of the most common of which is the zootoca vivipara, and another less common, the lacerta agilis, both of which are described in the article Varanus viviparus, C. p. 132, 1821, and commonly applied to the animals which inhabit ponds, wet ditches, and other damp places, such as the triton cristatus (the great waternewt,) Triton poniocristatus (the common smooth newt,) and other species which this distinction is given under SCLAMANDRIDE, P. C., pp. 382-386; and also in the Penny Magazine for 1843, p. 97 (No. 703).

EGG-TRADE. In 1835 the value of eggs exported from Ireland to Great Britain was 68,667; and perhaps at the present time it may exceed 100,000. At 4d. per dozen the number of eggs which this sum would purchase would be 72,000,000. From France and Belgium we imported 96,000,000 eggs in 1840; on which the duty of one penny per hundred was imposed, 4,450. Nine-tenths of these foreign eggs are from France. The departments nearest to England, from the Pas de Calais to La Manche, are visited by the dealers, and their purchases often produce a scarcity in the country markets. At most of the ports of these departments, from Calais to Avranches (C., p. 183, 1823) there is a more constant and regular trade. The weight of 80,000,000 eggs is not far short of 2500 tons. In the last three years the importations of foreign eggs were as follow:—

<table>
<thead>
<tr>
<th>Year</th>
<th>Quantity</th>
</tr>
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<tbody>
<tr>
<td>1842</td>
<td>69,548,747</td>
</tr>
<tr>
<td>1843</td>
<td>70,415,931</td>
</tr>
<tr>
<td>1844</td>
<td>67,487,920</td>
</tr>
</tbody>
</table>

The consumption of eggs at Paris is estimated at one hundred millions of eggs a year. Paris, a locality of Bohemia, famous for fossil Infusoria, especially Campilodiscus, which comprises nearly the whole of the white pulverulent mass. (Mantell, Medals of Creation, p. 233.)

P. C. S., No. 65.

EIDOGRAPH, from the Greek words oE, a form, and raphos, draw, is an instrument invented in the year 1621, by the late Professor Wallace of Edinburgh, and described in 'Transactions of the Philosophical Society of Edinburgh,' vol. iii. It is a species of pantograph, and, like the latter, it is used for the purpose of copying plans or other drawings on the same or different scales.

A rod or beam AB of brass, 30 inches long and five-eighths of an inch square, and made hollow for the sake of being light, slides freely through a hollow rectangular socket C, whose length and breadth is 4 inches; and this socket projects a steel pin of a conical form, and serving as a pivot; the pin entering into a tube of a corresponding form which stands vertically on a cylindrical mass D of metal. The mass serves as a base for the whole instrument; and while the beam AB is moved, the point of the pin in the socket C, in a path of turning with the socket upon the vertical axis in the tube. Each end of the beam AB carries a short tube in a vertical position, and through this passes the conical axle of a wheel or pack E or F, which is placed below the base triangles, wheels are precisely equal in diameter, and are capable of turning freely on their centres in a horizontal plane.

The vertical edge of each of these wheels is grooved so as to receive a piece of very thin watch-spring at E b, c F d; and the ends e and f, and d, is connected by a steel wire; the pieces of watch-spring are made fast near E and F to the circumstances of the wheels in order to prevent them from slipping on those circumstances; a small movement for the sake of adjustment only being allowed. Swivel screws at c and F serve to tighten or relax the band as may be necessary.

Under each of the wheels E, F, is fixed a rectangular socket similar to C, and in this slide, horizontally, a rectangular arm G H, K L, each of which is 27½ inches long; these arms, which are the centres of and parallel to, are adjusted by means of the screws at c and d, so as to be always parallel to one another. At L is fixed a tracing point, like that of a pantograph; and at G a pencil in a socket or tube; the tracer and pencil are always in a straight line, passing through the common axis of the mass D, and of the socket C. The pencil is made to press gently on the paper by weights, but it is capable of being raised from the place by means of a lever, one end of which is attached to the socket which carries it, and to the other is attached a string which is to be pulled by the operator when necessary: this movement of the pencil carrier is facilitated by means of small friction rollers.

The beam AB is divided on its upper face in 100 or 100 equal parts, and divisions equal to these are set on the upper face of each arm GH, KL. By these divisions the distances of A and B from the axis of D may have any given ratio to one another, and AG, BL may respectively be made equal to the last-mentioned distances. Thus, the isosceles triangles GAD, DBL will always be similar to one another; and the figure described by the movement of the pencil at G will be similar to the original figure over which the tracer at L may be made to pass. Consequently, a given plan or drawing may be enlarged or reduced in any required proportion.

Professor Wallace contrived an instrument which he called a Chorograph,' and described on the above plan, on one side and all its angles given; also for constructing two similar triangles on two given straight lines, having the angles given. See 'Geometrical Theorems,' &c. By William Wallace, LL.D. Edinburgh, 1829.

ELEODENDRON. From Oisias, an olive, and diphos, a tree. A genus of plants belonging to the natural order Celastracae. It has a 5-parted calyx; 5 expanding lineal-chiologist petals; a fiveangled very thickish disk; 5 anthers.

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inserted into the margin of the disk; the filaments at length recurved; anthers with a thick connective, roundish, opening longitudinally; the ovary immersed in the disk, 5-celled; the ovary pyriform, usually pubescent; style short, conical, the stigma simple, obnate; the fruit drupaceous, dry, or pulpy; the nut 1-2-celled; the seeds usually solitary, with a membranaceous or spongy integument erect. The species are small trees with shiny leathery leaves.

*E. glaucum* has elliptical serrated leaves, hardly 3 times longer than the petioles; the cymes loose, nearly the length of the leaves; the flowers pendant. It is a small tree, about fourteen feet in height, and is a native of Ceylon and Ceylon-tea. The tree has been introduced into Great Britain from Ceylon under the name of Ceylon-tea. It has leaves like those of the tea-plant, but it does not appear to be used as a substitute for that plant.

The genus *Elasmoglos* has oblong serrato-crenate, opposite and alternate, hard, smooth, shining leaves about 4 inches long and 2 inches broad, with the petioles ½ of an inch long: the cymes globular, and three times the length of the petioles. It is a native of the mountainous parts of India. It possesses powerful astrignent properties, but is not used as an internal medicine.

The fruit of all the species resembles that of the olive, and hence the generic name. *E. orientalis* is a native of the Mountains of Mecklenburg, whose name is derived from the Greek *Oriente*. It contains in its fruit a fixed oil like the common olive, which is used by the Moors for the same purpose as olive oil is used in Europe.

The species of Elasmodendron will grow freely in a mixture of loam and manure, and ripened cuttings will root in sand under a hand-glass. (Lindley, *Flora Medica: London, Encyclopaedia of Plants*; Don, *Gardener's Dictionary*.)

*ELATIUM* is a genus of free-flowering asters, from the London clay. (Egerston.)

**ELASTIC BANDS, in Machinery.** (Whewell, *P. C. C.*; p. 316.)

*ELATERRA* is a genus of plants belonging to Lindley's Calycaceae group of polygynous Eucarvixes. The sepalas are 3-5, distinct or slightly connate at the base; the petals hypogynous, alternate with the sepalas; the stamens numerous, by 3-5, cells, an equal number of styles, and capitate stigmas; the fruit capsular, 3-5-celled, with the valves alternate with the sepalas, which usually adhere to a central axis; the seeds numerous, with a straight embryo, whose radicle is turned to the hilum, and little albumen. The species belonging to this order are annual plants with faltous rooting stems, and opposite stipulate leaves, inhabitants of many parts of the globe.

This order is nearly allied to Caryophyllaceae, from which it has been separated by Cambessedes, on account of the different organization of the seeds, capsules, and stigmas. It agrees with Hypericaceae in many points, and especially in possessing receptacles for the stamens and petals, but in having a persistent central axis in the fruit, definite stamens, and so forth. The species are found in marshy places and under water in all parts of the globe. Cambessedes arranged these genera in this order:

1. **Merium** (named in honour of Prospero Merium, an old botanist), with a 5-parted calyx; 5 petals; 10 stamens; 5 styles; a 5-valved, 5-celled, many-seeded capsule, the valves separating, and bent in at the margins so as to constitute disseminating carpels. The genus is represented by only one species, the *M. arenariaeoides*, a native of Brazil, has been described.

2. **Bergia** (after Peter Jonas Bergius, professor of natural history in Upsal, and author of several works on botany), with a 5-parted calyx; 5 petals; 5 styles; a 5-valved, 5-celled, many-seeded capsule, the valves separating, and bent in at the margins so as to constitute disseminating carpels. This is a Southern genus, in which we find only one species, the *B. cernua*, a native of Brazil, has been described.
which prevented the father from closing with this proposal. It was then determined that he should enter into holy orders if a University College living fell vacant during the twelve months of grace, as they are called, for which he was still allowed to hold his fellowship; that could not happen, and that determination the law of the land of 1760 was made to try the profession of the law. He had entered himself a student of the Middle Temple in January, 1773; and he took his degree of master of arts on the 16th of February in the same year. Before Erskine, the first of the line, stored the Life of Lord Eldon, and which are there supported by documentary evidence, be correct, it will follow that there is an inaccuracy in Lord Eldon's own statement therein quoted (vol. i. p. 84) from Mr. Scott's work, according to which it is made to have given up 'the purpose of taking orders' before entering himself as a student at the Temple.

Mr. Twiss remarks, indeed, that his relinquishment of the purpose of taking orders was at this time 1 but inchoate.

During the years 1774 and 1775 he held the office of a tutor of University College, where his brother William was at the time senior tutor; but it is believed that all he did in that capacity was to attend to the law studies of some of the members of the college. He received none of the emoluments of the office. One or both of these years also he read the law lectures, as deputy for Sir Robert Chambers, the Vinerian professor; and for this service he had 60l. a year. Awkwardly enough, the first lecture he had to read was upon the doctrine of Pith and Place. However, and so he was to be away with maiden; and it so chanced that he had to deliver it immediately after it was put into his hands, and without knowing a word that was in it. 'Fancy me reading,' he said, when he described the situation to the legal question of the hour his words with about a hundred and forty boys all giggling at the professor. Such a tittering audience no one ever had.'

Mr. Scott was called to the bar on the 9th of February, 1778, on which he came up with his wife to London, and took a small house in Vincent Street, from which he soon after removed to another in Carey Street. He naturally joined the Northern Circuit; but it was, as usual, some time before he began to make much by his practice. Indeed after a trial of two or three years his prospects of success in the profession were not very promising, so he made arrangements for settling as a provincial counsel in his native town, when, in July, 1788, he was brought into considerable notice by his argument in the cause of Ackroyd v. Smithson (1 Bro. C. C. 503), heard before Sir Thomas Sewell, Master of the Rolls; and into still more when Sir Thomas's judgment, which was adverse to his client, was reversed in March, 1789, by Lord Chancellor Thurlow, in accordance with Scott's reasoning, which has decided all similar questions ever since. The question was what portion of the estate of a deceased by his testator had directed that the moiety assigned by the sale of his real estates should be divided, the party to whom he had given the share by his will having died in the testator's lifetime. Mr. Scott contended that the share was not due to the party who had retained the property of the heir, and the testator came to the heir-at-law. Even for some time after this success however he still retained the idea of settling in Newcastle; and had actually made a house be taken for him in that town, which he had also acted as the Recorder. One year, apparently 1780, did not go the circuit, because he could not afford it; he had already, to use his own words, bowed of his brother for several circuits, without getting adequate remuneration. But when matters were in this state he unexpectedly purchased the undivided share of his brother in himself in an election case (that of Clithero) before a committee of the House of Commons as at once changed his position, and with that his plans for the future. Having been applied to the legatees of one of the great trusts to take up Mr. Scott, upon the refusal of the next counsel to lead because he was not prepared, was persuaded to take the conduct of the case at a few hours' notice. It lasted for fifteen days. 'It found me poor enough,' said he, relaxing the circumstances in his memoirs, 'but I did not leave England without making more than I left me fifty guineas at the beginning; then there were ten guineas every day, and five guineas every evening for a consultation—more money than I could count. But, better still, the legatees of the estate gave me two years to make myself thoroughly acquainted with the law.' He was beaten in the committee by one vote; but the ability he had shown did not the less establish his reputation.

All thought of leaving London was now abandoned; his pecuniary from this time increased rapidly; and in June, 1783, on the formation of the coalition ministry of Lord North and Mr. Fox, and the great seal on Lord Thurlow's resignation being put into commission, he was one of several junior counsel who were called within the bar. Erskine was another; and it was at first intended to give precedence to him and Mr. Pigott, both of whom were Scott's juniors; but to this arrangement the law officers of the crown objected, and at last determined, as ultimately drawn out, gave him precedence next after the king's counsel then being, and after Henry Peckham, who had been made one a few days previously, and had been placed ahead of him. Mr. Scott, after playing several parts, was retained as counsel for the 17th of November, about a week after the opening of the session, on a motion connected with the famous India bill, which eventually upset Fox's government. The two young lawyers were however on opposite sides—Erskine the ministers, Scott with Pitt and the party destined soon after to come to power. The Coalition ministry was turned out on the 18th of December; and on the 24th of March, 1784, the king pro- rogued, and the next day dissolved, parliament, after the opposition House and government House of Commons had been brought down in the course of a long series of divisions to a majority of one. Mr. Scott was again retained for Weddle; and in the new parliament he took a prominent part in most of the debates that preceded the session of 1785, on the 9th of March, he spoke and voted with Fox against ministers on one of the questions connected with the great Westminster scrutiny; and his speech was consid- ered to have established the doctrine 'that the election must be finally closed before the return of the writ and that the writ must be returned on or before the day specified in it'. This principle the government soon after consented to enact as law by the statute 25 Geo. III. c. 84, 'To limit the duration of polls and prevent the evasion of the law.' In March, 1787, Mr. Scott was appointed chancellor of the bishopric and county palatine of Durham, by the bishop, who was a brother of Lord Thurlow, and had just been translated to the see. In June, 1786, on Lord Mansfield's resignation and the appointment of Sir Lloyd Kenyon of the Chute, the chief-justice of the King's Bench, the attorney-general, Mr. Pepper Arden, was made master of the rolls, in room of Kenyon; the solicitor-general, Sir Archibald Mac- Donald, became solicitor-general; and Sir Robert Peel, attorney-general was conferred on Scott. At the same time he was also knighted. A few days afterwards he was re-elected for Weobly; and he was a fourth time returned for the same place to the new parliament which met in November, 1790. He held the office of attorney-general until 1798. During that time when he was made attorney-general on the promotion of Sir Alexander Macdonald to the place of Chief Baron of the Exchequer. On this occasion he was returned a fifth time for Weddle. To the next parliament, which met on 20th of September, 1796, the last in which he sat as a member of the House of Commons, he was returned, along with Sir Francis Burdett, for the Duke of Newcastle's borough of Borough- bridge.

The period of Sir John Scott's tenure of the office of attorney-general extends to the year 1799. It is memorable for the state trials connected with the political excitement produced in this country by the breaking out of the French revolution. Sir John Scott, Sir John Stirling, Sir Peter Bellingham, Mr. Walpole, Lord Byron, Mr. James O'By, Mr. Gage, Mr. Pelham, Sir Alexander Macdonald, and their associates, were tried at the trial of Mr. Bellingham. The indictment was tried twice; and many of the prisoners were acquitted. There had been much difference of opinion as to the wisdom of the course taken by the government on this occasion, but perhaps too much credit has been common to them on the single fact that none of the trials issued in a conviction. There can be no doubt that the evidence, although it was held insufficient to support the charge of high treason, produced an immense effect upon the public mind; and the accused were dismissed from the bar unharmed, but to a great extent disgraced. The attorney-general na-
Eldon was removed to the bench with a great sacrifice of income, but he considered that his health and comfort required his retirement from the laborious office of attorney-general. His claim however was at first opposed by both Pitt and Loughborough the chancellor, both of whom were desirous of giving the office to Sir R. Pepper Arden, then Master of the Rolls.

When it became known that Sir John Scott was to be the new Chief Justice of the Common Pleas, Lord Kenyon, then Chief Justice of the King's Bench, publicly congratulated the profession on the appointment of one, who, he said, would probably be found 'the most consummate judge that ever sat in judgment.' And Lord Eldon proved an admirable common law judge. 

On the bench of a common law court, it is remarked by his biographer, 'no scope was allowed to him only judicial perfection, the tendency to hesitate. 

Compelled to decide without postponement, Lord Eldon at once established the highest judicial reputation; a reputation, indeed, which was a great source of satisfaction to himself when lord chancellor, by showing how little ground there was for his diffidence, and consequently how little necessity for his doubts and delays. He was also much attached to the place, and to the end of his life used to express the strong regret with which he had left the Court of Common Pleas.

But on Lord Loughborough's resignation of the Great Seal in April, 1801, about a month after Mr. Pitt had been succeeded as prime minister by Mr. Addington, Lord Eldon became lord chancellor (14th April). His own account was that when he was made Chief Justice of the Common Pleas, the king had insisted upon his giving a promise, that, whenever he made chancellor, he would take the Great Seal whenever Lord Eldon could do so. He continued to hold this office till the 7th of February, 1806, when, on the accession of the Whig ministry of Mr. Fox and Lord Grenville, he was succeeded by Lord Erskine; he resumed it on the 1st of April, 1807, on the return of the Tory ministry, and finally resigned it on the 30th of April, 1827, when Mr. Canning became prime minister, and the Great Seal was given to Lord Lyndhurst. He was raised to the dignities of Viscount Encombe and Earl of Eldon in 1832.

Lord Eldon's judicial character has been elaborately drawn by several competent pens. The reader may be especially referred to the volumes of his biographer, Mr. Twiss; to a somewhat similar and more extended account of his career; and to the Second Series of Lord Brougham's 'Historical Sketches of Statesmen who flourished in the time of George III.' It is admitted on all hands that in legal learning he never had a superior, if he had an equal, in Westminster Hall; and, although his intellect was not capacious, he acquired a great and universal reputation for his powers of commanding order, in the acuteness and subtility with which he applied his profession, and did not pass over the point or premise no matter how obscure or mischievous as might be feared. Indeed the anxious consideration with which his judgments were formed enhances their value and authority.

During nearly all the time that Lord Eldon sat on the woolpack he took a leading part in the general debates of the House of Lords; he was also understood to be one of the most influential members of the cabinet; and he was certainly regarded as one of the counsellors of the crown. While the conduct of all the great principles of the old Tory or Conservatism party. The two great measures of Parliamentary Reform and Roman Catholic Emancipation in particular were steadily opposed by him on all occasions, and to the last. Indeed it was his inflexibility on the latter of these two questions that occasioned his final retirement from office.

Opinions will of course be divided on Lord Eldon's character as a public man. The facts of his long career are now generally known, and some of them are so striking as to enable the present generation to form a tolerably correct estimate of the man who directed affairs in the eventful period of the latter part of the reign of George III. and the Regency. So much may we affirm without incurring the imputation of judging in the light of posterity. Mr. Eldon was a profound lawyer will be permanent, while his career as a statesman was not marked by any measure that places him among the great men of his age or country.

Lord Eldon survived in retirement till the 13th of January, 1838, and was succeeded in his peerage by his grandson, the present earl, the son of his eldest son John, who was born at Oxford, 8th March, 1774, and died 24th December, 1865, having married on the 22nd of August, 1804, Henrietta Elizabeth, daughter of Matthew White Ridley, Bart, who after her first husband's death became the wife of James William Farrer, of Ingleborough, Yorkshire, Esq., now one of the Masters in Chancery. Lord Eldon's other children were Elizabeth, born 1783, who married George Stanley Repton, Esq.; Edward William, born in 1791, and Henry John, born in 1793, who both died in infancy; William Henry John, born in 1795, who died in 1832; Frances Jane, born in 1798, who married the Rev. Edward Bankes, Rector of Coles-Castle, and Prebendary of Gloucester and Norwich, and died in 1858. Lady Eldon died in 1831.

(The Public and Private Life of Lord Chancellor Eldon, with Selections from his Correspondence, by Horace Walpole, Esq.)

ELECTION-COMMITTEES. The course of elections of members of the House of Commons from the issuing of the writs to the returns made to the Clerk of the Crown is briefly described. He is the immediate instrument by whose authority the remunerations made to him. [CLERK OF THE CROWN, P. C. S.] This mode of adjudicating election-petitions is the subject of the present article.

Till 1770, when the act well known as the Grenville act was passed, questions of contested elections were decided by the whole House of Commons: and every such question was made a party contest. The Grenville act introduced a plan, which, with several modifications, continued till 1832, and appeared to work with a great deal of general satisfaction. Since 1839 a different system has been in operation, under which the choice of members of election-committees has not been left to chance, and their individual responsibility has been increased by diminishing the number of members. The 7 & 8 Viet. c. 103 is the law now existing. The number of members of an election-committee was reduced from seven to five, including the chairman.

The 7 & 8 Viet. c. 103, now regulates the constitution and the proceedings of committees of uncontested elections.

At the commencement of every session, the Speaker appoints by warrant six members of the House to be a General Committee of Elections. The General Committee of Elections consists of six, eight, ten, or twelve members, whom they shall duly qualify, to serve as chairmen of election-committees; and the members so selected for chairmen are formed into a separate panel, called the Chairmen's Panel. The members
of the General Committee of Elections are excused from serving as members of election-committees, and all members of the House of Commons above the age of sixty are also excused from serving, on the grounds of exemption; the principal ministers for instance are excused from serving on election-committees, so long as they hold their offices, on account of their official duties. After the General Committee of Elections have appointed the Chairman of the Panel, they divide the remaining members of the House who are not excepted from service, into five panels; and members are chosen to serve on elections from these panels, in an order of succession determined by lot. All election-petitions are first heard by the earlier election-committees, and this General Committee give notice, as provided by the act, of the days on which particular election-committees will be appointed, and of the panel from which members will be taken. The General Committee sit in the House of Commons, for the purpose of trying any election-petition, and shall choose from the panel then standing next in order of service, exclusive of the chairmen’s panel, four members, not being then excused or disqualified for any of the causes aforesaid, and who shall not be specially disqualified for being appointed on the committee to try such petition for any of the following causes: that is to say, by reason of having voted at the election, or by reason of any matter connected with the election, or any matter related to the sitting member or party on whose behalf the seat is claimed by kindred or affinity in the first or second degree, according to the canon law. (§ 55.) At least four members of the general committee must agree in the appointment, which must be proceeded, also, in manner as aforesaid. They choose the members of an election-committee, the chairman’s panel choose from themselves a chairman for the committee, and communicate the name of the chairman selected to the general committee. The names of the chairman and members selected are thus communicated to the petitioners and sitting member or members, who may object to any of the members on any ground of disqualification specified in the 55th section of the act, but on no other ground. If any member is objected to, he is to be taken out of the general committee, and the committee are to choose another; or if the chairman is disqualified, they send back his name to the chairman’s panel, who proceed to choose another chairman. The five members finally chosen are afterwards sworn at the table of the House well and truly to try the matter of the petition referred to them, and a true judgment to give according to the evidence.

Such is a general sketch of the present mode of constitution of election-committees. For other details the reader must refer to the Law, Privileges, Proceedings and Usages of Parliament; pp. 341-373. It is a matter of practice for the General Committee of Elections to take the four members of an election committee chosen from each panel, and identify them with the names of the members of the House of Commons.

The second section of the act defines election-petitions, and specifies by whom they must be signed. Election-petitions are petitions complaining, 1, of an undue election; or 2, that no return has been made to a writ or on the day on which the writ was returned; or 3, that the writ was issued during any session or prorogation of Parliament, that no return has been made within fifty-two days after the date of the writ; or 4, that a return is not according to the requisition of the writ; or 5, of special matters contained in the writ; and they must be signed by some person claiming therein to have had a right to vote at the election, or to have had a right to be returned, or alleging himself to have been a candidate at the election.

All election-committees are empowered to send for persons, papers, and records, and to examine any one who may have signed the petition, unless it shall appear that he is an interested witness, and to examine all witnesses upon oath, which must be sworn in this act. They have the power to order the members of the House of Commons in which evidence is taken upon oath. Any one giving false evidence is made liable to the penalties of the law.

Parties complaining of or defending a return are required to deliver in to the clerk of the General Committee of Elections lists of the voters intended to be objected to, with the several heads of objections, not later than six in the afternoon of the day on which the elections are to be held; and the clerk will then send the list to the committee to try the petition; and the election-committee cannot enter into evidence against any vote, or upon any head of objection, not included in the lists. The committee are required to decide whether the petitioners or the sitting members, or either of them, be duly returned or elected, or whether the election be void, or whether the new writ ought to issue. The decision on these points is finally put between the parties: and the House carries it into execution.

ELECTION OF MEMBERS OF PARLIAMENT.

The ELECTRIC TELEGRAPH. [Telegraph, Electric, P. C. S.]

ELECTRICITY, ATMOSPHERIC. The similarity of lightning to the spark obtained by friction from an electrical machine is an instance of the electric nature of the atmosphere; and in one of Franklin’s letters, written apparently before the year 1750, the points of resemblance are distinctly stated. The first fruit of this discovery was the employment of thunder-rods for the protection of buildings and ships, and for the prevention of fires. In the last century, the application of the electric fluid to lighting up instruments was extensively used by philosophers for the purpose of enabling them to ascertain the nature and intensity of the electricity in the atmosphere. Such means are not unattended by danger; and science has to record the destruction of persons, during a thunder-storm, while attending to the indications of the electrometer connected with an apparatus of that kind. [LIGHTNING, P. C. S.]

Franklin in his papers, M. de Romas in France, and Cavallio in England, each employed, for the purpose of bringing electricity from the atmosphere to the surface of the earth, a kite made of silk stretched on a frame, from the upper part of which projected a piece of pointed metal, and from which a string or a strand of silk passed to the experimenter. Buffon, L. Menonier, and others, planted vertically in the ground, poles from 30 to 40 feet in height, carrying at the top a pointed piece of tin or iron, from which descended a metallic wire. M. Médocs in France, Mr. Bonavent in Ireland, and Mr. Cross in England, employed long wires in horizontal positions, which were insulated by being stretched between two glass pillars, each on the top of a pole planted in the ground. The wire used by Mr. Cross is 1800 feet long, and is also connected from the ground.

The numerous experiments made by Cavallo serve to prove that the electric fluid always exists in the atmosphere, but in very different quantities at different times, and that it is more abundant in the higher regions than near the earth. The same philosopher found, also, that it is more intense in frosty than in warm weather, and that fogs are accompanied by a great quantity of electricity, except when they become rain; in this case, little electricity is perceptible, the rain conducting to the earth the electricity of the air above. In high winds, also, the intensity of the atmospheric electricity is generally diminished, probably because the strata of air containing different quantities of the fluid are brought successively in contact with the earth. Thus there is also a marked form distribution of the fluid between the earth and atmosphere. It may be easily conceived that, in stormy weather, the variations of the atmospheric electricity will be very irregular; for currents of air in the upper regions, driving the strata of clouds in different directions, the electrical actions between the clouds and the atmosphere below must be extremely complex.

M. de Sausure has observed that, during summer and winter, by night as well as by day, of pure atmosphere is free from clouds, the electricity of the air is positive; and Mr. Read (Phil. Trans., 1794) has shown that out of 404 observations made in one year, the air was positively electrical in 341, negatively electrical in 63, and the phenomena were incapable in 7 observations only. It seems probable, in fact, that the negative electricity which may be observed in a pure atmosphere is caused by the discharge of its positive electricity into the earth or a cloud, when one or the other of these is in a state of electrification. But thus there is a hidden distribution of the electricity of the air above. In Ireland, the electricity of the atmosphere is positive in winter when the air is clear; he observes that it diminishes in frosty or foggy weather, and that he could detect electricity in such cases. In summer, however, the electricity was found to be negative; such also is the electricity of the atmosphere when it is vitiated by exhalations from fumes, tar, and decaying vegetation.
All observations concur in showing diurnal variations in the intensity of atmospheric electricity, but there is some uncertainty concerning the precise times at which the intensities are the greatest and the least. Of course, as the weather, the electricity was weakest at sunrise; that it attained the maximum of strength in the day-time, and continued in that state till sunset, when the intensity diminished; but there were changes of this magnitude, so that its diminution was much more rapid as the air became more humid; and he observed that, in winter, when a dry wind prevailed, if the sky were free from clouds, the electricity became very strong after sunset. M. de Sausure observed, at Geneva (1786) that, during winter, the intensity of atmospheric electricity had its first maximum at 9 a.m.; that it diminished till 6 p.m., when it was in a minimum state; it afterwards increased, and attained its second maximum at 8 p.m.; after which it continued to diminish till it was again at a minimum at 6 on the following morning. The same philosopher found that, in summer, the diurnal variations were less perceptible: on a dry warm day he found the electricity increase from sunrise, when it was almost insensible, till 3 or 4 p.m., when it became a maximum; it appeared then to diminish till the dew fell, when it became stronger, but it was scarcely sensible during the night. Lastly, the experiments of Mr. Read exhibit two maxima and two minima in twenty-four hours. The atmospheric electricity second strengthened at 2 or 3 hours after sunrise, and again about sunset; it was weakest at noon and at 4 p.m.

The experiments of Mr. Crosse show also that, in the ordinary state of the atmosphere, the electricity predominates, in Europe and in the Northern Hemisphere, to the north above the earth's surface; the same philosopher observes that it is most intense at sunrise and sunset, and weakest at noon and during the night. He finds that the approach of a thundercloud produces a change in the electricity of the atmosphere, rendering it positive if it were before negative; and the contrary: what ever be the nature of the change which takes place, the intensity of the electricity increases to a certain degree; it then diminishes and disappears, and is succeeded by an opposite electricity: this gradually increases till it becomes of higher intensity than the former kind, and then it decreases till it vanishes: it is again succeeded by the first kind. These changes are often found to take place several times successively. Fogs, rain, snow, &c. also change the electricity from positive to negative, again from negative to positive, and so on; the change taking place every three or four minutes. A cold rain, in large drops, is frequently accompanied by intense electricity; and during a driving fog or rain the electricity is at this time so strong as to attract a score of electricists. A warm small rain is weakly electrified; and a weak positive electricity generally prevails during cloudy weather. Mr. Crosse finds also that the electricity of the air is very weak during cloudy nights, which in winter and spring times produce extreme cold and dryness.

The intensity of atmospheric electricity has been observed to undergo annual changes: it increases from July to November and decreases, and in winter the greatest intensity occurs in winter, and the least in summer.

Any of the different kinds of electrometer may be employed to determine the nature and intensity of atmospheric electricity. [Electrometer, P. C. F.] The instrument proposed by M. Collard of Geneva is formed of the wire employed as a galvanic multiplier; it consists of numerous coils well insulated from one another, and one end communicates with the earth while the other extends into the atmosphere. The energy and direction of the electric current is indicated by the deviation of a magnetised needle from the zero point of a scale.

The aurora borealis, and many other meteoric appearances have been ascribed to the electricity of the atmosphere. [Aurora borealis, P. C. F.] ELECTRICITY, CONDENSER OF. [Condenser of Electricity, P. C. S.] ELECTRICITY, DISTRIBUTION OF. [Distribution of Electricity, P. C. S.] ELECTRO-METALLURGY. When a science, or the practical application of a science, is in rapid progress, it is difficult to embody the results in an alphabetical work like a Cyclopaedia, since the subject may grow to increased importance, and a new discovery or a development of a particular kind may be made, which becomes of especial importance. Such is the case with the arts depending on electric agency. When the articles Electricity, Electro-chemistry, and Galvanism, were published in P. C., little progress had been made in transferring from the lecture-room to the workshop or the studio the wonderful power to which they relate; and although at a subsequent period these arts have made great progress, and been the subject of numerous publications in the cyclopaeda, it is still desirable to give here an account of a branch of art which has become very important within the last two or three years.

The process is precisely the same as that of forming a thin metallic layer on the surface of some other body prepared for its reception; the outer layer being intended (but not always) for one of three purposes—the decoration, the protection, or the conductivity of some substances beneath. The mode of proceeding assumes different forms according to the purpose in view. The names Electrotype, Galvanotype, Volta-type, Voltagraphy, Galvano-Plastics, Electro Plating and Gilding, all have been applied in a somewhat confused manner to different substances and modes of treatment; and it is supposed that it would be convenient to adopt the term Electro-Metallurgy as a general one, including all or most of the varieties.

Surface-Deposit, in Electro-Plating.—In the common manufacture of table-plate the articles are either made of pure gold or silver, or have a surface of these metals laid upon a foundation of cheaper metal; and it is as an improved mode of applying the gold or silver that the electro process has been chiefly introduced. There have been long used for many purposes by the goldsmiths, who, by the same method, have been able to finish many articles of a cheaper metal. For instance, polished steel or copper used formerly to be gilt in France by the following means:—The metal being heated, a thin layer of gold was laid on it and then was allowed to cool. A second application of gold, and a second burning-in succeeded; and these operations were repeated until a sufficient body of gold had been applied. Another method, that of "water-gilding" (as it is most inappropriately named), consists in coating the cheaper metal with a tinnest layer of mercury and gold, dissolving the latter by mercury by means of heat, and leaving a bright golden surface. [Butter, P. C.; Gilding, P. C.] A later mode has been by cleaning the metal article in an alkaline liquor, and boiling it in a chemical solution of gold, by which a thin film of the precious metal becomes deposited on the foundation beneath. But in the most usual mode of preparing silver plate the processess are rather mechanical than chemical:—A long bar or ingot of mixed metal (copper and brass) with a thinner ingot of silver laid upon it, is drawn through a rolling-mill, by which the two are elongated and pressed together as a thin sheet; and out of the sheet so prepared articles of table-plate are made by stamping, punchting, hammering, and other mechanical processes.

The electro process differs from all of the above. In the first place, a designer sketches the pattern for the article, and from this pattern a modeller prepares a model made of dark-coloured wax, firm in substance, but capable of being easily dissolved by the action of small lumps of acid; the model the workers in metal operate by, casting, or stamping, or hampering, according to the shape of the vessel to be produced. The metal employed (at the large establishment at Birmingham, in Birmingham, at Richmond, one of the chief ironfounders) is an alloy of copper, nickel, aluminium, antimony, tin, lead, and bismuth, and fusable only at a high temperature. If the article is to be produced by stamping or by hammering, the alloy is rolled into thin sheets, which are worked up into form by the stamping-press or the hammer. As a CHASING OF METAL (P. C. S.) But when the article is to be cast (which the more elaborate patterns generally are) the operations are as follows:—From the wax model is made a mould of lead, by casting in which the metal is taken from this model by the action of molten brass, which is of course an exact copy of the wax model. This brass cast, called the "pattern," is carefully examined, and worked up by chiseling-tools to the proper fineness and delicacy of detail. From this brass pattern is made a mould of lead, by casting in which the metal is taken from this mould, which may be cast in the alloy or white metal; so that there are thus several alternations in wax, lead, brass sand, and alloy, three or four of which are in the character of casts, and two in that of moulds.

When all the mechanical processes necessary to the manufacture are finished, whether casting, stamping, or hammering, the article is cleaned, ground, and polished, in every part, to prepare it for the reception of the silver. It is then dipped into a solution of silver nitrate and is immersed in a solution of a particular mineral which he himself, a "catalyst" of the metals in question. The metal is then immersed in a solution of silver nitrate and then in a solution of a particular mineral which he himself, a "catalyst" of the metals in question. The metal is then immersed in a solution of silver nitrate and then in a solution of a particular mineral which he himself, a "catalyst" of the metals in question. The metal is then immersed in a solution of silver nitrate and then in a solution of a particular mineral which he himself, a "catalyst" of the metals in question.
manufactured articles may be placed at once, by suspension from rods placed across it. In the tank is a chemical solution of silver; and the wires of a galvanic battery are so arranged that the current, in completing its circuit, must necessarily pass through the solution. The result of this action is, that the current is deposited upon the surface of the". 

When the manufactured articles are taken out of the tank they present a remarkably dead appearance; this is removed, first, by friction with 'scratch-brushes' of bristle wires, and then by immersing with hard smooth pieces of blood-stone.

If the article—whether a piece of table-plate, a button, or a trinket—is to be coated with gold instead of silver, a process generally similar to the above is followed; the nature of the solution in the tank being the chief object of difference. Indeed many other metals can be deposited in a similar way; but gold and silver are the two to which attention is principally directed.

This process, in electro-plates. A far more remarkable department of electro-plating than the above is that in which the whole substance of the manufactured article is produced by deposition from the liquid in the tank; an operation constituting perhaps the most striking example of electricity applied to metal working.

In effecting this object, the design is first modelled in wax; a mould in lead is taken from the model; a cast in brass is taken from the mould; and this cast is worked up by the chaser—just as in the former instance. But instead of trickling a mould in sand from the pattern, the mould is formed in a melted composition of glue and treacle, which has, when cold, sufficient elasticity to enable the pattern to be removed from it with facility, however much 'undercut' the device may be. When the wax is ready, it is coated with a gelatinous waxen composition; and this cast, when further prepared, is suspended in a tank containing a chemical solution of copper. Galvanic agency is then resorted to, to deposit a layer of copper (by decomposing the solution) on the surface of the model, and this layer is made of such a thickness that when the waxen model is melted out from within it, the copper may be able to retain its shape unsupported. The result of the numerous copies is, that the inside of the copper shell represents a mould of the object, and the outside of the copper is a mirror-image of the object. The copper is protected by a resisting composition, and it is then suspended in a tank containing a solution of silver (or gold, as the case may be); the galvanic current causes the electrodissolution of silver in the inside of the original wax mould; deposition on the outside being prevented by the resisting composition. When a sufficient thickness of the precious metal is thus obtained, the copper mould is exposed so the action of an acid which gradually eats it away without injuring the gold or silver beneath. The result is, that after the use of the wax model, the lead mould, the brass pattern, the glue mould, the composition model, and the copper shell, there is produced a vessel or ornament article of absolutely pure silver or gold, preserved in the same form as the original wax model, and derived from the metal which had formed part of a chemical solution.

It might naturally be supposed that the particles of metal brought together in this singular way from a liquid would be deficient in that coherence which is one of the features of the metallic state. But such is not the case. The manufactured articles have a sonorous 'ring,' and a power of bearing planishing with the hammer, which show that the mutual cohesion of the separate particles is more than sufficient to enable the article to retain its shape under the least degree of pressure. In all these respects, the result is quite unsurpassed by any other process known. As a protection, an ornament, or as a copy or type, these applications are intended.

As a protection, Mr. Dent has applied electro-gilding to chrome-nickel-springs. At the Plymouth meeting of the British Association (1841) Mr. Dent stated that the common process of bluing the steel balance-springs of chronometers very much affects the elastic force of the spring; and he therefore proposed the employment of electro-gilding instead of bluing, as being an efficient protector from the ill effects of damp and saline atmospheres. Professor Christie at the same time stated that the use of the film of an electro-plated metal had given to him the advantage of protecting magnetic bars and needles by the same means, to prevent the disturbing effect often exerted by the oxidation of the surface of these delicate instruments.

Medallions are sometimes coated with copper as a means of preservation or of beautifying. The medallion is first coated with black-lead, and then exposed to a solution of copper (in the state of sulphate or some other salt), the metal which is precipitated being fixed by the medallion being suspended in a solution of acetic acid. Small twigs, leaves, seeds, and other vegetable specimens, may be similarly coated with copper; either for ornament or for the purpose of illustrating the size and form of the object. Apples and pears are similarly capable of being coated, by being either brushed over with powdered black lead or steeped in a liquid preparation of phosphorus, and then immersed in the tank. Indeed this method is capable of producing very beautiful results. The writer has seen three sprigs of holly, taken from the same branch, completely coated in the course of a few minutes, the one with copper, the second with silver, and the third with gold, all absolutely pure, and conforming to the most minute and delicate features of the plant. Insects preserved in the same manner may be thus coated with a film; and it is a striking proof of the equality with which the particles of metal arrange themselves, that the exquisite framework of the insect's wings is exhibited almost as distinctly as in the natural state. Mr. Smege gives similar examples. He says of one case of copper coating of wings:-

'The beauty of electro-coppered leaves, branches, and similar objects is surprising. I have a case of these specimens placed on a black ground, which no one would take to be productions of art. . . . When I state that the numerous hairs covering the leaves of a melastoma, and even the delicate hairs of the achatia, are all perfectly covered, the botanist must at once admit that these specimens have rather the minuteness of nature than the imperfections of art.'

In the present instance all such fruits and vegetables, as apples, pears, pears, grapes, cucumbers, and potatoes, by electro-coppering, a pin is inserted before the immersion, and on this pin being afterwards removed, the hole left by it furnishes an outlet for the sap and moisture from within; and it is found that in many cases the inside dries up completely without deranging the shape of the copper envelope.

Ornamental baskets, whether made of wicker or wire, are coated in a similar manner. So likewise are lace and other articles made by the electro-process: a number of such is shown in the plate. For productions of this kind spring up, the means are at hand for extending the art almost indefinitely; for by a preliminary steeping in a solution of phosphorus, or some other chemical preparation, almost any object may be produced upon which the object may receive a deposition of metal in a delicate film; and this film may be of copper, silver, gold, platina, or nickel. Porcelain and earthenware might without much difficulty be brought under similar operations.

Electro-deposit, as a means of Copying. The details given under Voltagraphy, P. C., belong to the present section of our subject; by a reference to that article it will be seen that the obtaining of an exact copy, type, or counterpart of any design, whether of the fine arts or to the manufacturing arts, is the object in view; and a few other particulars, in addition to those there given, will suffice.

The electro-process has been recommended not only for copying engraving, but for making smaller copies on which an engraving is to be executed. The copper-plates prepared for engravers generally contain a small portion of other metals, which render both the engraving and the etching somewhat uncertain: by the substitution, therefore, of sheets produced by the electro-process, which are quite uncontaminated with other metals, an advantage is anticipated. To produce these plates, a copper-plate is prepared in the usual way and suspended in a copper solution, in which a film of any desired thickness may be produced, and by a previous adjustment of the plate, the new portion may be separated from the old in the form of a distinct plate, susceptible of after-preparation for the engraver. Or, the copper-plate, instead of being made by deposition upon another plate of the metal being, may be produced on a flat surface of wax or plaster properly prepared.
In the copying of engraved plates, as described in Voltaography, P. C., the principle involved is nothing more than that in making a smooth plate; for the invisibly minute particles of metal, copper, are deposited upon the little cavities or depressions in either copper, and if these cavities happen to form a definite pattern or device, as in an engraving, a copy of this device is obtained, the original being in intaglio, and the copy in cameo or relief. Whether or not it would ever become advantageous to employ this process in the making of plate, and that part of the device, or type, or for wood-cuts, the practicability of it, as a question of electro-metallurgy, is clear. Mr. Smee thinks (p. 276) that the method may be adopted for such subjects as the 'metamorphic rocks, or the great results, where numerous copies of a block to print.' The design is cut in wood, and this block, after being prepared with black-lead, is immersed in a copper solution, so that an intaglio copper mould may be produced by deposition; this mould may be used to make copper reverses, which are at once ready for process, or is to be used as a die to form cliché casts. Mr. Smee's volume contains three specimens, varied in the following way: 1. A device was engraved on a wood-block; a copper reverse was taken from this by the electro-process; a cliché (metal alloy) cast was obtained from the copper in the manner described in Charing of Metals, P. C. S.; and the printing was conducted from the cliché. 2. The device was engraved on the wood; a cliché mould was then taken from the cliché, and the printing was conducted from the cast. 3. The device was engraved on the wood; a mould from this was taken in plaster; an electro-cast was taken from the mould, and the printing was conducted from the electro-cast.

The copying of coins, medals, seals, and plaster casts, has been sufficiently illustrated by the above details and by those contained in the article before quoted; and in numerous other instances of the kind it is easy to see that the same principle is at work, slightly modified in the details. It has been proposed to obtain duplicates of monumental brasses by such means, for antiquarian and historical purposes. A cast is to be taken from the brass in plaster, and from this cast, when baked, soaked in tallow, and blackened, an electro-cast impression may be obtained. By taking an impression from an embossed surface, with a sufficient thickness of metal, it has been suggested that stamps or dies for wafers and such like articles might be easily produced. By increasing the thickness of the metal in an electro-coppered specimen of fruit, and by removing the contents, the copper might form a mould for obtaining casts of the fruit. Various suggestions have been from time to time thrown out respecting the application of electro-metallurgy in many cases which occur to the dentist, the surgeon, the mineralogist, the architect; but it is unnecessary to particularise these. We may however mention that M. Peyré, of Versailles, communicated to the Acad. des Sciences, two or three years ago, a note on a method which he proposed to adopt for the multiplication of accurate graduated instruments: it is well known that the graduation of sextants and other astronomical and geodetical instruments is a difficult and expensive process; and M. Peyré conceives that the electro-process, by means of producing numerous copies of such, all taken from one specimen originally graduated by hand. Mr. Heineken ('Mech. Mag.' No. 972) states that the same plan had been suggested by him in 1840, and he also suggests that the electro-process might be successfully used for producing tools for regrinding or polishing specula, as the tool might thus be made from the specimen itself; as also tools for grinding lenses.

The production of copper busts, made entirely by deposition from solution, is an example of what we have before termed 'solid deposit.' The first specimen of this kind, we believe, was a small bust of Dr. Dalton, exhibited by Mr. Gobrecht, at the Royal College. Mr. Wallace, since which time, others have been produced elsewhere. In such works of art a bust is prepared of some fusible or friable material, upon which a copper film is formed by electro-deposition; the rest of the bust being cast, or the work being completed by hand, within, the copper shell forms a mould, within which a copper bust may be formed by a second deposition. It is stated that the Bavarian sculptor, Stigelmeier, has devised a mode of coating colossal plaster statues with copper by the electro-process, and he can complete such a process in the short space of two or three hours.

Galvanic Etching and Engraving. It is mentioned in 'Voltaography,' that Daguerreotype pictures are capable of being copied in electrolyte. This art, which forms the connecting link between two notable discoveries of modern times—light painting and electro-engraving—depends on an intimate connection of the metals of the former and the latter. Daguerre produced the daguerreotype silver plate after the application of mercurial vapour to it. [PhotoGraphic Drawings, P. C.] Mr. Grose, who described the method before the Electrical Society in 1841, explained that he used dilute hydrochloric acid in the electrolyte, and his process is known to have involved the use of different parts of the Daguerreotype plate, according to the extent to which the light and the mercury had before acted, bit it away in the manner of an etching, so as to produce deep lines in the shaded parts of the image in the lightest spot.

This is, therefore, a kind of etching by galvanism; and Mr. Smee has suggested the employment of a plan somewhat similar for etching in general. In this process, instead of a film of copper being added to the plate by deposition from the electro-plate a composition of white wax, lime, lampil, and wafers, which constitute the lines of the device; in the other processes the plate is made the negative pole of the battery, whereas here it is the positive pole. In common etching, the plate is coated with a composition of gum or gesso, and on the surface so produced, when hardened, is sketched the design, by scratched away the composition by means of a sharp point or needle. The plate is afterwards exposed to the action of dilute nitric acid, by which it is decomposed and the part, left untouched at the parts covered by the composition. In the galvanic method, the plate is coated with composition and etched with the needle in the usual way; but instead of being immersed in a vessel of nitric acid, it is dipped into a vessel of copper, through which a current is passed. The copper leaves the etched parts of the plate and becomes dissolved in the sulphate, a piece of copper being placed so as to receive an additional fluid from the solution as particles of copper are thrown off from the etched plate. As a plate etched in the common way is treated with the acid three or four times, to produce different grades of tone, so is likewise the plate etched by the galvanic method. Mr. Smee says that the advantages of galvanism are many, and that the absence of poisonous nitrous fumes, which are evolved in the ordinary process; the greater uniformity of action which takes place when acids are used; and the rapidity of working, which may be regulated to the greatest nicety. The lines may be of any depth, and are sharper and cleaner than when acid is used; and lastly, no bubbles are evolved, which the engraver well knows are apt to tear up the ground, or to cause unequal action (p. 286).
are to be black in the impression are left untouched on the plate—a plan directly the reverse of the former. In order to aid the artist in producing the required effect, he uses a white paint on a black ground; the metal plate may be blackened by hydro-sulphurite of ammonia, or by other agents; and a white point may be formed from a mixture of sulphate of lead, white wax, lard, and olive oil. The mode of pencilling is entirely different from that adopted in the former case, and, as would appear, more difficult; for the artist has to avoid with his pencil all the parts which are to form the device or inked part of the image. When the plate is finished it is coated with black-lead, and immersed in the sulphate of copper; whereby a plate is produced fitted for surface-printing.

Several improvements have been introduced in these curious branches of art; and specimens of pictures produced by these means have been recently given in the illustrated newspapers. Opinions may perhaps differ as to the ultimate success of the method, artistically and commercially; but its ingenuity certainly deserve a fair trial.

**ELECTRO-PLATING AND GILDING.** [Electro-Metalurgy, P. C. S.]

**ELECTRO-TINT.** [Electro-Metalurgy, P. C. S.]

**ELEO-CHARIS,** a genus of plants belonging to the natural order Cyperaceae, and the tribe Scirpaceae. It has fertile glumes, the lowermost layer with 1 or 2 of the lowest empty; 3-6 bristles. The nut compressed, crowned with the perasicle. There are only 9 species of this genus, known by the name of Spike-Rushes, found in Great Britain. *E. palustris* has a creeping root, and the stem clothed with minute scabrous sheaths; the leaves are arranged in rosettes, forming sometimes a large proportion of the pest found in bogs. *E. multiflora* has slightly creeping roots, with the stem clothed with obliquely truncate rather acute sheaths. *E. acicularis* has a fibrous root, and numerous slender erect stems, and very small spikes. It is found in damp places upon heaths.

(Repton, *Manual.*)

**ELEPHANTOPUS** (from *Didea*, an elephant, and *pous*, a foot), a tribe of the family Gramineae, and suborder Carymembria, the tribe Vannionaceae, and the division Elephantopteraceae. It has heads containing 3-4-6 florets, equal flowered, closely collected into a cluster, surrounded by leaves; the involucres compressed in 2 rows, the leaflets dry, oblong, alternately flat and folded, the inner usually 3-nerved; the receptacle naked; the corolla palmate, with a 5-cleft limb, which has acuminate segments and 1 recess deeper than the others; the stamens are inserted in the branches of the style half subulate; the achenium rather compressed, many ribbed, oblong, hairy; the pappus in 1 row consisting of several straight paleces, dilated at the base, but otherwise very narrow, acuminate, equal, and serrated.

*E. sternostomus* has, to the naked eye, a starchy-looking, scabrous, cuneatus, and very much narrowed at the base, those of the stem lanciculate. This plant is common in all parts of India, in dry elevated positions. It has a stem a foot high, with the heads of pale red flowers on long stalks. The roots are fibrous. Both the roots and the leaves are reputed to have active medical properties. The natives on the Malabar coast use a decoction of them in cases of dysuria. There are other species natives of South America and the West Indies.

(Lindley, *Flora Medicol Louden, Encyclopaedia of Plants.*)

**ELIMINATION.**

This word is from *eliminare,* to drive out of doors, and it is used in mathematics to signify the formation of new equations which do not contain a certain quantity, by means of given equations which do contain that quantity. Thus in so simple a case as \( x + y = z \), if by means of these two equations we deduce the obvious relation \( x = z - y \), and we have a new equation in which \( x \) is not found. Elimination is an essential part of very many mathematical processes: and in the present article we can only attempt to give a few general notions, such as may help a student to connect different portions of his algebra.

If the solution of equations were perfect, so also would be elimination. Having 10 independent equations for instance, each containing \( x, y, \) and \( z \), if we could choose any three, and from these three find \( x, y, \) and \( z \), we might substitute these values in the remaining seven equations, and thus form seven equations independent of \( x, y, \) and \( z \).

The general rule is that from \( m \) equations we can form \( m - n \) equations with \( n \) quantities eliminated. But not only must the equations be independent of each other, but no two or more must be capable of what we may call simultaneous elimination. Suppose, for instance, \( x \) and \( y \) were the two independent constants of a set of equations except in functions of \( x, y, \) and \( z \); if then we make \( x + y = p \) and substitute, we have a set of equations not containing either \( x \) or \( y \), but containing \( p \). If by means of one of these we eliminate \( p \) from the rest, the process which does, applied to the original equations, would allow of our eliminating both \( x \) and \( y \) by one equation only.

As to equations which are not purely algebraical, or which contain more than powers or roots, or combinations of them, there is no pretence for an organized method of elimination existing, except that of solution. For example, we can eliminate \( x \) between the equations \( x = \log (x + y) \), and \( x = \log (x + y) \); because it so happens that we can find \( y \) from the first, as \( \ln y = x - x \); and this value of \( y \) may be substituted in the second. But if the first equation had been \( x + 2y = \log (x + y) \), we could not have found either quantity in finite terms of the other, from either equation. In such a case, we must have recourse to infinite series: with these instruments, elimination is always theoretically possible. But whether the results produced will be convergent, and otherwise convenient for use, must depend upon the circumstances of each case. In practice, the name of elimination is spoken of, elimination in finite terms is generally understood.

Let us now take some algebraical equations, and suppose a pair of them, containing \( x, y, \) and \( p \), and put \( x = \theta \), and \( y = 0 \), and \( z = 0 \).

\[ \begin{align*}
Q &= RB, \\
N &= PA, \\
P &= MN, \\
N &= M, \\
X &= M + N,
\end{align*} \]

We have then
\[ \begin{align*}
Q &= M + P + N, \\
P &= M + N, \\
N &= M + N + X, \\
X &= M + N + X, \\
T &= M + N + X.
\end{align*} \]

Take a value of \( x \) which makes \( X \) vanish, and with this value of \( x \), find a value of \( y \) which makes \( P \) vanish. We have then
\[ \begin{align*}
Q &= N - M, N = M, N, \\
N &= M, N = M, M = 0, \\
N &= M, N = M, N = M, M = 0.
\end{align*} \]

The values of \( Y \) and \( X \) must be known to find the values of \( M, N, M, M \), or \( M, M, N, M \) be made infinite by the value of \( X \), the whole process fails. All we can say then, is that the roots in \( X = 0 \) must contain among its roots all the values of \( x \) required, it may possibly contain other values.

Next, suppose the student to make a multiplier to avoid fractions. Let it be convenient to begin with \( Q, P, \) instead of \( Q, P \). Then when \( Q, P \) both vanish, \( X \) vanishes; but we can now only say that the roots of \( X = 0 \) may, with proper values of \( x, y \), satisfy one of the other equations at any values of \( Q, P, 0,0 \),

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We shall take the following example, to show how comparatively complicated the results of a very simple instance may be. Let the equations be

\[ p = x + y + z = 0, \quad q = x^2 + y^2 + z^2 = 0 \]

Multiply by \( x \), to prepare for division without fractions, and divide by \( x \); the remainder is

\[ (x^2 + y^2 + z^2) / (x^2 + y^2 + z^2) \]

Multiply by \( y \), and for that purpose, for a similar reason, divide by \( y \); the remainder is

\[ (y^2 + x^2 + z^2) / (y^2 + x^2 + z^2) \]

The second remainder, \( x \), is

\[ (x^2 + p^2 + r^2) / (x^2 + p^2 + r^2) \]

One of the roots of this is \( x = 1 \), with which it will be found that \( p = 2 \) satisfies the equations \( p = 0 \). And in this instance it does happen that all the roots of \( x \) and \( y \) are capable, each with its proper value of \( y \), of satisfying the given pair of equations.

If we take the principal letter to be \( x \), the problem of ordinary algebraic elimination is reduced to eliminating \( x \) from each of the equations, which may be at once eliminated. The same method will do when the equations are of different degrees, but in that case it is more convenient to bring down the higher to the lower, first, in the following manner:

Suppose the equations to be

\[ a + bx + cx = 0, \quad p + qx + rx = 0 \]

Multiply by \( p \) and \( x \), and subtract, which gives a new equation of the form

\[ a^2 + bx^2 + cx^2 = 0 \]

Repeat the same sort of process, making the first terms destroy each other, and then the last; we are thus led to two other equations, the first of which may be at once eliminated. The process will do when the equations are of different degrees, but in that case it is more convenient to bring down the higher to the lower, first, in the following manner:

Suppose the equations to be

\[ a + bx + cx = 0, \quad p + qx + rx = 0 \]

Multiply both by \( x \), and add, which gives new equations of the form

\[ p^2 + qx^2 + rx^2 = 0 \]

Multiply by \( p \) and \( x \), and subtract, which gives a new equation of the form

\[ a^2 + bx^2 + cx^2 = 0 \]

The problem may be reduced to that of elimination between purely linear equations, as follows:—Suppose it required to eliminate \( x \) between \( a + bx + cx = 0 \) and \( px^2 + qx^2 + rx^2 = 0 \). Multiply both by \( x \), and add, which gives new equations of the form

\[ px^2 + qx^2 + rx^2 = 0 \]

Multiply by \( p \) and \( x \), and subtract, which gives a new equation of the form

\[ a^2 + bx^2 + cx^2 = 0 \]

Since two equations are introduced at each new step and only one new power, there must be a step at which the number of equations becomes equal to the number of powers, after which, at the next step, the number of equations will be in excess by one, which is what is wanted for elimination. It is also worth notice that if we were to stop at the step at which the number of equations is the same as the number of powers and forces the powers as independent quantities, we might then eliminate between the first and second power, and produce the result in the form \( A = 0 \).


ELIZABETHAN ARCHITECTURE. By this name we distinguish the architectural style existing in England from about the middle of the 16th, to the end of the first quarter of the 17th century, and was accordingly in its meridian during the long reign of Elizabeth. Whether it were white to disturb a name already fixed, it might with equal or even greater propriety be termed the Elizabethan Renaissance; it being a style formed out of the continental Renaissance engrafted upon our Tudor and Old English domestic styles; and it was, we may observe, applied exclusively to domestic, as at least regular buildings, in which respect it was very differently circumstanced from the Gothic style, which was almost as exclusively ecclesiastical in character and purpose. The age of Elizabethan architecture was that of palace-building, not church-building; and it style developed itself which was eminently palatial in many of its qualities—certainly not deficient in any one—very one—very one—very one—very one; or rather, more deficient in one or two important respects. It may be observed as an abstruse, that if that which the terms of the law of successful proceedings in picturesqueness is paramount almost all the productions in that style, because many of them possess neither the one quality nor the other; yet such is the case with regard to the whole of it, a style being held, by the author, and the merely making use of it does not confer the power of employing it with mastery or even with good taste; otherwise we should not have so much flat and vulgar architectural productions as show the name of the Elizabethan, Italian, and Gothic styles. Very few architectural writers however have submitted the claims of Elizabethan to be considered a style: those who have spoken of it as requiring some historical notion, have done little more than enumerate some examples of it, while others have condemned it in the most unjust manner. If the censors of Elizabethan had taken the pains, they might perhaps have made out a tolerably fair case against the style—at least what would have looked so, though in reality founded upon considered argument; whereas they do not even make any show of criticism. In the one place, Elizabethan is neither Gothic nor Italian is childish, for if it was, it would not constitute a style by itself; to set it aside disdainfully as an impure style is not much worse, because any transcendental style, which consists of necessary or accidental parts, is as unnatural as the style of the ancients, who are not contented with the elements of the style, and make them to do of elements that have not yet been brought into consistency; and as a man's life is not the more true because he knows it, so in the same manner it is not the more correct because it is not considered as a style. Furthermore, it is thought that the Elizabethan style is a new one, and that it must be considered in the same light as Elizabethan, and of course something excellent as such. Both its detractors and its admirers are equally one-sided: the latter are as ostentatiously blind to its worst vices and defects as they are to its merits and capabilities; they mistake the faults and blunders of particular buildings for characteristics of the style itself. Historical interest it certainly possesses, nor is it deficient in artistic merit: accordingly it has of late years engaged the attention of a number of critics; and its merits have been at times so much praised and set up that it has been made the subject of several graphic publications (such as Nash’s admirable ‘Old English Mansions,’ C. J. Richardson’s ‘Architecture Remains of the Reigns of Elizabeth and James,’ Hall’s ‘Ye Olde English Architecture,’ &c.) and it has also been occasionally adopted in practice with more or less success, especially for interior decoration, with which, however, the affection of antiquarianism on the one hand, and of more fashion on the other, have had quite as much to do as true taste. The style itself, indeed, is by no means one for either indiscriminate or servilecopying, for even the very best examples present something exceptional, and what, though we tolerate it in them because they are by the present and authenticated taste, the style, becomes intolerable at second-hand in what we know to be of modern construction. In the hands of an artist capable of treating it with both freedom and feeling—of seizing on and bringing out all its better qualities, and not afraid of discarding or reforming its base parts, very much may be made of Elizabethan; and there surely need be no scrupulosity about tampering with a style which is in a manner outlawed by the majority of architectural teachers. In one respect it will not therefore be so much as hard for any one, either to adopt it without an objection that admit of being simplified—that is, not by the usual process of paring down—a of omitting embellishment, and attenuating such members as are retained. Deprived of vigour and richness, many of the forms become not only spiritless but unconvincing in their effect, and we cannot but feel that the style, which is regarded to other essential characteristics, may be made to look like tawdry ornament. Strange as it may sound to many, one great difficulty attending this style arises from there being nothing like a system of rules for it—no standard form for many of the very best examples; after so very much from
one another, that they are rather apt to bewilder by the choice they afford. Hence merely to say that a building—
more especially a modern one—is in the Elizabethan style, is saying nothing—is rather telling us what it is not than what it really is. We have things of the most opposite character imaginable passing under that name; there are, for instance, two shop-fronts in the metropolis, one at the corner of the Quadrant in Regent-street, the other at that of Berners-street and Oxford-street, which seem to have been expressly intended to show with how much good and with how much bad taste our English Renaissance may be applied; for while the former offers a well-composed and elegant design, the other is an unceulous and incoherent jumble of tawdry fragments, without any artistic combination.

Notwithstanding the attention directed of late towards the Elizabethan style, there is yet no work which gives anything like either a satisfactory history, or synopsis, or analysis of it. Of the publications before mentioned, and similar ones, some consist only of pictorial views, without any letterpress, while those which are more professedly architectural are only miscellaneous collections of studies from particular buildings or parts of buildings and their decorations, without arrangement of any kind,—valuable as materials, but too fragmentary to afford any clear and comprehensive insight into the style generally, with its numerous and complex modifications. It cannot be expected that, within our limits, we should attempt to draw up such a systematic scheme as we conceive to be a desideratum; still we may do something to open the way for others, leaving them to expand their hints into a connected and well-digested treatise.

It is equally unjust and indiscreet to speak of Elizabethan architecture, as is usually done, as being marked by the introduction of the Grecian orders, those employed in it having nothing whatever in common with the orders of antiquity but that sort of resemblance which renders us all the more sensible of the prodigious difference between the respective styles. Considered as classical or antique, they can be regarded only as grotesque parodies, since the application of them in all the varieties of the Renaissance style is as contrary to the practice of the ancients as their character is dissimilar. The orders are employed merely as decoration, and then only for the separate stories of an edifice, or for distinct compartments of a front. Hence they are invariably microstyle, and are

still further reduced in height by being placed on tall pedestals, and look all the smaller owing to the spacious proportions of the windows between them. In fact they are to be regarded only as accessories and decorative filling-up; for they have scarcely sought of even the apparent character of Elizabethan. In point of design too they retain little of the orders after which they are named; with the exception of one or two distinctive marks, such as the Doric triglyph, and the forms of the respective capitals, they are all assimilated in character, the Doric being frequently quite as slender and as much embellished or more so than the Corinthian. Pedestals are mostly paneled and fitted in with ornament, the panels themselves being multiplied in a variety of patterns. The shafts of columns are frequently enriched with one or more bands (either sculptured or plain), and the lower part of the shafts is often covered with arabesque carving. Pilasters are similarly treated—sometimes banded, sometimes paneled, and frequently filled in with arabesques or other ornaments, among which raised faceted blocks are very common ones.

Entablatures are almost invariably made to break over columns; and are so crowded with mouldings and other carvings, as to have the look of being all cornice. Orders are usually applied only to parts of a front; for instance, the centre, which is marked out as a lofty frontispiece or portal ornamented with several tiers of columns, and thus not only distinguished from the rest, but in many instances rendered quite distinct from it, all besides being comparatively genuine Tudor, without any intermixture of foreign elements. Even where such is not the case, the Tudor physiognomy manifests itself in windows and bays, which last are almost peculiar to our English architecture of the period as small circular towers and turrets with conical or spire-like roofs are to that of Flanders and France. Although square-headed, and without tracery of any kind, the windows retain a good deal of the latest Gothic or perpendicular character, being divided by mullions and transoms into numerous compartments after the manner of pannelling, a mode that freely admits of a window being made of any extent; and not only are single windows sometimes exceedingly spacious, but are put so closely together as to render the whole of a front nearly all window. This fashion, which however is only an occasional variety of the style, may be exemplified by what is called 'the Duke's house,' at Bradford, Wiltshire, the front of which is made up

[The Duke's House, Bradford, Wiltshire.]

entirely of windows and bays, in a manner that would be too monotonous, were not the plan-line broken by semicircular projections being thrown out, as smaller bays, from the larger ones. Thus the design acquires a pleasing playfulness of form; and it is besides not only marked by perfect regularity of composition, but also by a certain compactness, the windows not having the appearance of being intended for separate openings squeezed together for want of more space. The parapets upon the bays, consisting of fanciful open-work, enhance the general richness of effect, and both they and the parapeted terrace serve to indicate what are pleasing peculiarities in the style. But the building here given by way of specimen affords no example of the characteristic Elizabethan nave, a feature so singularly diversified, that to exhibit only the leading varieties of it would require a series of cuts, beginning with the simplest and proceeding to the most complex forms. In the absence of such illustrations, we can only say that almost every imaginable combination of curves, both
convoe and convex, with straight lines and angles, are to be met with in gables. Differently shaped gables often occur in the same building, and produce very great effect of outline, which is further increased by embattled parapets, with battlements and ornaments upon them, by small domes on turrets, and by chimney-shafts, all of which, mingled together in glorious confusion of light and shade, give such magnificence to what are otherwise plain and homely structures, and impart animation to what would else be listless masses. In like manner porches and balustraded terraces often give character to the exterior of a building, and make the upper may be comparatively flat and uninteresting. The style is excellently well adapted for brick and stone, such contrast of colour seeming natural to it, and serving to bring out the several parts more distinctly, and making it indubitable that the whole ought invariably to be red, and of superior quality and execution; for white or yellow bricks are so far from producing a similar effect, that they have both an insipid and mean appearance, the building seeming at a distance to be of stone, and when approached discovered to be of an inferior material. The brickwork itself is often variegated by the intermixture of darker bricks so disposed as to form a regular pattern on the walls, generally consisting of intersecting diagonal lines. There are also many instances of brick alone being employed, the ornamental members being formed of moulded bricks, and though the effect is comparatively sombre, it is by no means unpleasing.

To the internal characteristics of the Elizabethan style belong spacious bay-windows; long and ample galleries [Gallery, P. C. S.], but generally of low proportions; massive and elaborately sculptured chimney-pieces [Chimney-Piece, P. C. S.] screens of similar character, either with open arches or with a panelled and painted back; walls, ceilings, arches, and sometimes, and entirely covered with scroll-work foliage; wide staircases with richly carved balustrades. [Staircase, P. C.] The prevailing character is that of heaviness and staidness; on which account it is ill-suited for literal imitation at the present day, especially for houses upon a modern scale, and for small rooms. In regard to architecture many of the defects of detail are merged in the picturesque impressiveness of the whole; but the ground-plan, the room, and spaciousness of the rooms is thought near to the eye within a room, is apt to strike chiefly as too rude grotesque and ponderous. Besides which it is an expensive style for internal finishings; for thought it will very well bear to be greatly refined upon, it hardly admits of being simplified, decoration even partaking of gorgeousness being almost indispensably necessary to conceal the native uncouthness of both forms and proportions.

ELLIPSISOLITHES. Mr. Sowerby gave this title to some (composited?) forms of fossil Cephalopods, from the mountain limestones.

ELLIPITIC FUNCTIONS, or ELLIPTIC TRANSCENDENTS. This is no subject for a Cyclopaedia, except in a very limited sense. We can only undertake here to describe a branch of the subject.

If we had passed direct from algebra to the differential calculus, without any consideration of logarithmic or trigonometrical quantity [Transcendental, P. C.], we should have found ourselves stopped in the integral calculus by want of language in which to express the integral of such a function as

\[ \sqrt{(a + bx + cx^2)} \]

It would no doubt have been found (since the same difficulty has been conquered in a more complicated form in the subject of the present article) that all such integrals could be expressed by means of those of

\[ \sqrt{(a^2 - x^2)} \quad \text{and} \quad \sqrt{(a^2 + x^2)} \]

and the connection of the former of these with the arc of a circle, and of the latter with logarithms, the properties of the function of the first order, that is, with a complete system of trigonometrical formulæ, would speedily have followed. From this mode of arriving at a new set of transcendental we are saved by having the science of trigonometrical already prepared on a geometrical basis, in connection with the properties of the circle. But we have no such preparation founded on the ellipse, a curve which is an extension of the circle.

Nor is there any connection between the geometry of an ellipse and the eccentric anomaly, the angle which is the extended representative of the angle at the centre in the circle, except by means of a definite integral. In fact, \( e \) being the semi-axis major, \( c \) the eccentricity, \( \phi \) the eccentric anomaly, and \( c \) the arc, we have

\[ s = a \int \sqrt{1 - e^2 \cos \phi} \, d\phi \]

The integral calculus is, as yet at least, the only manner in which the arc of an ellipse can be approached: accordingly, a large class of integrals, closely related to, and containing among them, the expression for the arc of an ellipse, have received the name of elliptic functions.

By an elliptic function is meant any integral of the form

\[ P \int \frac{d\phi}{\sqrt{1 - P \sin^2 \phi}} \]

in which \( P \) is a rational function of \( x \). This can be shown to depend for its determination upon the form

\[ \int \frac{d\phi}{\sqrt{1 - n \sin^2 \phi}} \quad \text{and} \quad \int \frac{1 + n \sin^2 \phi}{\sqrt{1 - (n - 1) \sin^2 \phi}} \]

which in every case depends upon one or more of the three following forms:

\[ \int \frac{d\phi}{\sqrt{1 - e \sin^2 \phi}} \quad \text{and} \quad \int \frac{1 + e \sin^2 \phi}{\sqrt{1 - (e - 1) \sin^2 \phi}} \]

The earliest researches into the integrals connected with the arcs of an ellipse or hyperbola are those of Maclaurin, in his treatise on Fluxions, and of D'Alembert, in the Berlin Memoirs for 1746. Vagnani, in 1756, showed how two arcs of an ellipse might be assigned in an infinite number of ways, which should be by an ellipse subject to a given differential expression. Euler, in 1761, showed how to assign the complete integral of certain differential equations of which the terms are separately nothing but elliptic functions. Landen, in 1765, showed that every arc of an hyperbola can be obtained by means of two arcs of an ellipse. Lagrange, in 1775, gave a general method for approximating to the values of elliptic functions of all kinds.

But those to whom it is due that the theory of elliptic functions has become a distinct and important branch of the integral calculus, with general formulæ which bid fair to make it an extended form of trigonometry, are Legendre, Abel, and Jacobi. Of these, the first [Legendre, P. C.] almost devoted his life to the subject. His various memoirs, and the latest extentions of them, are contained in the two following works.

'Traité des Fonctions elliptiques et des Integrales Elliptiques,' 4to, Paris, vol. i., 1826; vol. ii., 1829; vol. iii., containing three supplements, 1826; and 'Exercices du Calcul Intégral,' 3 vols. 4to., Paris, 1811. Both these works contain extensive tables for the calculation of the functions.

The memoirs of Abel, the substance of some of which are in the third volume of Legendre, were originally published in Crelle's Journal, but are now collected in his works, which were published in French, 'Œuvres de N. H. Abel,' collected by B. Holmboe, Christiania, 2 vols. 4to., 1839. Jacobi's work is 'Fundamenta nova theoriae functionum ellipticarum, auctore D. C. G. J. Jacob,' Regiomonti, 1829, 4to. As to elementary works, there is some account of Legendre's first memoirs in the second and third volumes of Loyal's 'Mathematical Repository;' several works on the integral calculus, that of Mr. Hispen is peculiar, contain the first elements. There is a work on the subject expressly by M. Verhaul, printed in Belgium; and there is an article on elliptic functions and definite integrals in the Cyclopaedia Metropolitan.
lating angle; and let it be made to enter an oblique para-
lelopiped or rhomboid of glass perpendicularly by the
ends, the interfaces of two opposite sides of the rhomboid
to the ends being equal to the polarizing angle: the pencil of
light will then suffer two reflections, one from each of two
opposite sides of the glass, and it will emerge perpendicularly
to the opposite end. Now, if one of the sides of the rhomboid
are so disposed that the plane in which the two reflections take
place in it are coincident with, or at right angles to the plane
in which the pencil of light is polarized, no effect is produced
on the pencil, but if the rhomboid be turned on an axis
perpendicular to its two ends till the plane in which the two
reflections take place is inclined to the plane of the original
polarization in an angle equal to 45°, 135°, 225°, or 315°, the
emergent pencil will be found to be circularly polarized.

(2) Let the angles of incidence and reflection be such
that the planes of the prisms be any other angle than one of
these, excluding also the angles 0°, 90°, 180°, 270°, the pencil will be ellipti-
cally polarized.

Thus, if $y$ and $x$ be rectangular co-ordinates of a particle of ether,
in the former of the plane of the two reflections and the
other perpendicular to it; and if the plane of the reflections be
inclined at an angle represented by $a$ to the plane of polar-
ization; then the general equation for a vibration (supposed
to take place in a plane perpendicular to the plane of polariza-
tion), being $a \sin p (\omega - z)$, the resolved vibrations perpen-
dicular and parallel to the plane of reflection would be,

$$x = a \cos a \sin p (\omega - z)$$
$$y = a \sin a \sin p (\omega - z)$$

But the phase in the latter being conceived to be accelerated
by a quarter of a vibration, or 90°, when compared with the other
(\text{Airy's} Tracts, Und. Theo. art. 136), the last equation becomes

$$y = a \sin a \sin (p (\omega - z) - 90°)$$
$$x = a \cos a \cos (p (\omega - z))$$

which is the equation to an ellipse, and proves that the par-
ticles of ether are in the peripheries of ellipses. When
when $\omega = 45°, 135°, 225°, 315°$, we have another
form of the equation,

$$y^{2} + x^{2} = a^{2}$$

which is the equation to a circle.

If polarized light, after having suffered two reflections in the
glass paralleloiped, be made to suffer two additional
refractions in a similar paralleloiped, similarly situated, the
emergent pencil will be restored to a state of plane polariza-
tion; but the new plane of polarization will be perpendicular
to the former when the inclination of that former plane to the
plane of reflection is 45°, 135°, &c. This is explained
(\text{Airy's} Tracts, Und. Theo. art. 136), from which it follows that the
vibrations in the plane of the reflected rays are accelerated 90° by the first
paralleloiped, and another 90° by the second, while no ac-
celeration takes place perpendicularly to that plane. If the
inclination be any angle between those, and be represented
by $\alpha$, then the state of polarization will be inclined to one another in an angle equal
to $2\alpha$.

Sir David Brewster discovered that, when a pencil of plane
polarized light is reflected once from the surface of polished
metal, it acquires properties similar to those which arise from two
refractions of the light within glass. First, only a partial
polarization takes place in it when the metal is so disposed
that the plane of the incident and reflected pencil is coin-
cident, disposed, one at the top, and the other at the bottom,
left of the plane of the first reflection. He finds also that,
with steel, the major axis is to the minor axis as 22 to 12.

It has been proved that, in particular states of the incident
pencil, elliptic polarization may take place in which the
particles are symmetrically disposed; and that, in other
whoses whose particles are unsymmetrically disposed, elliptic
polarization is a necessary result. See General View of the
Undulatory Theory of Light, 1841.

ELLISTON, ROBERT WILLIAM, was born in Bloomsbury,
London, on the 7th of April, 1774. His father was a watchmaker, one of whose brothers was Master of
Sidney Sussex College, Cambridge. Young Elliston was
sent to St. Paul's school, and then to a grammar school
for reading: but, when he was the fourth boy, he ran away
from school, became for a few weeks a lottery-clerk at Bath,
and in that town, in April, 1791, appeared on the stage for the first
time, personating a very humble character in Richard the
Third. He then obtained an engagement in the company of Tate Wilkinson, at York; but, soon becoming tired of playing petty parts, he obtained through his uncle a reconciliation with his father, and secured a home. The transit of perfection was invisible.

In the season of 1826 he played regularly at Bath, undertaking characters of all sorts; and in 1796 he married Miss Randall, a teacher of dancing there. In June of that year he made his first appearance on a London stage, in the play of Haymarket, in the same evening, the part of Octavian, and that of Vapour in the farce of 'My Grandmother.' After occasional appearances in that theatre, and a temporary engagement at Covent-Garden, he became in the end of 1798 a member of the Company, and manager of the Haymarket. Next year he succeeded John Kemble at Drury Lane; but, after the burning of the theatre, he quarrelled with Thomas Sheridan and left the company. He now took on his own account the small house then occupied by the Citizens, in which he gave the name of the Surrey Theatre. There he and his company performed some of Shakespeare's plays and several operas, altering them so as to evade the licence of the patent theatres; and in 1805 he published his only literary effort, 'The Venetian Outlaw,' a drama in three acts, adapted from the French.

On the re-opening of Drury Lane theatre, Elliston, again a leading actor in his company, delivered Byron's address and performed Hamlet. In 1819 he became the least of that then living; in 1820, and this lease terminated in bankruptcy in 1826. From the date of that event he sunk into a subordinate position. After speculating in the Olympic theatre, he became again manager of the Surrey; and there, till the close of his life, continued occasionally to perform. He died of apoplexy on the 7th of July, 1831.

Elliston has been asserted, not without some show of reason, to have been the very best comedian of our time. Others surpassed him in particular excellences: but none united so many of the merits essential to eminent success in the highest walk of comic acting. So, likewise, he rose higher in tragedy than any other actor who was distinguished for excellence in comedy: he was admirable in those tragic parts which he either wrote himself, or adapted. The weakness and eccentricities of his own character have furnished to Charles Lamb and others the themes for an infinite fund of good-humoured rillery. His predominant fallacy was inordinate self-esteem. He was vain of himself as an actor, valuer of himself as a manager: and in both phases his vanity was continually breaking out in incidents which, while they were irresistibly diverting, exhibited a humorous whimsicalty, and a fervid sincerity of self-deceiving imagination, making him the most curious and the most kindlier of observers of human oddities who could exercise his scrutiny.

ELYMUS, a genus of grasses belonging to the tribe Hordeinae. It has 2 glumes, both on the same side of the spikelet, without awns or setae, with 2 or more perfect flowers, and the pistil 3. The following species of the genus have been described. Two only are natives of Great Britain.

E. ramosius, upright Lygeum grass, has an upright close spike, 2 to 4 inches long, not winged; the glumes lanceolates, downy, not longer than the spikelets. It is a coarse grass, common on sandy sea-shores; and, with other grasses, it sends down long fibrous roots among the sand in such a way as to prevent its moving about with the winds. On some parts of the coast immense stands are formed by this grass, and others, binding down the sands which are thrown up by occasional and successive high tides. Although this grass, according to Sir H. Davy, yields a large quantity of sugar, it is not fit for feeding cattle. Its root-cylinder may be used for making a cord for hurdles, and for other purposes requiring a tough fibre.

E. gramineus, perennial Lygeum grass, has a lax spike bent downwards; the rachis winged; the glumes awl-shaped, glabrous, longer than the spikelets. The stem is 3 or 4 feet high, and the spike 1 or 2 feet long, bent down in a remarkable manner at the summit. This plant is commonly called the awl-shaped Lygeum. It has been found near Gravesend. Most of the remaining species are natives of America, both North and South.

(Baglinton, Manual of British Botany: London, Encyclopædia Britannica.)

EMPLACEMENTS. The executors of a tenant in fee or in tail are also entitled to the emplacements as against the heir or heir in tail, but not as against a doweress or a deviser of tenant or fee, for the devise of the land carries with it the crops. Emplacements.

EMBICA, a genus of plants belonging to the natural order Euphorbiaceae. It has monocious flowers; the calyx 6-parted; 6 stamens combined; 3 styles dichotomous; the fruit fleshy, trilocular, 6-seeded.

E. officinalis is a native of most parts of India. It is a tree having a crooked trunk, with branches thin and scattered in every direction; the male branches spreading and opening. The leaves are alternate, spreading, 1 or 2 feet long, and about 1 or 2 inches broad: the stipules small, withering; the flowers minute, of a greenish colour; the fruit a drupe, triangular, ovate, 3-celled; the seeds 2 in each cell. The bark of this tree is astrignent, and is used in India as a remedy for diarrhoea. The fruit is acid, and tastes astrigent, and when the juice is mixed with oil of vitriol, it is a very good astrigent. This plant is the Physiologus, Embica of Linnaeus; and Myrobulanus Embica of Bankes. (Lindley, Flora Medica.)

EMBOSSED is the art of producing raised figures: patterns upon wood, metal, paper, cloth, or other materials, by a stamping or press, or in a more gradual manner, as by an ordinary screw or hydraulic press, or by revolving cylinders. The pattern is usually produced by forcing the face of the material to be embossed against a graving in which the design is cut or otherwise formed in intaglio; and sometimes, when the article to be embossed is in the form of a sheet, a counterpart to the die, often made of lead or other soft metal stamped by hand itself, is applied at the back to to be consumed and cut into a parts heat is employed during the operation with great effect.

The embossing of cloth for book-covers—an important branch of this art—and the process of stamping the cover of most books, is described in Dr. Ure's 'EncyclopædiaBritanica,' 2d ed., p. 221; and in Dr. Ure's 'Dictionary of Arts' under the title 'Embossing of Cloth,' is a full description, illustrated with engravings, of a machine for both embossing and printing silk, cotton, or woolen cloth, paper, or other fabrics, in one or more colours by one or more cylinders, one or more metal cylinders or rollers, either of which may be employed for embossing or printing, or for performing both operations simultaneously. These cylinders or rollers are arranged round, and driven by a common cylinder or drum: the paper or paper of cylinder (Caledonius, P. C. S. p. 268) round which the fabric to be embossed is caused to pass. A soft cloth, or felt, is applied round the surface of the paper cylinder to answer the purpose of what a printer technically styles blanketing, and a smooth iron roller is provided to roll in contact with the paper cylinder, so as to remove any impression which it may receive, through the fabric operated upon and the blanketing, from the embossing roller. In embossing paper, however, this surface or device must be exceedingly smooth for writing or printing, or else executed in recess or intaglio. The patterns produced by the former kind of roller, though commonly called embossing, do not strictly accord with the definition above given, which conveys what appears to be considered the strict sense of the word.

A very curious process of embossing wood, communicated by Mr. Straker to the Society of Arts in 1824, and described in the forty-second volume of their 'Transactions,' p. 53, is employed for saving the expense of carving, and for its importance for the engraving of raised figures on wood, such as are employed in picture frames and other articles of ornamental work, are usually produced either by means of carving, which is an expensive operation, or by applying to the plain surface of the wood some design or ornament, imprinted in fresh composition, a plan which is not always available. His invention, which he proposes to employ either alone or in con-
juncture with ordinary carving, depends upon the fact, that if a depression be made upon the surface of wood by a blunt instrument resembling an old fanner's blade, and the latter being taken away any portion of it, such depressed part will again rise to its original level if the wood be subsequently immersed in water. He therefore proposes to draw the required pattern upon the surface of a piece of wood previously cut to the required form, tie a length of silver thread round the blade, dip the latter into water, and immerse the whole in a spirit of amber, or die to all those parts of the pattern which are intended to be in relief, so as to form depressions in the surface of a depth equal to their required prominence. In doing this, care must be taken by the artist driving the instrument to a depth about one third of the grain of the wood. The whole is then to be planed or filed down to a uniform surface, after which the wood is steeped in hot or cold water, by the action of which the parts previously depressed will rise to their former level. The parts that remain depressed may be filled in by the ordinary operations of the carpenter. [CARVING, P. C. p. 331.]

Very beautiful ornaments of embossed leather, available in lieu of carving for architectural decorations, medallions, picture-frames, cabinet-work, and similar purposes, have been recently produced by a process patented in 1859 by M. Claude Schruth, and thus noticed by Dr. Urse in the Supplement to his 'Dictionary of Arts,' with a reference to the twenty-five subjects of ornamentation by which it is enabled to ornament and emboss leather, which may be finished by the ordinary operations of the saddler. [CARVING, P. C. p. 331.]

The leather is beaten soft in water, then wrung, pressed, rolled, and felled as it were, by working it with the hands in the course of passing them over the work, which is laid on the mould, and forced into all its cavities by means of a wooden, bone, or copper tool. In other cases the embossing is performed by the force of a press. The leather, when it has become dry, is easily taken off the mould, however deeply it may be inserted into its crevices, by virtue of its elasticity. The elasticity which thus enables the leather to be removed from a mould which is undercut is also important as a means of preserving the ornaments from injury by friction. The most essential difference between these two kinds of ornamental work done with the needle, thus comprehending within its meaning every description of decorative needlework, including tapestry, and some descriptions of weaving. At the same time the union of one is usually limited, relating to the kind of needlework only, which however embraces an almost innumerable variety, both as to the materials employed and the mode of using them. The word, she observes, appears to be derived from the French broderie, which some deduce from transposition from border, signifying the use of the term to arise from the circumstance that embroidery was formerly applied only chiefly to the borders of stuffs; and, according to its present acceptance, it is the art of adding to the surface of any material a texture or representation of any object we wish to depict, through the medium of the needle, threaded with the material in which the work is to be executed. [EMBROIDERY, P. C. p. 49, some remarks will be found upon the history of the art, and upon the peculiar characteristics of the embroidery of various nations, much fuller information is contained in the work above referred to (pp. 185-190), and in the account of the Needlework of Wilton (pp. 342-354). In the former work there is also a description of the mode of executing various kinds of embroidery, in some of which a very rich effect is produced by inserting pieces of cotton wool, or slips of parchment, to suit the pattern which forms the foundation upon which the embroidery is executed and the threads of silk or other material of which the pattern is formed, so that the embroidery may be raised considerably above the surface. Gold and silver thread, or silk, is often used in the same way, and spangles or tinsel are occasionally mixed with the needlework. The fabric to be embroidered is usually stretched in a kind of frame or loom, and the pattern is drawn either upon its surface, or, if it be very transparent, upon a piece of paper applied underneath it.

Although embroidery has, until within the last few years, been a purely hand-embroidery, chiefly cultivated for its own sake as a tasteful and elegant occupation or amusement, it has latterly assumed the character of a manufacture, a most ingenious machine for executing it having been invented by M. Holl, of Mülheim, the inventor of the invention, or as it is said to enable a female to embroider any design with 80 or 140 needles as accurately and expeditiously as she formerly could do with one, a minute description, illustrated by an engraving, is given in Dr. Urse's 'Dictionary of Arts,' article 'Embroidering.' An early description of the machine was exhibited in Paris at the national exhibition of works of industry in 1854, where it excited much attention, and that within a very few years it had been brought into use in France, Germany, and England. The work produced is calculated as it necessarily is, the price of a machine for working 120 needles was estimated at not more than 6500 frs., or 200, and such a machine is capable of performing daily the work of fifteen expert embroiderers employed at the ordinary rate. It requires the labour of about 200 of these to tend the work, and of two children to change the needles when their threads are used, and to watch continually for any irregularities of action which may need attention.

Referring to the mechanism by which the several movements are accomplished, we may briefly explain the principle on which it acts. The needles, which are pointed at both ends, and have their eyes in the middle, so that they need not be turned round between each stitch, have wire cords passed through them, which are pushed forwards by the action of small pinners, of which there are two pair to each needle, one on each side of the web, each pair being alternately employed in pushing and pulling the needle through the web. As soon as the needles are passed completely through in either direction, a kind of carriage or frame, which carries the series of pinners by which they have been drawn through, begins to move along a railway so as to draw the needles to the full length of their threads, after which the carriage returns to its starting point, and the pinners put the needles again through the web, to be received on the opposite side by the other set of pinners, which then retire with them in like manner. So far as the action of this part of the machine can affect the matter, the needles would continually pass through the same holes in the web; but to enable them to pass through it at different points in succession, according to the pattern required, the web itself, which is placed vertically in a frame furnished with rollers on which it can be wound, or unrolled, with the needle's frame fixed on the opposite side of the web, is situated in such a manner that the machine moves forward and works downwards. By this means every needle of the series produces a distinct and separate copy, on a small scale, of the pattern, the arrangement of the stitches being precisely according to the movements of the pinners. [EMBROIDERY, P. C. p. 49.]

EMBRYON (εμβρυον), properly the young of an animal while still in the mother. The Embryo is that part of the seed in plants which in the course of its development becomes the young plant. [EMBRYON, P. C. C., p. 331. The articles Fucus, EMBRYON, EMBRYON, etc., etc.]

The structure of this part of the plant has been given. Its origin, development, and functions have however been recently the object of investigation. In the early stages of the growth of the egg, the only solid object is a spheroidal mass of protoplasm; this mass, which is composed of cellular tissues, is called the nucleus; as it develops itself, a distinct cavity is observed in its interior, which is called the sac of the embryo.
The contact of the pollen with the stigma, this sac disappears, and an embryo is found in its place. The principal points to which attention has been recently directed are, first, the determining cause of the growth of the embryo, and, second, the mode of its development. Without denying that it is now well established that the pollen, by means of its tubes, passes from the stamen to the pistil and at last coming in contact with the ovule, produces the growth of the embryo. But the question still arises as to whether the pollen-tube, after entering the ovule, penetrates the ovum or otherwise affects it. Schleiden, who must be ranked amongst the greatest physiological observers of the present day, says that if the pollen-tubes be followed into the ovule, it is found that they do not enter it, but merely penetrate the intercellular passages of the nucleus and reach the embryo-sac, which being forced forward, is pressed and indented, and by its folding forms the embryo in the first stage of its 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 exterior to the embryo-sac and of the embryo when it is just within it. 2. The irrevocable chemical similarity of their contents shown by the reaction produced by the application of water, oil of sweet almonds, iodine, sulphuric acid, and alkalies. The general connexion of the germination of the seed with the growth of the plant, and this 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, as is seen by the action of alcohol on it. The force of this, by an organising process, the cells are produced which fill the end of the pollen-tube, extending in Orchis Morio far beyond the ovule, and thus forming the parenchymen 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. These views of Schleiden, with his conclusion that the pollen-tube is the embryo in all cases, have been represented to the female than of the male in the animal kingdom, and have been adopted by Professor Wydler of Berne, who did not however observe the folding-in of the embryo-sac described by Schleiden.

On the other hand, observations have been made in France, by MM. Mirbel and Schiap, on another class of plants, in which they did not meet with the structure described by Schleiden, and consequently they object to the general applicability of it. They explain the development of the ovule of the Zoa Mayos (common maize). In this plant there is no true embryo-sac, but they found the commencement of the embryo, which they call the primary utricle, and which is placed as the nucleus, as an involution of the sac, existing in the cavity of the nucleus. In this peculiar also, only one, and not two membranes, as described by Schleiden, existed in the embryo. They also found in other plants the primary utricle existing in the interior of the embryo-sac, and at a period anterior to the act of impregnation. They therefore conclude that the pollen-tube does not become the embryo, and that no involution of the embryo-sac takes place. Their conclusions are probably as much general as those of Schleiden.

Mr. Griffiths, in a paper recently published in the Linnean Transactions, gives the result of a long series of investigations on the development of the ovule in the genera Santalum, Oyrias, Loranthus, and Viscum. From his observations on these facts derived from those described by Schleiden and Mirbel and Schiap, he has arrived at conclusions somewhat different from those of any of these observers, and he carefully refrains from drawing an inference from the facts which account of a utricle that would apply to the animal kingdom. 'The first process,' he says, 'in the development of the seed subsequently to the penetration or application of the pollen to the embryo-sac would, in Santalum, Oyrias, Loranthus, and Viscum, appear to consist of the formation of cellular tissue. This may be applied, he believes, to most if not to all instances. This cellular tissue appears to have two different origins; one, and this is the earliest in development, being perhaps referable to the embryo-sac, and the other to the extremities of the pollen-tubes.' Thus far be agrees with Schleiden, that the pollen-tube penetrates into the embryonic sac, and that the embryo is derived from its intruded extremity, his observations on Santalum and Loranthus confirming this fact, whilst Oyrias is an exception confirmative of the role, 'But none of my observations,' says Mr. Griffiths, 'have tended to confirm Schleiden's hypothesis, that the pollen-tube, after the pollen-tube; and it appears to me sufficiently obvious, that if such were the case the cylindrical bag (the primary utricle of Mirbel), constituting the embryo in its first stage of development, would consist of three membranes or layers, viz., the innermost, or center, of the ordinary utricle, the third, that of the pollen-tube itself.' He also expresses his conviction that the primordial or primary utricle of MM. Mirbel and Schiap, which is chiefly derived from the embryo, which no doubt often and perhaps generally exists before fertilisation.

Dr. Giraud, who is one of the latest observers on this subject, has published a paper in the same volume of the Linnean Transactions. He wrote a series of observations upon the ovulum of the Tropeolum majus, and conducted his experiments with a perfect knowledge of previous investigations, except those of Mr. Griffiths, which, having been made in India, were not published in England till after those of Dr. Giraud. He concludes from his observations on the Tropeolum majus, 'that in this plant the primary utricle and the future embryo never have any structural connection with the extremity of the pollen-tube at their first origin, or at any subsequent period of their development,' and further, 'it is evident that the fact that the pollen-tube is never brought into contact with the embryo-sac. As the primary utricle makes its appearance before imbibition has occurred, it cannot be possible that the organ has ever formed the extremity of the pollen-tube, and the power which produces the formation of the organ as the primary utricle takes its origin wholly within the embryo-sac, and at the earliest period of its formation is not in contact with that membrane, it cannot have been formed by the pollen-tube passing before it a fold of the embryo in its passage into the cavity of that structure, as Schleiden has maintained.' It is very obvious from the facts above stated that botanists are not yet in a position to give a general expression for the origin and mode of development of the embryo.

The function performed by the embryo during its growth, is attended with different effects from those of the ordinary growth of the tissues of the plant, and it has been generally described as a different process, under the name of germination. When a seed is placed in a moist situation sufficiently warm, and with access to air, the following phenomena, according to the researches of De Saussure, and the more recent ones of Boussingault, take place:—1. Absorption of oxygen. 2. Decomposition of the carbonic acid; 3. A disengagement of ammonia; 4. Conversion of starch into dextrose, gum, sugar, &c.; 5. Increase in bulk, and growth of the embryo. All these phenomena were supposed to be connected with the growth of the embryo, and the absorption of oxygen and the disengagement of carbonic acid gas were regarded as an act of life and as necessary to the process of germination. From this point of view germination and vegetation, the growth of the plant, were stated to be antagonising processes, the one being a respiratory, an oxidizing process; the other a decomposing, a deoxidizing process. At the same time the albumen of the seed was regarded as the sole source of nutriment for the growing tissues of the young plant, (Giraud, p.c.) From his paper read before the British Association, July, 1845, Dr. Lankester proposed a new theory of the phenomena of germination. It is obvious that the only essential process of germination is the growth of the young plant or embryo. The process of development of the embryo from primitive cotyledons, is precisely the same as that of every other part of the plant, and from an identity of structure Dr. Lankester inferred there must be an identity of function, and all that he regards as being essential to the growth of the plant are different from processes, which are peculiar to the embryos of the different plants, and which are not explained by the old theory, as follows:—

1. In many plants there is little or no perisperm or albu-
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2. Many plants with horzy and hardened pedicels, as the Phytelaphus macrocarpus, the Phvctiis deutetix, and species of Betcrr, Coccs, and Astrococ?cum germinate, without consummation, and in the following season, the young plants are abundant. The Phytelaphus macrocarpus, in particular, is capable of producing large numbers of young plants in a single season.

3. The quantity of carbonic acid obtained by De Saussure varied not according to the number, but according to the mass of the seeds, proving that it arose from the decomposition of the embryo, and not from the growth of the embryo as a process of life.

4. De Saussure found that the relation between the oxygen consumed and the carbonic acid given out was different in different plants, but this relation ought to be constant if the intensity of oxidation or combustion during germination be correct.

5. Bousignault observed that the changes supposed to be peculiar to germination went on in the peripetalum after the young plant had developed its radicle and plumule, and was capable of an independent existence.

6. The changes which take place in the chemical composition of the peripetalum of the seed during germination can be artificially produced by mixing starch and protein (diastase) together, and exposing them to the action of the atmosphere. This theory modifies the view which is mostly taken of the use of the albumen. It does not appear to be deposited entirely for the use of the young plant, but in many cases is merely stored, and then used in the preparation of the embryo that the wood of a branch does to the buds which grow upon it.

Another point of interest with regard to the function of the embryo has been already discussed, and that is the influence of electricity on its development. These experiments have been lately conducted by Mr. Edward Solly. In a paper recently published, he says, 'Out of a series of 55 experiments on different seeds, 20 appeared in favour of electricity, 10 against it, and 25 showed no effect whatever; and on carefully counting the whole number of seeds in the entire series, there were found 1250 of the electrified, and 1253 of the non-electrified seeds up.' From these and other experiments there can be little doubt that the asserted influence of electricity on the germination of seeds has been admitted on insufficient evidence, and that we have no proof at present that electricity under any of its forms, when artificially employed, exerts any influence on the growth and nutrition of plants.


EMPHYSEUSIS (Emphysema). The term expresses in the law a permission to the enjoyment of land on condition of paying annually a fixed sum (canon, pension) to another person who was considered the owner of the land. This relationship of occupier and owner was found on contract, which in the later empire received the name of contractus emphyteuticus. The occupier was called emphyteutus.

The title of the emphyteutus depended on his paying what he had contracted to pay, and also all the taxes to which the property was liable. If he neglected to pay these duties for three years he might be ejected out of the land by the owner, without having any compensation for his improvements. He could alienate the land after giving notice to the owner, who might, however, if he pleased, take the land at the price of the emphyteutus, and which he could claim in any person who was able to answer all the demands to which the land was subject by virtue of the contract. In each case the owner was bound to receive the purchaser as his emphyteutus, and to receive any payment which he had claimed in the payment not exceeding a fifth part of the price at which the land was sold.

The relation between the emphyteutus and the owner originated, as already stated, in contract. The owner could also alter this will.

This kind of contract is first mentioned in the case of Agri Vegetalae, that is, lands which were leased by the Roman state, by towns, and by other corporations both civil and ecclesiastical. This Agri Vegetalae, which seems to be first distinctly mentioned about the time of Hadrian, appears to have been formed after the analogy of the old Ager Publicus. The Digest is the oldest extant authority in which the term Emphyseusis occurs. The use and enjoyment expressed by the word emphyseus were always carefully distinguished from ownership; the emphyteutus was a perpetual lessee who enjoyed the use and enjoyment of a perpetual term.

The subject of the emphyseus is discussed Dig. 6, tit. 3; Cod. 4, tit. 66; Mühlenuhr, Doctrina Pandemarum: Savigny, Das Recht des Besitzes, p. 99, 3rd ed. EMP EMP (Spurina, from, 'in, and vice, 'pus,' a word which may be compared with Internus, Stomachus). Although this term was restricted by the antients to purulent collections in the lungs, it is now employed to signify all collections of fluid in the pleurs which do not arise from an obstruction to the air passages, but are passive, and have a gaseous nature. In a natural state the pleurs, like other serous membranes, secretes a clear fluid, which is removed by absorption as quickly as it is formed. But from the existence of inflammation or the presence of foreign bodies, other fluids often accumulate. The most common of these are serum, blood, pus, and fibrinous matter. Any of them may be present alone, or may be mixed in varying proportions. It is however almost impossible to ascertain by any internal means the nature of the fluid. Dr. Townsend relates two cases of empyema: in the one, a case of two months' standing, produced by the bursting of a tuberculous abscess in the lungs; on the fluid being removed, it was found to be composed of a fibrinous matter, which, arising from the same cause, a perfectly transparent and purulent fluid was found. It is therefore not only difficult to discover the nature of the fluid, but the same exciting cause may give rise to the presence of different kinds of fluid.

Whatever may be the cause, if the fluid which runs in the lungs, it always exists in conjunction with a peculiar state of the pleurs. This membrane is covered over a greater or less extent with a fibrinous secretion, which, in this and other cases becoming organised, constitutes what are called membranous or false membranes. This fibrinous matter is sometimes deposited in so large quantities on the pleurs, which covers the lungs, that even after the fluid is removed, the lungs which have been compressed, cannot expand, and consequently the action of one complete inspiration is in vain. The fluid and contraction of the chest is produced. The false membranes thus produced are liable to various diseases, and they may inflame, ulcerate, or become calcified, and thus produce various secondary diseases. Sometimes a part is thrown off from one side of the cavity of the pleurs to the other, and a case is related by Dr. Townsend of a person 'in whom the effusion was divided by these partitions into three compartments, so perfectly distinct from each other, that bad the operation of cutting between them been performed, the fluid only could have been evacuated into which the incision had been made; so that in order to draw off the entire effusion it would have been necessary to perform three separate operations.'

The worst effect of the presence of fluid in the pleurs is exerted on the lungs. By its pressure the lungs become incapable of expanding for the admission of air. Its position is generally by the side of the spinal column, but through the depression of the fibrinous matter, the more convex lobe and of the ribs often contract adhesions, and in this manner the lungs may be forced to occupy very varied positions in the cavity of the thorax. When the effusion is extensive, the lungs becomes flattened and fuscous, its surface is corrugated, and its tissue becomes soft, pliant, and dense, exhibits no contrition, and is almost entirely deprived of blood. It does not often inflame in this state, but frequently becomes the seat of the dependance of tuberculous consumption, and only could have been evacuated into which the incision had been made; so that in order to draw off the entire effusion it would have been necessary to perform three separate operations. It is not often inflame in this state, but frequently becomes the seat of the dependance of tuberculous consumption, and only could have been evacuated into which the incision had been made; so that in order to draw off the entire effusion it would have been necessary to perform three separate operations. It is not often inflame in this state, but frequently becomes the seat of the dependance of tuberculous consumption, and only could have been evacuated into which the incision had been made; so that in order to draw off the entire effusion it would have been necessary to perform three separate operations. It is not often inflame in this state, but frequently becomes the seat of the dependance of tuberculous consumption, and only could have been evacuated into which the incision had been made; so that in order to draw off the entire effusion it would have been necessary to perform three separate operations. It is not often inflame in this state, but frequently becomes the seat of the dependance of tuberculous consumption, and only could have been evacuated into which the incision had been made; so that in order to draw off the entire effusion it would have been necessary to perform three separate operations.
tussion and oedema of the integuments; dulness of sound on percussion, and absence of the respiratory murmur on the disea-
sed sides; palpitation of the heart, displacement of the heart;
prostration of the abdomen; a harassing short cough, small rapid pulse, and the other symptoms of hectic fever; and a sound on speaking like the bleed-
ing of a goat, but this only occurs when there is a thin strin-
tum of fluid in the pleura, and it is absent when the em-
pyema is extensive. The intensity of all these symptoms is
so great as to occasion a variety of fluid effused, the persis-
tion of the disease, and the constitutional strength of the pa-
ient. The difficulty of breathing is in proportion to the quantity of fluid which presses on the lungs. The ab-
intestinal parts are sound sides from the reception of the
fluid upon the sound lung when a person lies so that its
weight comes directly upon it. The cough is not a constant
symptom, and may be entirely absent where there is no in-
fammation of the lungs or bronchi. The hectic symptoms
will vary according to the strength of the individual and the
duration of the disease. Night-sweats do not occur in con-
junction with the other hectic symptoms in empyema, unless
the lung is in a state of tuberculous ulceration.

The removal of the fluid by aspiration or operation, as
was practised in empyema, is likely to be
confounded. Its general symptoms resemble those of
tubercular phthisia, but the history of the disease, and more
particularly the stethoscopic signs, will point out the distinc-
tion. In phthisia there is no displacement of the heart; absence of
the sounds in the lungs is less frequent than in the heart; the
lung, and is followed by nucule rale, pectoriloric. 

Hepatization of the lungs has been referred to as likely to be
confounded with empyema, but this is so rare a disease in a
chronic form, as to render it unnecessary to point out this dis-
tinction between the two diseases here. The same remark
applies also to tumors in the sac of the pleura, which, al-
though they have been recorded, are too rare to need a de-
scription. Enlargement of the liver, with that organ press-
ing upon the diaphragm and lungs, might present the same
symptoms as in empyema, but a careful examination in con-
junction with hepatic symptoms would soon indicate the di-
agnosis.

The treatment of empyema may be of two kinds, medical
and surgical. The general principles on which the first should
be conducted are those which would be applied in pleuritis
[Pneumonia, P. C.] It however often happens that the re-
sources of medicine fail, and that no other chance of relief can
be offered the patient than that of drawing off the effused
fluid by means of an operation. This is called the operation
of empyema, or paracentesis thoracis. This operation, al-
though in modern times it has got much into disrepute, was
promoted by Hippocrates (Hipp. 'De Morbis,' lib. II. 575: Gal-
nius, 'Opera,' lib. III. 174: Asp. 'De Medicis,' lib. I. 145: Dr.
mine, 'Surgical,' vol. I. 132: Dr. Cooper, 'Lectures,' vol. II. 931)
for the relief of the chest, and for the removal of pus and
surgery, with apparently much success. It has recently been
recommended, especially by Lennec, in cases of empyema
which do not offer a chance of being cured by medical treat-
ment. In such cases, where all other remedial measures
have been tried, there seems an increased conviction that this
operation may be had recourse to with every chance of benefit;
and cases have now been recorded, both in the practice of the
luban and English hospitals, in which a large proportion of
those operated on have recovered. Another class of cases to
which paracentesis has been recommended, are those in
which the empyema is dependent on acute inflammation of the
pleura, and in which the fluid accumulates so rapidly as to
threaten the immediate removal.

In the performance of paracentesis, the most eligible spot
for the operation is between the fifth and sixth, or the sixth
and seventh true ribs, at the point just in front of the indig-
trations, which remains prominent; but the line may not be
drawn on one side, if it is intended that the wound should
close after the operation, and the incision through them should
be about two and a half inches long. The intercostal muscles
will thus be exposed, and should then be cautiously divided:
and when the pleura is exposed, a purse-string suture should be
made in it. In dividing the inter-
coastal muscles, the knife should be kept close to the upper
edge of the lower rib, in order to avoid the risk of wounding

the intercostal artery, which runs in a groove upon the lower
edge of the upper rib. The size of the opening into the pleur-
a is generally half an inch; and the greater vessels must be
avoided. A canula, supplied with a stopper, should then be in-
truded and kept in the wound, so that the whole or a part of the
fluid may be drawn off.

(From Practical Medicine, article 'Empyema'; Cooper, Dictionary of Surgery; First Lines of Surgery.)

ENAMELLING. [ENAMEL, P. C., p. 384.] To what
is stated on the subject under the above head we may add a
few words upon the process which has been extensively pro-
vided for the covering of the teeth, by means of various other
hollow articles, such as capescur and other culinary and

domestic utensils. The superior cleanliness of such articles,
and the security which they afford against any metallic
mild, has led to the ready acceptance of them in domestic
operations in cookery and confectionary, and for the preparing of
pharmaceutical decoctions, extracts, &c.

A patent was obtained in 1799 for two modes of perform-
ing this process, by Dr. Hickling, of whose specification Dr.
Urs gives as abstract in the 'Supplement' to his 'Dictionary of
Arts, &c.; but though the manufacture of enamelled ware
was carried on for some time under this patent, it was at
length given up, for want, it is said, of due encouragement.

Dr. Hickling, in his 'Supplement,' 1847, describes these
modes, also describes a process patented by Mears.
Thomas and Charles Clarke, in 1839, for applying enamel
lining less liable to crack or split off with the action of fire
than that commonly used. According to their specification
the process is to cut the teeth to the shape of the saucers,
place them for three or four hours to the action of dilute sulphur
acid, and then boiling them for a short time in pure water.
The first enamelled composition is then applied. It consists
of 100 lbs. of calcined ground flints, 18 lbs. of glass
refined, and finely ground with the flint. This mixture is
fused and gradually cooled, after which it is to be ground in
water with the addition of one-eighth of its weight of potter's
clay, until the mixture forms a mass of a paste consistence,
which will later be ground and mixed up with the enamelled
for the inner surface of the vessel about one-sixth of an inch
thick. This coat is set by placing the vessel in a warm
room, after which, while it is yet moist, the second or glazing
composition is poured slowly and evenly over it in the form of
a dry powder. This glazing composition consists of 136 lbs.
of white glass (without lead), 30 lbs. of borax, and 50 lbs.
of soda (crystals), all pulverized together, vitrified by fusion,
ground, cooled in water, and dried. To 45 lbs. of this mix-
ture 1 lb. of soda is added, the whole being then mixed to-
gether in hot water, and when dry, ground to prepare it for
slitting on the vessel as above stated. The vessel is then
dried in a stove at a temperature of 242° Fahr., and sub-
sequently heated gradually in a kiln or muffe until that
product is carried on the enamelled; leaving a fine film of the
material on the surface. The enamelled ware is then
kept in the kiln, with the addition of lead, until the enamelled
ware is in its complete form.

The use of glazed porcelain in such applications, for the
purpose of passing water and gases, as well as for the advan-
tage of being held in the hand of the patient, is also recom-
manded. The parts of the patent were not patented in
the Court of Exchequer. From the evidence on the trial it
appeared that the process of cleaning with sulphuric acid
was abandoned by the patentee.

The process of glazing occurs might be made by Dr. Hickling's specification of 1799. 'In fact,' observes Dr. Urs, 'the formulae by which a good enamel may be compounded are almost innumerable,
so that a patent for such a purpose seems to be unimportant, or
leaders, leading, or being abandoned, or being abandoned.

The patent poses delusive properties, owing to the presence
of lead, which was found in some of the earlier wares made
under Clarke's patent, before the use of glass containing lead
was avoided, and litharge, or oxide of lead, had been
imported from Germany. Now, however, the use of lead in this
kind of ware, which is extensively manufactured in Peru, Gleu-
prohibited, is likely to be the source of great mischief.

ENWARE, a country in Afric, south of Abyssinia, was
visited by the Portuguese Antonio Fernandes, in the
seventeenth century. Modern travellers have not yet pro-
strated so far inland, but they have collected information
respecting it; according to which, this country is situated

...
Thus genus P from Vicabam, and long extend the family. As familiar genus and a Aba!, die the spoken the "ENCAUSTIC of leopards, as chalk. judgment a magnitude appears the distance, extended edible and one of them is used for dyeing black. But the most remarkable of these trees is the coffee-tree, in that and which the wood is used as fuel. According to a tradition prevalent in Abyssinia, according to Niebuhr (Correa, P. C., p. 521), this tree was brought to that country from Abyssinia; but as no extensive plantations of coffee have been found in Abyssinia by modern travellers, it is very probable that it has been transplanted from Enarea to Africa, or perhaps from Kaffa, a neighbouring country lying farther to the south, where it is also found in an indigenous state and in great quantity, though less extensive. Enarea also contains many attar trees, and a variety lying between 13 and 14 feet. Elephants, giraffes, and buffaloes are stated to abound, as well as many other kinds of wild beasts. The civet (Viverra civetta) is so numerous that civet forms an important article of exportation. Gossenkool ascends upon the part of the country, or brought to some more distant part of Africa. The capital of Enarea is Sakkia, which appears to be a considerable place not far from the banks of the river Kibbe, and is visited by caravans which come from Assoo and Gondar in Abyssinia. The Abyssinian merchants bring to Sakkia rock-salt, which, under the name of Amolh, constitutes the currency of the country; beads of different kinds, several kinds of dried cotton-goods, copper, daggers, knives, guns, and cotton-goods, are obtained from Enarea coffee, musk, slaves, gold, and the skins of lions, panthers, black leopards, and antelopes; also ivory and horses. The inhabitants of Enarea belong to the widely-spread nation of the Galla; and their language is so similar to that which is spoken by the tribes of the Galla subject to Shoa, that they understand one another without difficulty. A small portion of the population and the royal family have been converted to the Islam by the Mohammedan merchants who visit their country from their creeks upon the coast of the interior of Africa. But the larger number of the inhabitants are still heathen. It is said that among them a small number of Abyssinian Christians are found.

(Monatsberichte über die Verhältnisse der Gesellschaft für Völker- und Welt-Bildung zu Berlin; Lensberg's and Kraft's Travels in Abyssinia.)

ENCAUSTIC TILES AND PAVEMENTS. [Tiles and Pavements, P. C. S.]

ENCODUS, a genus of fossil Cycloid fishes, from the chalk. (Aptian.)

ENDOCARP. [Purcell, P. C. S.]

ENDOGENITES, the name for certain fossil plant-stems, as E. crossi, from Titikka. (Mantell.)

ENDOWMENT. [Winer, P. C.; Vicarage, P. C.]

ENEMY. [Allen, P. C.]

ENFRANCHISEMENT. [Coffthold, P. C. S.]

ENGRAVINGS. [Coffthold, P. C. S. and P. C.]

ENLARGEMENT OF OBJECTS. The mind forms a judgment of the apparent magnitudes of visible objects chiefly from the angles subtended by the eye at their principal linear dimensions; but many circumstances render that judgment erroneous, and create illusions respecting apparent magnitude of which it is important to be aware.

When objects are near a spectator the forms and colours of their parts usually afford distinct perceptions of them; and since, in proportion as the objects are more remote, the quantity of light reflected from them to the eye diminishes, the perception of the line becomes dulled. Hence, indistinctness of form and colour being in the mind associated with remoteness, when from any cause an object appears indistinct, and at the same time to subtend at the eye an apparent area of the same size as when it is usually seen at a greater distance, the imagined remoteness gives rise to a perception of increased magnitude. It is thus that a well-known object, as a man, seen by night or through a fog, appears to be much greater than it would be if seen at an equal distance by daylight or in an atmosphere free from vapour. For a like reason, the image of an object, as a man in dull-coloured clothing, when seen at a distance against a bright sky, seems greater than in other circumstances it would be at an equal distance; for the sensibility of the eye being diminished by the surrounding brightness, the object is obscurely seen.

The parts of space about a spectator extending indefinitely in every direction from the surface of the earth, and the human eye being incapable of appreciating differences between distances of these objects, it follows that, like as a long straight wall seen at a small distance from its front appears to be a circular arc, the figure of the sky must be, apparently, a portion of the concave surface of a sphere. Now a series of objects beyond one another give indications of distance, and the imagination may obtain on looking along nearly level ground towards the horizon, while the absence of intermediate objects between him and the part of the heavens above his head, whether the sky be unclouded or completely overcast, will lead him to imagine that the summit of the celestial vault is comparatively near him. Thus the apparent figure of the vault is a segment less than a hemisphere; the ratio of the vertical height to the declivity of the base being about as 1 to 3 or 4. It follows that a plane image of the earth's surface will not appear as a sphere, unless the heavens near the horizon would make with the latter an acute angle; and, if we form our estimate of the magnitudes of the sun and moon, or of the distances between stars, by their projection on the sky, it is evident that the apparent disks or spaces will appear greater near the horizon than near the zenith, particularly in directions tending towards the zenith. This is conceived to be, in part, the cause of the apparent enlargement of the sun and moon, and of the distances between stars. But the apparent diminution of the magnitude of an object in this illusion is strengthened by the false judgment which is made of magnitude on account of the perception of a great distance horizontally. Some part of the effect, moreover, may be due to the diminution of the brightness of the celestial bodies on account of the light lost by the rays passing through the denser part of the atmosphere and the vapours in the horizon: small stress should however be laid on this circumstance, since, on looking at the sun or moon in the horizon through a tube which allows nothing but the celestial body to be seen, the illusion vanishes, though the diminution of tint remains. The apparent magnitudes in the horizon, when measured by a micrometer, are rather less than they are when observed near the zenith.

The visible magnitudes of luminous objects, as the sun, the moon, or the planets, are probably at all times greater than the geometrical magnitudes, on account of the imperfection of the eye: If a spectator who is very short-sighted looks at the full moon, and another at the same object, the latter will make up of a great number of moons surrounding, and partly overlaying one which appears to be in the centre, so that the diameter of the compounded image is more than double the simple diameter of the moon; but the image is apparently restored when such spectator places before the eye a concave lens of a certain curvature; but an enlargement of the disk still exists to a certain degree, probably, ever for those eyes which are considered as in the most natural state.

An apparent diminution of the magnitudes of objects with which we are familiar takes place when they are seen in situations which lead us to consider them as nearer to us than they really are, and this may be exemplified by what is known to occur when men, horses, &c. in a country seen from the top of a high building, or when a man standing on a high building is seen from the ground. The error of judgment may be rectified by frequently viewing such objects in the like circumstances, for it will at length be found that they appear in such situations as large as when viewed at equal distances on level ground. [Magnitude, P. C.]

ENTOBIAS, a genus of fossil Annelida. (Forb.)

ENTOMOCORCHUS, a genus of Crustaces, from the mountain lakes of S. Africa. (M'Coy.)

EOCENE. The lowest of three great divisions of tertiary strata is thus termed by Mr. Lycell.

EPHEDRA (the Greek name of the Ephedrae, which is a genus closely allied to the natural order Gnetaceae. The species are dioecious; the male flowers are arranged in the form of a caktin, having a...
bled calyx, and 7 stamens, 4 of the anthers of which are inferior, 2 superior; the female flowers have a quintuple calyx, 2-parted, 2 ovaries, and 2 seeds covered over by the berried calyx, which are not numerous, and are found in Europe, Asia, Africa, and America.

*E. distachya* has the sheaths of the joints 2-toothed, blunt, the calyx 3, opposite, stalked, the peduncles shorter than the internodes and sheaths, and some parts of Germany, and abounds in the southern parts of Europe, and from thence eastwards to Persia and India. The berries, which consist of the fleshly calyx covering the ovoid, ripen in July and August. They have a sweetish taste, and contain a mucilaginous mass.

*E. monostachya* has the sheaths of the joints the same as the last, but the calyxes either solitary or opposite, and the peduncles longer than the calyxes. This plant is found in Hungary, Greece, and in those countries the fruit is eaten as a great luxury.

*E. altissima* has clustered calyxes and spreading branches, and is a native of Barbary. There is an American species found on the borders of Lake Michigan in the country of the Chippewy Indus. It bears a large fruit.

(Burnett, *Outlines of Botany; Loudon, *Encyclopedia of Plants.)

**EPHEMERA** (ephemera, living for a day), a genus of *Nymphalidae* belonging to the family *Ephragnidae*, of the order *Lepidoptera*. They have long, soft, tapering bodies, terminating in two or three long ova. Their wings are placed nearly or quite perpendicularly. Their antennae are very small and three-pointed. In the larva state they live in wet places, and eat an evergreen plant: 4 or 5 years; but when they attain their final stage of metamorphosis and perfect form, they are among the most fleeting of living creatures, existing only a few hours, and propagating their species before dying. In this shape they are sometimes seen mysteriously, during fine summer evenings, by the waterside, where they may be seen flying about and balancing themselves in the air, in the manner of gad-flies.

(Walter, *Introduction to Entomology*, vol. ii.)

**EPHESMUS** (Ephrem, *Ephraem*), an ecclesiastical writer of the fourth century of our era, was probably born in the town of Nisibis, though some state that he was born at Edessa. The time at which he attained the height of his fame is about A.D. 370. In his early youth he entered the monastic life, and in seclusion he carried on his philosophical studies with zeal and success. But at a later period he seems to have become tired of solitary life, and feeling a strong desire to benefit others by the talent and knowledge which he possessed, he went to Edessa, where, as the most distinguished Syrians came to receive his instruction. He soon became desan of the church at Edessa, but declined accepting any higher ecclesiastical office, and when he was elected bishop, he displayed his intelligence in the market-place and acted in such a manner that the people thought he was out of his senses. He then absconded, until another had been appointed to the office of bishop in his place. He flew away to Cappadocia, to see Babington the Great, who formed the highest opinion of his learning and piety. Ephrem spent the greater part of his life in writing and preaching on devotional and moral subjects, and especially against the Arian heresy; but he was equally energetic whenever there was any occasion to show by his acts that he really was the benevolent man that he appeared to be. This was especially manifest at the time when Edessa was suffering from famine: he gave his assistance everywhere; he called upon the rich to help the poor, and he himself undertook to help them; and so, by his virtues, he relieved what was not intended for them. He was looked up to with admiration and reverence by his contemporaries, who distinguished him by the honourable designation of 'the prophet of the Syrians'. He lived 78 years, and it is said that he had his will that no one should praise him, according to the common practice, in a funeral oration, that his body should not be wrapped up in corbord robes, and that no monument should be erected on his tomb. An interesting life of Ephrem, though not free from many errors, is that of ArchbishopFabian, which was translated and published in the year 1856, and is one of the most correct and instructive books on the life and works of Ephrem.

Ephrem was one of the most prolific writers of his time; he knew no other language than the Syriac, and was consi-

dered to surpass all his contemporaries in the elegance and power of his oratory. Nearly all his works were translated into Greek in his own lifetime, and their popularity was so great that in some churches they were publicly read at the Eastern and Western Liturgies. The Greek Church, down to this day, regards him as a saint. According to Photius he wrote upwards of a thousand orations, besides many hymns, poems, and tracts. He was a great lover of the Scriptures, and in the Greek translations which were made during the latter half of the fourth century after Christ. We still possess two biographies of him, written by his disci-
533 is the Panarian the Cyprus, there nople, and he returned at the age of twenty to Palestine, where, for some time he was instructed by the teachers of the Christian "Vespers," which he had received in Constantinople. Afterwards he built a monastery near his native village, and was for a time at the head of it, in a.d. 368 he was made bishop of Constantinople (formerly called Salamis) in Cyprus, the metropolis of the whole island. During this period he travelled a great deal by his teaching, his writings, and the simplicity of his life. In a.d. 382 he was invited to Rome to give his vote in the case of Paulinus, bishop of Antioch. A few years after his return to Cyprus he became involved in a bitter and long controversy with Johnnus, bishop of Jerusalem. The quarrel was carried on with such vehemence, that once while Epiphanius was preaching at Jerusalem against the views of Origen, Johnnus and his party received him with shouts of laughter and catcalls, and when the preacher came forward to address them, his audience fell silent; similar scenes frequently occurred, and the longer the enmity lasted the bitterer it grew: Epiphanius accused Johnnus of entertaining the heretical opinions of Arius and Origen, and Johnnus returned with other accusations against his adversary. The disputed points of fact, letters and defences were written by both parties, and their friends did all they could to bring about a reconciliation, but in vain; for Johnnus entertained a morbid hatred of Epiphanius, until after the lapse of several years he found that he was in the wrong, and was silenced by shame. But fresh contentions arose in another quarter. Theophilus, bishop of Alexandria, who had expelled some monks from Egypt, on the ground of their favouring the views of Origen, contrived to win Epiphanius over to his side. The method the bishop used was to give the deposed refuge in Constantinople, where they were received with distinction by Chrysostom. Epiphanius forthwith convoked a meeting of the Cyprian bishops, got them to condemn Origen and his works, and sent letters in all directions to announce the condemnation. Soon after he was prevailed upon by Theophilus to go to Constantinople; but he refused to have any interview or communication with Chrysostom, unless he would sanction the condemnation of Origen and expel the Egyptian monks. However over to this side, and Theophilus, without having effected anything, for he was severely attacked by Chrysostom for attempting to interfere with his episcopal rights, and the empress Eudoxia too was not favorably disposed towards the Antiochite, and the bishop had now leave by wishing each other all kinds of evils, and the deities, say the writers of the time, granted their wishes; for Chrysostom was deposed soon after, and Epiphanius died on board the ship which was to carry him to Cyprus, in a.d. 409. He was then nearly one hundred years old, and had been Bishop of Constantinople for thirty-five years.

Epiphanius is described as a man of very great piety, and adorned with all the virtues of a Christian: the opinion of his sanctity was so great in his time that a church was built there in honour of him, as early as a.d. 647. He wrote and spoke with equal facility Hebrew, Syriac, Egyptian, Greek, and Latin, and was especially versed in the history of the church, though he seems to have been a very credulous historiographer. His polemical style was not very weak in conducting a controversy, add his language is such as might be expected of a man who paid no attention to elegance and refinement,—it is plain and homely in the highest degree. (Lives of Johnnus and Polyanus in Patristis's edition of Epiphanius, vol. ii. p. 318, &c.; Sozomen, Hist. Eccl. vi. 10; Sozomen, viii. 14; Hieronym. Opera, vol. ii. p. 309, De Scriptor. 114.)

Epiphanius was the author of a considerable number of works. His principal work is a work called "Theocritus," which may be come down to us, but some of them are lost. Among those still extant there are several which are of a doubtful nature, and are ascribed to most ecclesiastical historians to a person of a much later date, who may have borrowed the name of Epiphanius for the occasion. The most important among the extant works are 1. 'Anacostus' ('Acacius'), that is, the anchor of faith against the heresies of the time, especially the Macedonian. Epiphanius's main object is to establish the Catholic doctrine of the Trinity and of the Holy Ghost. 2. 'Pamasma' ('Parasma'), that is, a repository of remedies against the eighty heresies which he denounces. The first edition of this work was in a.d. 374, at the request of Acacius and Paulus. Phocides (Bibl. Cod. 122) states that this work contains a more full and useful account of all the heresies than any other, and that it contains everything written by Epiphanius against his enemies, besides various other heresies, together with many useful observations of Epiphanius. The author himself published an abridgment of this work under the title of 'Anacostumia,' which is still extant. The first edition of this and a few other works appeared at Vienna, 1644, fol.; by Harleian MS. 1641, 1635 and was afterwards often reprinted with some additions which are not in the first edition. The best edition of all the works of Epiphanius (the Greek original with Latin abridgment) was published at Paris, a.d. 1622, 2 vols. fol., which was reprinted with some additions at Coignosa, 1682, 2 vols. fol.


EPISTHEGUS (from evwraiai, and vovde, because the plant is parasitical on the roots of the beechn) is a genus of plants belonging to the natural order Orobanchacea. It has the sterile flowers perfect, and the fertile flowers imperfect; the inner stamens are ribbed; the upper lip emarginate, the lower 3-toothed; the imperfect corolla slender, 4-toothed, deciduous; the stamens as long as the corolla; the filaments smooth; the stamens 2-lobed, acute at the base, valveless, deciduous in the middle; the stigma terminal. The plant is a very common weed in Europe, and is a palliative in the cases of lung disorders, being very adapted to cold climate and poor light. It is also sometimes used as a substitute for the *Dorocharis virginalis* of Linnæus. It is a smooth fleshy branching plant, growing from six to eighteen inches high, and clothed with small scales instead of leaves. The corolla is purple streaked with white. The capsule disintegrates after it has ripened, and in the process gives off a fragrant fluid which is frequently used in a quack medicine called 'Mariner's Cancer Powder,' which consists of equal parts of this plant and white arsenic. It is said by some writers to have a really beneficial effect.

(Lindley, Planora Medicina; Don, Gardner's Dictionary.)

EPISTAXIS (from evwraiai, a dropping, bleeding of the nose) is the term used by most noologists to indicate bleeding from the nose, which essentially consists in an effusion of blood externally from the pituitary membrane. There are few signs that a bleeding body m. is in North America a sign of great anxiety. Blood may flow from the nose under various circumstances; sometimes when the system is in a state of plethora, and at others when in a state of debility. When it occurs in plethoric persons it is usually preceded by pain in the head, or, in general, frightful dreams, increased heat on one side of the face, injection of the eyes, flashes of light before the eyes, increased beating of the temporal arteries, deafness, &c. These symptoms will be present, or more or less intense, according to the general condition of the sufferer. This active form of the hemorragie comes on in the course of many diseases, as the inflammatory forms of fever, inflammation of the brain, lungs, &c. Where the bleeding comes on in a state of debility it is called passive, and may make no great difference with the symptoms. This form comes on in the course of low and malignant fevers, and various diseases which come on in a cachectic state of the body.

Bleeding at the nose, when it occurs alone, most frequently comes on in children. After ten or twelve years of age it is often seen in boys than girls. It is frequently hereditary, and whole families exist who are liable on slight causes to bleed at the nose. The cause may be the action of the blood itself upon the vessels of the nose, or the flow of blood to, or retards the flow of blood from, the head. Thus, mental excitement, anger, shame, protracted study, stooping, sneezing, deep sighing, hallooing, crying, coughing, tumours on the veins, tight neckcloths, &c., may all cause the bleeding. Certain flowers, plants, and other medicaments, are used under this head, and even the bleeding of the nose occurs in such cases as suicide, or relative poisons, as too free living, the suppression of accustomed discharges, whatever interferes with the free circulation or the blood, as tight clothes, whatever determines the
blood to the surface of the body, as diminished pressure of the atmosphere, as in ascending mountains, a highly heated atmosphere, &c., will also produce it.

Bleeding at the nose is not in itself a dangerous disease. It may, however, come on in states of the body when the system is already exhausted, and be the forerunner of a fatal result. In inflammatory diseases, and where the person is phthisic, it is frequently a relief to the system, and is followed by a beneficial sympotum. In such persons, however, after middle age, and who are inclined to phthisia, this symptom should be looked upon as indicative of congestion, which may proceed further, and the warning should be regarded, and a diminution in the indulgences of the table insisted on.

In the treatment of bleeding from the nose regard must be had to the state, age, &c., of the patient. When it occurs in children, and in the great majority of simple cases, all that is required is to cover the piece of the nose where the bleeding takes place; cold should be applied to the face, and a piece of cold metal placed between the nape of the neck and the clothes. Acid drinks may be given at the same time. When the person is phthisic and has suffered much pain in the head, singling in the ears, &c., previously, it will not be advisable to stop the bleeding until these symptoms are relieved. This may be followed by the exhibition of purgatives; and bleeding from the arm should be had recourse to if the bleeding continues. When the bleeding is of a profuse nature stoppage of any natural discharge, this latter should be restored. Copping on the nape of the neck, or even dry cupping, may be recommended in these cases. But in the passive states of the system it is frequently desirable to avert the bleeding with cupping. Under these circumstances cupping should be applied immediately to the pituitary membrane.

A solution of the acetate of lead, of the sulphate of zinc, of iron, of copper, or of alum, may be injected up the nostrils, or a dose of half a cent of the solution thrust up the nostril. The various preparations of tannin, as catechu, kino, &c., may be employed in the same manner. These astringents may also be administered internally with small doses of spumum. One of the most effectual means however of arresting hemorrhage is a plug made of a piece of nose nare, this plug being made may be done by introducing a piece of sponge or lint upon a ligature into the mouth, and carrying it through the nare to the nostril in front. This generally exercises sufficient pressure to arrest the bleeding.

(Copland, Dictionary of Medicine; Cyclopaedia of Practical Medicine, article Epistaxis.)

EPROUVETTE is an apparatus consisting of a gun or mortar suspended from a horizontal axis for the purpose of determining the velocity of the recoil of a piece when a charge is fired in it. Mr. Robins (New Principles of Gunnery) first proposed the employment of such a machine, but Dr. Hutton, of Woolwich, afterwards considered impracticable its construction.

The piece, mortar or gun fixed, near its centre of gravity, to the lower extremity of an iron rod, which may be about seven feet six inches long, and its base is attached by a short brace to a arm which projects from the rod, an adjusting screw being provided for the purpose of keeping the axis of the bore perpendicular to the same rod. Sometimes however a frame of iron, like the letter A, serves to suspend the gun, which is then fixed, at two places, in collars at the lower extremities of the frame. To the upper part of the rod is attached a horizontal axis, by which the gun is to vibrate; and each extremity of this axle rests in a socket at or near the top of the frame which constitutes the stand or support of the gun and its suspending apparatus.

From the lower side of the gun projects downwards a rod or style of iron, which is pointed at its lower extremity, the point being in a line drawn from the middle of the horizontal axis of suspension through the centre of gravity of the gun. Under the rod, at each end, is a block of hard wood in the upper surface of which is cut a groove, in a vertical plane, in the form of a portion of a circle whose centre is at the middle of the axis of suspension; and this groove being however roughened, so that the point of the rod projecting below the gun, in the ball of the latter, catches on the wax a circular arc: the measure of this arc gives, of course, the angle of the recoil.

Instead of this pointed rod and grooved block, a quadrant of brass of any convenient radius, as twelve inches, is fixed in a vertical position to the rod or frame which carries the gun, the horizontal axis of suspension passing through its centre: the quadrant, whose arc is graduated, vibrates with the gun, and an index at the extremity of a bar on that axis remains at rest till the gun has recoiled as far as the force of the fired gunpowder can impart it; when, by a contrivance, it is enabled to return with the quadrant, showing, by the degree in coincidence with it, the extent of the recoil.

In the Eprouvette constructed by Dr. Hutton, the quadrant had on it three equal arms: one of these showed the degrees in the angle of recoil; another showed by inspection the length of the chord: and the third showed in like manner the length of the versed sine of the arc of recoil.

This instrument, the gun or mortar is charged with a given quantity of powder, which is introduced without a cartridge; and is fired, when exactly in a horizontal position, by means of a piece of quick match: the extent of the arc of recoil is then to be measured as read.

The velocity acquired by the recoiling piece is in describing half a vibration in a circular arc varies (by mechanism) with the square root of the vertical height, or with the chord of the half vibration: hence, if by the explosions of equal charges of different kinds of powder in a suspended gun, the latter be made to recoil from a vertical position through arcs or springs which are measured in degrees, the velocity resulting from the forces which produced the recoil being equal to that which the gun would have acquired in descending by gravity from the upper lowest point of the arc; it follows that the chords of those arcs or angles will express the relative velocities produced by the different kinds of powder. Again, by mechanics, the forces are as the squares of the velocities; and these, when produced by a body descending on circular arcs, are as the squares of the arc of descent; therefore the angles of recoil, or the half vibrations, being found from the experiments, their versed sines will express the relative forces of the different kinds of powder.

A gun suspended in the manner above described has been employed, instead of the ballistic pendulum, to determine, by its recoil, the initial velocity of the shot fired from it with a given charge of powder. (Ballistic Pendulum, P. C.)

EQUALITY, APPROACH TO. As a general rule, such a result may be considered as near to the true, that is, nearly true when the equation is true, may be stated as nearly true when that equation is only nearly true. Usage of words however is apt to lead to mistakes when it is equality, and nearness to equality, which are in question: A and B are absolutely equal when either of the following equations is true; one of them being of course a consequence of the other:

\[ A - B = 0 \quad \frac{A}{B} = 1 \]

and it is usual to say that a small quantity is nearly nothing, or near to nothing. In strictness, we might as well say that a large quantity is near to infinity, as that a small quantity is near to nothing: but it is not always true, except only as to the latter, when obtained by subtraction. (Twofte, P. C.) Nevertheless we can hardly hope to abolish the common idea of small quantities being near to nothing: we must therefore guard those who accept the phraseology from the mistake to which it very frequently leads.

It is not true that quantities are necessarily nearly equal when their difference is near to nothing (meaning small). If we here understand small with respect to quantities themselves, it is true; but not necessarily when A - B is a small fraction of A, let it be \( m \), where \( m \) is a small fraction of unity; then \( A - B = m \) gives

\[ B = \frac{A}{1 - m} \]

or B and A are in the ratio of 1 - m to 1, nearly that of 1 to 1. But if A and B be both small, their difference is small: and yet that difference may be itself many times greater than the smaller of the two quantities from which it was obtained. If the base of the number of unity, be small, it is not unity, but small fractions; but not nearly equal. Therefore we want to think of approach to equality, we must rely on approach to

\[ \frac{A}{B} = 1 = m, \text{not to } A - B = 0 \]

We are here merely guarding a phrase, not explaining principle at length. In the articles Laplace; Linear; Pieters, Vatierko, f. C., will be found the elementary
EQUATIONS

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Notions, proper attention to which will secure the beginner from error.

When a person, for any common purpose, speaks of a small number as next to nothing, he compares it with the whole mass from which it is taken, and he always means by small that which is a small fraction of an important quantity. The terms small and great being purely relative, may have many meanings in different circumstances; but with that we have here nothing to do. Whatever small may mean, we have no right to say that quantities are nearly equal, except only when the relative word small may be properly used in relation to the quantities themselves.

This last caution is the more necessary to the young mathematician, from his frequently meeting with words small and great, with an absolute sense. Though this absolute use of the words is only an abbreviation [Litterae, P. C.], be may, without care, now and then forget that it is so.

EQUATION, BINOMIAL. A binomial equation is an algebraical equation of two terms. Its form is therefore

\[ ax^2 + bx^n = 0, \]

all the consideration of which may easily be reduced to that of one or other of the forms \( x^n = 0 \) (a being integer), at least if we confine ourselves to equations in which the data are all real quantities. All that is necessary is given in the article Roor, P. C., so that we shall here confine ourselves to such statement of the mode of resolving \( x^n = a \) into factors as may be useful for reference.

First, as to \( x = a^n. \) Of this \( x = a^n \) is always a factor, and if \( x \) be even, \( x = a^n \) is also a factor. The remaining factors are all of the form

\[ x = \pm a \sqrt[n]{a_n + \frac{1}{a_n}} \]

in which \( a \) may be either the quantity or any multiple of it less than \( a. \) Thus whether \( a \) be 10 or 9, we go as far as four times 10 - 9, since 4 is the integer next less than the half of 2 either of 10 or 9. Accordingly, if \( a \) be odd, and if \( a \) be the integer next less than the half of 2 or any odd multiple of it which does not equal \( a. \) Thus whether \( a \) be 10 or 11, we go as far as nine times 9 - 10, since 9 is the last odd integer which does not equal either 10 or 11. If then \( a = 10 - a \) and \( b \) be the last odd number which does not equal \( a, \) we have

\[ x = \pm a \sqrt[n]{a_n + \frac{1}{a_n}} \]

EQUATION, PERSONAL. It is a fact which has now been for some years established, and which might reasonably be suspected, that different persons, attempting to observe the phenomenon of a phenomenon, by means of a clock which beats seconds, do not agree in their results, but differ generally in one and the same way, one of the observers being almost always a little before the other in the moment which he assigns to the phenomenon. If this had not been the case, if one of the observers had been as often before the other as behind him, the difference could only have been considered as simple casualness. But, looking upon the constant occurrence of a difference of one kind between two observers, it becomes obvious that the cause is in the organs of the men themselves; and that physical constitution, temperament, habit, &c., make differences between one person and another.

Personal equation is a name given to the quantity of time by which a person is in the habit of noting a phenomenon wrongly; and it may be called positive or negative, according as it is added or subtracted before or after it really takes place. Thus if \( a \) and \( b \) are severally in the habit of noting events 8-tenths of a second after and 4-tenths of a second before they take place, their personal equations may be described as being \(+ 0.3\) and \(-0.4.\)

The absolute personal equation of any one is a thing undiscernable; since we can only refer one human observer to another, and note the differences of their times of observing the same phenomenon. If we could cause a thousand persons to note a given definite phenomenon by one clock, and if we could take the mean of all their results, we might say that there is very strong reason to presume that the mean is the time which perfect organs would have noted: for we may think that the chances are much in favour of human imperfection being, in the mass, as much of one kind as of the opposite. But a little consideration will show that this reasoning is not to be relied on. It may be that the whole race, by its constitution, a rather large personal equation of one or the other kind: for we can only see the differences, without knowing upon what quantities they are differences. This question is, however, practically immaterial; for any given amount of personal equation compared to the whole race is equivalent to making all the clocks wrong by the same quantity. Suppose, for example, that every person suddenly received an addition of one second to his personal equation, or began to note phenomena a second later: and that in January, 1796, the difference amounted to 8-tenths of a second. Mackey'slone inferred that his assistant had contracted some bad habit of observation: it is now very well known that age causes persons to observe later than they did before, though it is not usual for the habit to undergo such sudden changes as in the above case. In 1823 Mr. Bessel, at Königsberg, ascertained that he was in the habit of observing phenomena as much as 1-senth before his assistants. Argelander. The last trial of his poor memory of the observatory at Bonn; but, passing through Königsberg in 1832, Mr. Bessel took the opportunity to make some further comparisons with him; and it was found that the above quantity was reduced at length. Age has brought them together. A close trial of the subject was made by M. Quetelet and Sheepshanks, 1838-1841, in determining the longitude of Brussels by transmission of chronometers between that place and Greenwich. This method of course requires the most careful transit observations at both places, and the
personal equation becomes of considerable importance. It was necessary that some observer should compare himself with M. Quetelet at Brussels, and with the assistants at Greenwich. This was undertaken by Mr. Sheepshanks, and the results were as follows. He carried on one observation with another, 45-hundredths of a second behind M. Quetelet, and 27, 35, and 44 hundredths before MM. Main, Henry, and Ellis, severally. The result was that the longitude of Brussels lay in a plane third above the line of fixed points, had been supposed to be if the difference of personal equations had been unknown. (See a memoir on the difference of the longitudes of Brussels and Greenwich, by MM. Quetelet and Sheepshanks, Mem. de l'Acad. Roy. de Brus-}

EQUATIONS, DIFFERENTIAL, AND EQUATIONS OF DIFFERENCES. The plan we shall follow in this article is that of M'cob or EQUATIONS, P. C., in which a subject is treated in a particular and the student, as a guide to his reading, or for reference. We have not room either to teach the subject or to illustrate it by examples. We may refer to the following works:—

Moigno, "Lecons de Calcul Differentiel," 3 vols., vol. ii. Paris, 1846, 8vo.; De Morgan, "Differential and Integral Calculus," London, 1842-, 8vo. (Lib. U. K.); various numbers of the "Cambridge Mathematical Journal," Cambridge, 1839-1843, 8vo., a work which has at this time (August, 1849) reached the end of the fourth volume and the twenty-first number; Brooke, "Synopsis of the ... Formules ... de Pure Mathematics," Cambridge, 1829, 8vo.; Peacock, Herschel, and Babbage, "Collection of Examples," 3 vols., Cambridge, 1820, 8vo.; also the various numbers of the "West Cambridge Calculus," 1841, 8vo. We must confine ourselves to a selection from striking points, or our article would exceed all reasonable limits.

1. Let there be a function \( \phi(x, a, b, c, \ldots, n) \), or \( \phi \), containing the variables \( x \) and \( y \) and the constants \( a, b, c, \ldots, n \).

If we make \( \phi = 0 \), we tacitly require that \( y \) should be a function of \( x \).

If \( \phi(x, y, z, \ldots, n) = 0 \), and the result of complete differentiation,

\[ \frac{d\phi}{dx} + \frac{d\phi}{dy} = 0 \]

we eliminate one of the constants, \( x \) or \( y \) (or \( z \), etc.) and all the rest of the constants; and according as we eliminate one or another constant, we have one or another of the many such equations as were there constant.

These are called differential equations of the \( \phi \)th order, and they are said to be of the first order.

2. The word order refers to the number of differentiations, the word degree to the highest power of the highest coefficient which enter. Thus \( y'' + y'^2 = x \) is a differential equation of the second order and the fourth degree. Let \( \phi \) always denote a function with respect to \( x \).

For partial differentiation we shall save room by writing as follows:—\( \frac{dy}{dx}, \frac{dy}{dx} \) for \( \frac{dy}{dx}, \frac{dy}{dx} \) &c.

3. If we eliminate two of the constants between \( \phi = 0 \), \( \phi' = 0 \), \( \phi'' = 0 \), we have a differential equation of the second order, and so on; there are altogether \( n(n-1) \) differential equations of the second order, if we have \( n \) constants.

And generally, when there are \( n \) constants, there are as many differential equations of the \( n \)th degree as there are ways of taking \( m \) out of \( n \) things.

Thus there is only one equation of the \( n \)th degree.

4. If there be a system of \( p \) equations between \( p + 1 \) variables, so that \( p \) of the variables are functions of the remaining one, and if we differentiate each equation once, \( n \) can eliminate \( p \) constants, and form \( n \) equations of the fi. order.

We have \( p \) second differentiations, and we can eliminate \( n \) constants, and so on. And if there were \( p+q \) variables, we should have similar systems with \( q \) independent variables.

5. Equations of differences are formed in a corresponding way by taking the \( n \)th power of the constant coefficient.

Thus, suppose \( u_1, u_2, u_3, \ldots, u_n \) a function of \( x \), and \( \phi(x, u_1, u_2, \ldots, u_n) = 0 \).

Change \( x \) into \( x + \Delta x \), usually into \( x + 1 \), and let \( u_1 \) become \( u_1 + 1 \), or \( u_1 + \Delta u \).

If we eliminate \( \alpha \) between \( x(1, u_1, \ldots, u_n) = 0 \) and \( \phi(x + \Delta x, u_1, \ldots, u_n) = 0 \), we have an equation of the form \( \psi(x, u_1, u_1 + \Delta u_1) = 0 \), or \( \psi(x, u_1, u_1 + \Delta u_1) = 0 \), as we please, and this is an equation of differences of the first order.

But exactly the same equation would be obtained, if for \( a \) we had substituted any function of \( \cos(2\theta) \), or of \( \cos(2\theta - x) \).

On this point see INVARIABLES, P. C.

6. When there are more than two variables, say three, it is possible to form an equation of a definite function of two of them shall be eliminated.

Thus, if \( \phi(x, y, z, \psi(x, y, z)) = 0 \), in which \( z \) is a function of \( x \) and \( y \) and \( z \) (a \( \psi \)) a given function; we differentiate with respect to \( x \) and \( y \) separately, and produce three equations.

From these three eliminate the two last, \( \psi \) and \( \psi' \), and we get an equation involving only \( x, y, z, x', y', z' \) in finite forms. This is called a partial differential equation.

7. The analogies between the constants of a common differential equation and the arbitrary constants of a partial one must not be relied on as capable of being carried all the length. It is not, for instance, universally true that two arbitrary functions may be completely eliminated by differentiations of the second order.

We now consider common differential equations of the first order.

8. Let \( y = \phi(x, a, c) \), and \( y' = \phi'(x, b, c) \), and let elimination give \( y' = \chi(x, y, c) \), the differential equation. There is another mode of arriving at the same result.

Let \( \phi(x, y, c) \), \( \phi'(x, y, c) \), and \( \chi(x, y, c) \) be identical with \( \psi(x, y, c) \).

9. The difficulty of returning to the primitive from the equation \( y = \phi(x, y, c) \) consists in that of reducing it to the form \( \psi(x, y, c) = 0 \). Generally, if the factors are made to disappear, and the restoration of these factors is a problem of exactly the same difficulty as the solution of the equation.

10. The quantity \( P + Qy, P \) and \( Q \) being functions of \( x \) and \( y \), is integrable at once when \( P = Qy \).

When this condition, which is usually called the criterion of integrability, is satisfied, the integral is

\[ \int P \, dx + \int \left( Q - \frac{d}{dy} \right) \, dy \]

in which \( y \) is constant in the first integration, and \( x \) in the second. Any arbitrary constant may be added. Either of the following forms are also integrals of \( \psi(x, y) + x, y \) or \( \chi(x, y) \), if the criterion is satisfied.

11. The equation \( y' = \Phi(x, y, c) \) can have no other primitive with the same constant, except \( y = \phi(x, c) \) from which it was derived. But it may have another solution which has not an arbitrary constant, or even more than one: these are called singular solutions. A singular solution makes \( x' \), \( y' \), &c. infinite if \( y \) be substituted from it in terms of \( x \). It also makes \( \psi_x \), \( \psi_y \), &c. infinite in the same manner.

12. The singular solution may also be found from the primitive \( y = \phi(x, c) \), as follows. Eliminate \( c \) between \( y = \phi(x, c) \) and \( 0 = \phi'(x, c) \), the result is the singular solution.

This rule and the last are subject to exception when the singular solution takes the form \( x = \phi(x, c) \) or \( y = \phi(x, c) \).

13. The geometrical character of a singular solution is as follows. If \( y = \phi(x, c) \) be the equation of a family of curves, then is, of one curve for each value of \( c \), the differential equation \( y' = \phi(x, y) \) also belongs to every member of that family. The singular equation is the equation of the curve which touches every one of the family of curves.

14. The equation \( y'' = x + y' \) is historically remarkable as having led to the theory of singular solutions: it is called Clairaut's form. The complete primitive \( y = \phi(x, c) \) belonging to the family of straight lines is, a singular solution is the result of eliminating \( x \) and \( y' = x \) from \( x' = 0 \).

15. It is not often that the factor which makes an equation integrable can be recovered in any general form. As soon as the solution is obtained, it can always be found; but the only use of it is to find the solution. There is always an infinite number of such factors, any one of which will do. When in \( P + Qy \), the criterion \( P' - Qy' \) is not 0, yet it is a function of \( x \) only, and \( J \sum\left( P'(x) - Q'(x) \right) \, dx = \psi \), then \( J(x) (P + Qy) \) is integrable.
functions of $x$ and $y$ of the same degree, proceed as follows. Reduce the equation to the form

$$y'' + A_1 y'' + \ldots + A_n y = 0,$$

in which $A_1, \ldots, A_n$ are $n$th order homogeneous functions of $x$ and $y$, $y''$ being the second derivative of $y$ with respect to $x$. Let $y = e^{tx}$ and find, in terms of $t$, the several values of $y''$ or $t$-integrals, of the equation.

25. The only equation of differences of the first order which can be generally treated, at present, is the form

$$\Delta u - P_n y = Q_n,$$

where $P_n$ and $Q_n$ are functions of $x$, or its corresponding form $U_0 + P_n y = Q_n$. Supposing $n$ to be an integer, which is what is usually required, let $\Delta u$ denote $u_{n+1} - u_n + \ldots + u_1$ where $m$ is an arbitrary integer chosen to start from. Accordingly $\Delta u_m = y_m$.

26. Equations of differences in their most general form have solutions which appear to resemble the singular solutions of differential equations, but there are important points in which the resemblance fails. ("Differential Calculus," Library of Useful Knowledge, p. 738.)

27. Let $y''$ stand for the nth differential coefficient of $y$.

The following expression

$$(P_n y^{(s)} + P_{n-1} y^{(s-1)} + \ldots + P_s y)$$

is absolutely integrable, independently of all relation between $x$ and $y$, if

$$P_u - P_n y'' - P_{n-1} y'' + \ldots = 0,$$

in which accents refer to complete differentiation with respect to $x$. And the integral is

$$P_n y'' + P_{n-1} y'' + \ldots + P_s y.$$

One remarkable case is this:—each term $P_n y''$ is absolutely integrable when $P_n$ is a rational and integral function of $x$ of a degree lower than the nth. Thus $y''$, $y'''$, $y''''$, $y''''''$, are all integrable functions.

28. The equation $y'' = \phi x$ is not only completely integrable, but may easily have all its intermediate differential equations found. For instance, suppose $y'' = \phi x$. Multiply this successively by $1, x, x^2, x^3$, and, by the last section, we have five integrable equations, leading to the five differential equations of the fourth order which belong to $y'' = \phi x$. Treat the first result in the same manner with $1, x, x^2, x^3$, the second with $1, x, x^2, x^3$, the third with $1, x, x^2, x^3$, and, by the last section, we have ten equations of the third order. Proceed in the same way with the results, taking care never to let any multiplication enter which raises the coefficient as high as the order of differentiation which it accompanies, and then we shall appear to have successively 16 equations of the second order, 5 of the first, and finally the original primitive.

29. The following theorems will sometimes be of use. Let

$$P_n y'' + P_{n-1} y'' + \ldots + P_s y = 0.$$ 

The theoretical mode of proceeding, occasionally convenient enough in practice, is to find the $n$ values of $y$, say $y = \phi_1(x, y), \phi_2(x, y), \ldots$, and so on: sometimes, when a couple of expressions of the form $ax + by + c, dx + by + c', d'x + c, e'x + c'$ occur, it will be convenient to introduce two new variables derived from equating the preceding to $Au + Bu + Ax + Bx$. We have given the most effective general methods; the number of transformations which have a particular application is very large.

30. When the equation is of the first order, but of a higher degree, as

$$P_x y'' + P_{x-1} y'' + \ldots + P_s y = 0,$$

the theoretical mode of proceeding, occasionally convenient enough in practice, is to find the $n$ values of $y$, say $y = \phi_1(x, y), \phi_2(x, y), \ldots$. If these can be separately integrated, giving,

$$v(x, y, c) = 0, v(x, y, c) = 0, \ldots,$$

then the complete primitive of the equation is

$$v(x, y, c) = v(x, y, c) = \ldots = 0.$$ 

The case in the last section be made by this last rule as they arise, the results will be given in terms of $P_0 P_1$, $\ldots$, and there will be no difficulty about the constants, which in the ordinary mode may appear to enter in too great numbers.

30. There are very few cases of equations of higher orders than the first which can be integrated in general terms. The equation $y'' = \phi x$ gives

$$y'' = c + 2 \int \phi ydy,$$

which is integrable. Again, $y'' + Q y'' = R, Q$, and $R$ being functions of $y$, gives

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The function $y$ is, of course, a function of $x$, but the general solution of the linear equation $y'' + P y' + Q y = 0$ is $y = A y_1 + B y_2$, where $A$ and $B$ are arbitrary constants.

If $y'' = 0$, the general solution is $y = C_1 x + C_2$, where $C_1$ and $C_2$ are arbitrary constants.

The general solution of the linear equation $y'' + P y' + Q y = 0$ is $y = A y_1 + B y_2$, where $A$ and $B$ are arbitrary constants.

The general solution of the linear equation $y'' + P y' + Q y = 0$ is $y = A y_1 + B y_2$, where $A$ and $B$ are arbitrary constants.

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The general solution of the linear equation $y'' + P y' + Q y = 0$ is $y = A y_1 + B y_2$, where $A$ and $B$ are arbitrary constants.

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The general solution of the linear equation $y'' + P y' + Q y = 0$ is $y = A y_1 + B y_2$, where $A$ and $B$ are arbitrary constants.

The general solution of the linear equation $y'' + P y' + Q y = 0$ is $y = A y_1 + B y_2$, where $A$ and $B$ are arbitrary constants.
52. The equation \( x\,dx + y\,dy + zdz = 0 \) when produced from \( \phi(x, y, z) = c \), is the equation of a family of surfaces, the individuals of which are defined by the different values of \( c \). That is to say, any point of one of these surfaces being taken, and any other point infinitely near to it, the equation is satisfied by \( x, \, dx, \) &c., as derived from those points. But when the condition is satisfied, then \( x\,dx + y\,dy + zdz \) still belongs to any surface in the following limited sense. On any surface, and through any point of it, a curve may be drawn such that the equation \( x\,dx + y\,dy + zdz \) is satisfied if the two contiguous points first named be taken on that curve.

53. When there are three variables and two equations, with two constants, as in \( \phi(x, y, z, a, b) = 0, \psi(x, y, z, a, b) = 0 \); the most ready theoretical mode of imagining the differential equations is the reduction to two equations of the form \( a = 0 \) \( (x, y, z, b) \), \( b = \psi(x, y, z) \), and differentiation. Two equations of the form \( P\,dx + Q\,dy + zdz = 0 \) are thus produced from which, by combination, may be derived an infinite number of equations of the same kind, answering to the infinite variety of pairs which can be produced from the primitive equations. This corresponds with the obvious geometrical fact that one curve may be the intersection of an infinite number of different pairs of surfaces.

54. A partial differential equation, such as \( \phi(x, y, z) \), \( x', y', z' = 0 \), belongs to an infinite number of surfaces distinguished by the forms of the arbitrary function which enters into the solution. The most general method of proceeding is as follows, which supposes that a particular solution is found having at least two new arbitrary constants. Let \( f(x, y, z, a, b, c, \ldots) = 0 \) be such a solution, and call it a fundamental or primary solution. Make \( f = F \), where \( F \) is any function of \( a, \) at pleasure. Then the general solution is

\[
f(x, y, z, a, F) = 0,
\]

in which \( a \) is a function of \( x, y, z, \) determined from

\[
f'(x, y, z, a, F) = 0.
\]

The arbitrary character of \( F \) introduces an arbitrary function.

The geometrical meaning of this is as follows. The primary solution \( a \) and \( b \) being independent, is the equation of an infinite number of families of surfaces when \( b \) is made \( = F \), the equation is restricted to one of those families; and each case of the general solution, answering to one form of \( F \), is the equation of the surface which touches every individual of the family throughout the extent of some curve. Every surface which comes under the general solution is then tangent to a whole family of primary solutions. But it must not be forgotten that every primary solution is also a case of the general solution, so that there is no primary solution but what is also tangent to a whole family of other primary solutions.

55. There is generally a surface which touches all the surfaces of the general solution, and is a singular solution of the partial differential equation, not contained in the general solution. It is found by substituting in \( f(x, y, z, a, b) = 0 \), values of \( a \) and \( b \) derived from

\[
f(x, y, z, a, b, c, \ldots) = 0.
\]

We shall illustrate this subject in Variation of Parametres, P. C. S.

56. Let \( x\,dx + y\,dy + zdz = 0 \), where \( X, \) &c. may be functions of \( x, y, \) and \( z \). The integration entirely depends upon that of the following system of ordinary differential equations.

\[
X\,dy + M\,dz = 0
\]

we may integrate, and the results reduced to the form \( a = (x, y, z, b) = 0 \), \( b = (x, y, z, a) \), \( a \) and \( b \) being functional symbols, then the complete integral of the given equation is

\[
f(x, y, z, a, b) = 0,
\]

and \( F \) being any functions whatever.

This may be extended to any number of variables. Thus if

\[
x\,dx + y\,dy + zdz = U
\]

let the solution of

\[
x\,dy + M\,dz = 0
\]

be obtained in the form \( a = F, b = Q, c = R \), where \( a, b, c, \) are the constants introduced by integration, and \( F, Q, R \), are functions of \( x, y, z \), independent of those new constants. The complete solution of the partial differential equation is \( F, Q, R \) \( = 0 \), \( F \) being any function whatever.

57. The same mode holds when there are several equations with two more variables than equations, if the multipliers of differential coefficients be the same in all. Thus the system \( x\,dx + y\,dy + zdz = 0, x'\,dx + y'\,dy + zdz = W \), can be integrated if the system

\[
X\,dy + M\,dz = 0
\]

is
EQU

\[
\begin{align*}
\frac{\partial x}{\partial y} + \frac{\partial y}{\partial u} &= \frac{\partial v}{\partial w} + \frac{\partial w}{\partial x} \\
X &= Y = U = V = W
\end{align*}
\]

can be integrated in the form \(a = p, b = q, c = t, s = d\), described as above. The complete solution is the system \(F(x, y, z, S) = 0, F(x, p, q, R, S) = 0, F(x, Q, R, S) = 0\) where \(F, \&c.\) are symbols of any functions whatever.

58. Nearly all that can be done in this part of the subject depends upon cases of three variables and their connection with surfaces. The following notation is universal in universal use. Having \(x, y, z\) for \(x, y, z\) be denoted by \(p, q, r\), and the second differential coefficients \(z_y^2, z_x^2, z_{yx}^2\), by \(a, b, c\), respectively.

65. Let \(p = x_1\). The general solution, deduced as in \(54\), gives the equation of all developable surfaces, if \(f\) be arbitrary. The form \(q = dp, \phi\) being a given function, has \(\phi = a\) for \(a\) a primary solution, and belongs to a particular class of developable surfaces. Both these equations and all developable surfaces, satisfy the equation \(\varphi^2 - \psi^2 = 0\).

60. For the method of dealing generally with the equation of the second degree, \(Br. + S + T = V\), see 'Differential Calculus,' Library of Useful Knowledge, p. 719. It would hardly yield a short account for a work of reference.

61. Let \(z = x_1\). Of this, very important equation the complete solution is \(z = x_2 + x_3\). The solution is \(\phi = ayx\), giving \(y = \psi (x, b)\). Then \(z = x_2 + x_3\) is a primary solution of the given equation.

62. Let \(z = x_1 + x_2\). The second differential coefficients \(z_y^2, z_x^2, z_{yx}^2\) are denoted by \(a, b, c\), respectively. Then eliminate \(a, b, c\) from \(x = f(x, y, a, b, c)\).

64. Linear equations of differences with constant coefficients, such as

\[
\begin{align*}
u_{x+1} + au_{x+2} + bu_{x+3} + cu_{x+4} &= 0
\end{align*}
\]

may be solved in a manner corresponding to linear differential equations by assuming \(u = ne^x\) and obtaining its particular solutions by means of \(\lambda, \mu, \lambda^2, \lambda^3, \mu^2, \mu^3, \mu^4\) or \(\lambda, \mu, \lambda^2, \lambda^3, \mu^2, \mu^3, \mu^4\).

65. \(E_{\text{qu}}\) is a leafless branched plants, with a straited fubblestem, articulations shed off at the base; the spores are surrounded by clastic clavate filaments, and inclosed in these arising from the plicate scales of terminal cones; the vernation is straight, and the cuticle abounds in siles.

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68. \(E_{\text{qu}}\) is a leafless branched plants, with a straited fubblestem, articulations shed off at the base; the spores are surrounded by clastic clavate filaments, and inclosed in these arising from the plicate scales of terminal cones; the vernation is straight, and the cuticle abounds in siles.

69. \(E_{\text{qu}}\) is a leafless branched plants, with a straited fubblestem, articulations shed off at the base; the spores are surrounded by clastic clavate filaments, and inclosed in these arising from the plicate scales of terminal cones; the vernation is straight, and the cuticle abounds in siles.

70. \(E_{\text{qu}}\) is a leafless branched plants, with a straited fubblestem, articulations shed off at the base; the spores are surrounded by clastic clavate filaments, and inclosed in these arising from the plicate scales of terminal cones; the vernation is straight, and the cuticle abounds in siles.

71. \(E_{\text{qu}}\) is a leafless branched plants, with a straited fubblestem, articulations shed off at the base; the spores are surrounded by clastic clavate filaments, and inclosed in these arising from the plicate scales of terminal cones; the vernation is straight, and the cuticle abounds in siles.

72. \(E_{\text{qu}}\) is a leafless branched plants, with a straited fubblestem, articulations shed off at the base; the spores are surrounded by clastic clavate filaments, and inclosed in these arising from the plicate scales of terminal cones; the vernation is straight, and the cuticle abounds in siles.

73. \(E_{\text{qu}}\) is a leafless branched plants, with a straited fubblestem, articulations shed off at the base; the spores are surrounded by clastic clavate filaments, and inclosed in these arising from the plicate scales of terminal cones; the vernation is straight, and the cuticle abounds in siles.

74. \(E_{\text{qu}}\) is a leafless branched plants, with a straited fubblestem, articulations shed off at the base; the spores are surrounded by clastic clavate filaments, and inclosed in these arising from the plicate scales of terminal cones; the vernation is straight, and the cuticle abounds in siles.
E. avenae, corn-field horse-tail, has the sterile stem, with few furrows, slightly scarios; the branches simple, rough, with four simple anthers, the fertile stem simple, with few lax distichous flowers, and frequently a source of serious injury to the farmer and gardener. It is subject to variation according to the locality in which it grows. It is easily distinguished from E. unifoliata for which it might be mistaken by its drooping and compound branches.

(\textit{Newman, History of British Ferns and Allied Plants; Babington, Manual of British Botany; Loudon, Encyclopædia.})

ERASTIANISM. \textbf{[Erastus, P. C. S.]}

ERASTUS, THOMAS, a physician, and the author of various medical works, but better known for the use made of his name in ecclesiastical discussions, than in connexion with his own profession. He was born at Basel in Switzerland, and remained in the city of Basel in 1640. There, in 1644, he was attacked by the plague, and narrowly escaped death. He is said to have observed that or some other occasion lost the use of his right hand, but to have acquired the power of writing rapidly with the left. At Basel he seems to have studied divinity, philosophy, and literature. He afterwards went to Bologna, where he studied medicine, and appears to have speedily acquired a high scientific reputation. After having remained nine years in Italy, he went to Germany, and was by the Elector Palatine Frederic III. made Professor of Philosophy and Medicine at Heidelberg. This scientific character which he acquired in his own profession appeared to have been that of one who did not take dogmas or theories for granted, but acted on induction from his own experience. He was appointed physician to the prince, and held rank as counsellor of state in the Palatinate. He soon afterwards became involved in polemical controversy. In 1664 a conference was held in the monastery of Maulbronn on the question of the real presence, or rather on the question whether the reference to the eucharist should be made to a literal, figurative, or spiritual sense. In which Erastus maintained the view that it is figurative. He was afterwards became involved in his controversial as to excommunication. A sort of fanaticism in favour of the use of ecclesiastical censures and punishments had been introduced by Olevianus, a refugee from Trer or Treves, and by several fugitives from the cruelties of the Duke of Alva in the Low Countries, and had spread among the Protestants of the Palatinate. Erastus termed it 'febbris excommunicatoria,' and thought it to be the same philosophy as nitro-ferment, with the force that the others were possessed of for the purpose of murdering, or orthodox, by their enemies, to be zealous in cutting off members from their own communion. He examined the principles and historical authority of ecclesiastical censures, and carried on the controversy in which he was violently opposed by Dathenus, and as a result of the disputes, the censures which had probably died as a local dispute, had it not been revived by Castelvetro, who had married the widow of Erastus, publishing from his papers the thesis called 'Explicatio Quaestiones excommunicationem.' The writings had been written in 1658, and was thus published in 1689. The general principle adopted by Erastus is, that ecclesiastical censures and other inflictions are not the proper method of punishing crimes, but that the administration of the penal law, and of the natural philosophy, of the church, should rest with the temporal magistrate. He held that the proper ground on which a person could be prohibited from receiving the ordinances of a church—such as the sacrament or excommunication—was gathered from the propriety, but a difference in theological opinion with the church from which he sought the privilege. The church was to decide who were its members, and thereby entitled to partake in its privileges, but was not entitled to take upon itself the punishment of those which he had condoned, inflicting any other punishments, on the ground of moral misconduct.

It is pretty clear that whatever other view may be entertained by particular churches as a matter of opinion, ecclesiastical censures and punishments, unless as in England they are made virtual by mere forms of civil procedure, are a dead letter to all temporal efficacy in every country in Europe where justice is well administered. For authors so often referred to have been so little read. The original thesis are very rare. An English translation was published in 1689 and was re-edited by the Rev. Robert Lee in 1846. By some inadmissible exaggeration, it had become the popular view of the doctrines of Erastus, that his leading principle was to maintain the authority of the civil magistrate over the conscience, and to subject all ecclesiastical bodies to their direction and control, or at least to their own opinions. In the late discussions in the church of Scotland, of which the result was the secession of a large body of the clergy and people because it was found that the church could not make a law to nullify the operation of law, those who maintained within the church the principle that it had no such power were called Erastians as a term of reproach. As in all cases where such words as Socinian, Arrian, Anthimian, &c. are used in polemical debates, the party rejected with disdain the name of heresy would in the course of this dispute no one seems to have thought of explaining that the controversy in which Erastus was engaged was about a totally different matter, and that only a few general and very vague remarks in his writings have given occasion for the supposition that he must have held the principle that all ecclesiastical authorities are subordinate to the civil. It is probable that any of the disputants who may have made themselves acquainted with his opinions found them so distinct from their reputed change of religion that one was not disenchanted to undermine the arena of conflict by letting the secret come to light. Thus were pamphlets written in refutation of Erastianism without any reference to the writings of Erastus, and published under his name. His greatest work, 'De Delineation Logicae et Scientiae Demonstrativa,' was written on medical science, the greater part of which are in the British Museum.

(\textit{Erasm und Griesbach, Allemannia Encyclopædia; Adamus, \textit{Vita Germannorum Medicorum, 107, 109.}})

ERBIUM. \textbf{[Chemistry, P. C. S.]}

EREMEAUSIS, is the act of gradual combination of the combustible elements of a body with the oxygen of the air. It is a fact that a proportion of combination, but not attached in most cases with any sensible development of heat and light. This process is constantly going on in combustible bodies exposed to the action of atmospheric air, and one of the first changes which take place during the decomposition of animal and vegetable substances, is the union of one or more of their combustible elements with oxygen. The change of the elements of wood into the substance called humus, the formation of acetic acid from alcohol exposed to the air, the production of vinegar, and of other similar substances, have been shown to be dependent on the process of cereumacius. The changes in color, consistency, and of other properties which vegetable juices, saw-dust, leaves of trees, blood, &c., undergo when exposed to the atmosphere, these are but the results of the same process. These processes are essentially the same, putrefaction going on in bodies containing nitrogen, fermentation in substances without this gas. \textbf{[Fermentation, P. C. S.]} Although it is not uncommon for fermentation and putrefaction to be regarded as the same process, Liebig has pointed out the fact that in all cases of putrefaction must take place previous to any decomposition in organic substances. 'The juices of the fruit,' he observes, 'or other parts of a plant which are enclosed within a closed position, retain their properties unchanged as long as they are protected from immediate contact with the air, that is, as long as the cells or organs in which they are contained resist the influence of the air. They do not start to ferment or putrefy exposed to the air, and have absorbed a certain quantity of oxygen that the substances dissolved in them begin to be de-
composed. ' Gay Lussac found that the juice of grapes which were expressed under a receiver filled with mercury, so that the air was completely excluded, did not ferment; but if the smallest possible quantity of air was admitted, fermentation immediately began. Again he found that if the juice was exposed to a boiling temperature, and then bottled and corked tight, that it would not ferment till again exposed to the influence of atmospheric air.

In the same way animal food of every kind is kept from putrefaction by being heated to, and secured in vessels at, the temperature of boiling water. Food thus prepared has been kept for fifteen years, and when the vessels were opened, it was contained fresh as when first secured. The oxygen in those processes acts by exciting a change in the composition of the asziotised matters dissolved in the juices, the composition of these substances undergo a change in consequence of the oxygenisation proceeding. A remarkable and important fact with regard to this process is, that when this condition of intestine motion is once excited, the presence of oxygen is no longer necessary. The smallest particle of a body containing nitrogen in the act of decomposition, communicates the same state to the particles in contact with it, and the whole mass thus becomes influenced by the first oxygenated particle. If the atmospheric air be excluded after this process has commenced, the fermentation or putrefactive process, proceeding directly to its completion, is thus to a single particle of animal or vegetable matter in a state of eterneecusia will cause, by contact with other substances, fermentation and putrefaction, and upon this fact depends the necessity of, or some forensic processes, or saccharine solutions before fermentation will properly take place.

In carbonaceous substances their decomposition is usually attended with the formation and giving off of carbonic acid, but in substances containing nitrogen other secondary compounds are formed, more especially nitric acid, and the decomposition of these substances is sometimes called nitrification. Lichig has shown that the nitric acid in these cases is not formed by the direct union of oxygen and nitrogen, but that the presence of the slow decomposition of nitrogenous bodies is the formation of ammonia, and that it is the nitrogen of the ammonia, whilst its hydrogen is uniting with oxygen to form water, that unites with the oxygen of the air to form nitric acid. Ammonia is more readily oxidised than any other compound of nitrogen, and this is to be attributed to the presence of hydrogen, the oxidation of which yields water, which is necessary to the formation of nitric acid. Nitric acid may be formed in this way in substances containing no nitrogen, as the decomposition of those substances is capable of splitting ammonia; and this will explain the presence of nitrates on the surface of the earth, on old walls, &c, as well as in decomposed animal matters.

(Liebig, Chemistry of Agriculture; Turner, Elements of Chemistry, 7th edition.)

ERIGERON, a genus of plants belonging to the natural order Compositae, the sub-order Cymbflofibre, the tribe Astcroides, the sub-tribo Asterinace, the division Asteraceae the sub-division Erganmaceae. It has many-flowered radiant heads; the flowers of the ray ligulate, with pistils only and in many rows, those of the disk tubular; mostly with both stamens and pistils, the receptacle naked and foveolate; the involucres imbriated, the pappus pilose in one or many rows, the fruit compressed.

E. philadelphicum has the stem slightly furrowed, downy, with spreading hairs; the leaves of the root cuneate-obovate, sometimes deeply sinuate, the upper becoming gradually entire, and acute at the base, the leaves of the ray 1-200 pale purple, slightly hirsut. This plant is native of North America, and is used as a medicine in the United States. It possesses stimulant properties, and is given as an emmenagogue. It also acts on the kidneys, and is considered a valuable diuretic.

E. acris has the stem corymbose, the branches alternate, bearing single heads; the leaves linear, lanceolate, entire, spreading; the lower leaves narrowed below; the ray erect, scarcely exceeding the disk; the inner female flowers of 2 form, numerous. It has a stem 6-18 inches high; the flowers yellow in the disk and pale blue in the ray. The ashes of this plant contain about five per cent. of potassa, and it is somtimes used for repriciting in soap, and, like many other species of the family is said to keep away fleas. With species of Comyns [Comyn, P. C. S.] and Paliarca, it has the name of fleas-bane. It is a native of Europe, and is a common plant in Great Britain. E. concolor and E. alpinus are also found in England and Scotland: the first is a rare plant, and is found on waste ground; the second is a native of Highland Scotland. These species are numerous, and some of them are ornamental plants.

(Baithington, Manual; Burnett, Outlines of Botany; Lindley, Flora Medicinal.)

E. RON. [Wool Tree, P. C.]

E.R.O/DIUM (from ipodicus, a heron), a genus of plants belonging to the natural order Geranaceae. It has 5 petals, 5 stamens, 5 fertile and 5 sterile with glands at their base; the fruit beaked, separating into five to seven segments. The plant is hermaphrodite, and is ultimately spirally twisted, and boarded internally. The species are herbs or undershrubs, having variously-formed leaves, membranous stipules, and many-flowered peduncles. The species of this genus are found in Great Britain, under the name of Geranum, are numerous, upwards of fifty having been described.

E. circurarium, Hemlock-leaved Heron's Bill, has a procumbent hairy stem, the peduncles many-flowered, the flowers of the petals eliatic, the perfect stamens eliiated, not toodh below, glabrous, the leaf hairy below, the leaves pinnate, the leaflets sessile, pinnatifid, cut. The flowers are purplish or white. It is a native throughout the whole of Europe, and is found in the north of Africa. It is abundant on sandy soils and wasteland in Great Britain. There are several well-marked varieties, one of which may be rarity species, as E. c. pimpinellefolium.

E. moeschatum, Musky Heron's Bill, has a procumbent hairy stem, many-flowered peduncles, the clawn of the petals eliatic, the perfect stamens eliatic, not toodh below, glabrous, the leaf downy, the leaves pinnate, the leaflets nearly sessile, ovate, unequaly cut. It is found in waste places in Great Britain, but is an unfrquent plant. It is a larger plant than the preceding, and emits, when wounded, a strong musky odour.

This plant is very generally diffused, and has been found all over Europe, at the Cape of Good Hope, and in Peru.

E. marianum, Marine Heron's Bill, has a prostrate slightly hairy stem, the peduncles 1-2-flowered, the flowers in a minute, the leaves simple, ovate, cordate, stalked, lobed, and crenate. This is a rare plant, but a native of Great Britain, in sandy and gravelly places near the sea.

Most of the remaining species are natives of Europe; some are found in the north of Africa, two or three in Asia, and the same number in America; but the mass of them are truly European. The perennial species are ornamental, and will thrive well in any kind of garden soil. They may be propagated by seeds, and the plants are propagated by seed, which ripens in this country, and only requires to be sowm in the open border to spring in any kind of soil.

(Baithington, Manual of British Botany; G. Don, Gardeners' Dictionary.)

E. PHILIA. [DASIA, P. C. S.]

ERKINSKIE, EBENEZER, founder of a considerable set of seceders from the established church in Scotland, called the Secession church, was born on 22nd June, 1672. He studied in the university of Edinburgh, for some time acted as tutor and chaplain in the family of the Earl of Rothes, and became a licentiate in divinity in 1702. In 1708 he was chosen minister of Forthmoak in the shire of Kinross. He became a very popular preacher, and though his charge was in a retired district people flocked from distant parts of Scatland to attend on his ministry. After having resisted various offers of ministerial appointments in other places, he engaged for the parish of Aberchirder, in the counties of Kincardine and Stirling, in 1713, after he had served for twenty-eight years in Forthmoak. Mr. Erksne's first difference with his colleagues of the church of Scotland was in his support of the principles of the 'mow of modern divinity,' a subject of great controversy during the early part of the century. He was one of several clergymen who, in connection with this subject, were 'rebuked and admonished' by the General Assembly. The secession of the body headed by Mr. Erksne's brother, granular, from the malefice of the party of Queen Anne's reign restoring lay patronage in the church of Scotland, and, though not in all respects technically the same, it was virtually on the same ground as the late secession of the 'free church.' Mr. Erksne's brother, Erksne of Kinross, led by queen Anne's reign, but his brother Ralph, had refused to be pressed, forced on an objecting congregation by the law of patronage. In 1739, the General Assembly enjoined the presbytery to
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receive the presentee. At the same time they passed an act of Assembly regulating inductions, which, as it tended to enforce the law of patronage, was offensive to Mr. Erskine, and he preached against it. After some discussion, the General Assembly refused to treat with Mr. Erskine, whose connexion with the church was thus proscribed, and the Assembly decreed that the church should be disjoined from the ministry of the Gospel. Erskine was indignant, a pamphlet was printed, and the Edinburgh Magazine was used to denounce the Assembly. A reconciliation was sought, and a petition of the ministers and people of Skirlach was presented to the Assembly, but Mr. Erskine, in his petition, refused to agree to a decision. The Assembly subsequently endeavoured to smooth the way for his restoration, but he declined to take advantage of it, and he and his friends, including his brother Ralph, formally seceded in 1756. [Sascedus, F. C.] When the Secession was divided, Mr. John Erskine of Cardross and Mr. Erskine and his brother were of the party of the former. He died on 22nd June, 1756.

[Brown, Historical Account of the Secession; Chambers, Lives of Eminent Scotsmen.]

ERKINE, RALPH, author of Gospel Sonnets, and other religious works, was born on the 18th of March, 1685, and died on the 6th of November, 1722. He became clergyman of the parish of Dumfries in 1711, and his celebrity chiefly rested on his alliance with his brother Ebenezer in the founding of the sect of the seceders in Scotland. [Erskine, Ebenezer.]

ERKINE, JOHN, a writer on law, was born in the year 1695. His father was the first John Erskine, of Cardross, and Lord Cardross, and he was thus the cousin-german of Lord Chancellor Erskine. Erskine's life was that of a recluse student, and was marked by few incidents. In 1719 he became a member of the faculty of advocates but he does not appear to have practised in the courts. He was subsequently appointed professor of Scots Law in the university of Edinburgh. In 1754, he published 'Principles of the Law of Scotland' in one volume 8vo., a work remarkable for its lucid arrangement, and for the tenebrism and clearness of its exposition of the leading principles of the law. It was designed to be a text book for his students, but became a leading law authority. It passed through several editions, the last of which was edited in 1791. More, the present occupant of Ebenezer's chair. He retired from the chair in 1780, and died at his own estate of Cardross in 1765. He had employed his years of retirement in expanding the matter of his 'Principles' into a larger work, which he left behind him nearly finished, and which was published in 1773, in two volumes folio, with the title 'An Institute of the Law of Scotland.' This work has been repeatedly republished with notes, bringing down the law to the dates of the respective editions. It is the great oracle of Scottish law, an authority without superiors among its subjects, and mentioned with delight by John Stuart of Linlithgow, when writing of the legal learning of the English lawyers. It is of little value in respect of its constitutional law, which the author seems not to have been capable of observing otherwise than in mere detail. Owing to the late incorporation of the laws of Scotland with the laws of Great Britain, information relating to these subjects is meagre and antiquated. In all things however relating to the rights of persons arising from their relation to each other, and in the peculiar rules of the feudal system in Scotland, the work continues to be of great value, and to be as useful to the practical lawyer as in its profundity of research and clearness of detail it is an object of admiration to the theoretical student.

ERKINE, JOHN, an ecclesiastical leader, son of the preceding, was born on the 1st of June, 1731. He was licensed as a preacher in 1743, and in 1744 obtained the charge of the parish of Kirkintilloch, near Glasgow. In 1763 he received the degree of D.D. from the university of Glasgow. He was active and prominent among the members of the collegiate church of the Greyfriars in Edinburgh. He had for his colleague Dr. Robertson, the historian, who was leader of the moderate party in church politics, or that body which had the least affection for the predominant characteristics of the General Assembly's party, rebuked the leader of the Evangelical Popular, or as it was sometimes called Orthodoxy party— the same which lately seceded from the church of Scotland, and formed the 'Free Church.' Erskine was an acute and popular preacher, and the titles of the books and pamphlets written by him would fill a considerable space. He died on the 19th of January, 1803. His memory is still revered by his own party.

[Account of the Life and Writings of John Erskine, by Sir John Wisdom.]

ERECA, a genus of plants belonging to the natural order Cruciferae, and to the tribe Brassicaceae. It has an erect calyx, obovate petals, distinct, notoothed stamens; an ovul, oblong, 2-celled, 2-valved, siliquae; smooth concave valves, with an entire seedless beak, scarcely shorter than the valves; the seeds globose. The species are annual branching herbs, with small leaves, and glandular-stipulate pedicels short and remarkable for their beautiful reticulation of brown veins.

E. sinuata, Garden Rocket, has lyrate pinnatifid leaves, with toothed acute lobes, a hairy stem, the pedicels shorter than the pods, which are obovate, and shorter than the valves. It is a plant of grassy fields and waysides in the north of Africa, in Spain, Portugal, France, Italy, Switzerland, and Greece. It is very subject to varieties, and many have been described by various botanists. Although mostly hairy, sometimes its stem is smooth. In Scotland it varies from three to seven feet high; the stems are very variable in the depth and arrangement of their colours. When full grown it has a sweet and unpleasant taste, and a strong, peculiar, almost fetid smell; but when young and tender it is frequently eaten as a salad, especially on the Continent. It is the Roquette cultivée and Le Rocket des Jardins of the French, Raukette of the Germans, and Rucola of the Italians. The whole plant has been used in medicine as a sal inguage. The ripened seeds are a good substitute for the seeds of the mustard, but not so pungent. When cultivated as a salad, the seeds should be sown in a warm border early in February, and again in March and April for successive crops. The plants should be thinned, when the seedlings are three inches high, and the rows placed from three to four inches apart, and they should be kept clear of weeds. If a supply is required throughout the year, the seeds may be sown every month. The plants sown in February should be allowed to produce seed, which ripen in August, and may be re-sown the following spring. The cultivated varieties are ornamental plants, and when cultivated as ornament need only to be sown in the open border and treated as other hardy annuals.

[Lindsay, Flora Medica; Don, Gardener's Dictionary.]

ERUCASTRUM, a genus of plants belonging to the natural order Cruciferae, and to the tribe Brassicaceae. It has a square pod, the valves convex, with one straight nerve, the seeds oblong or oblong in a single row. This genus has been formed by Schimper and Kerner, and is only one of the numerous species of the genus Sinapis. E. incommun, the Sinapis incommn of Linnæus, has been found in sandy places in Jersey and Alderney, and has consequently a place in the British Flora. It has adpressed pods, which are turqoi, with a short 1-seeded beak. The stem reaches from 1-3 feet high. This plant is also a native of the South of Europe, especially Spain; and is the Caule Hispanica L'Héritier, the Hirschfeldia adpressa Bochow, the Eschscholzia grandiflora Gerwick, and the Telinum baldianum of the natives of Switzerland and the upper district of the Rhine.

[Babington, Manual of British Botany; Don, Gardener's Dictionary.]

ERYBURN [Vicere, P. C.]

ERYNGIUM, a genus of plants belonging to the natural order Umbelliferae, and the tribe Saniculae. It has a calyx of five leafy teeth; the petals erect, oblong, with a long inflexed point, the fruit oblong, covered with chaify scales without ridges or veins. The species are usually perennial spiny herbs, with the flowers congregated into oblong or roundish dense heads.

E. maritimum, Sea Holly, has the radical leaves roundish, pinnately lobed, the leaves from the involucro 3-lobed, spurious, longer than the heads, the scales of the receptacle 3-lobed. The stem is more than a foot in height, and is branched and leafy. It is a native of Europe on the sands of the sea-shore, and is found on the European and African shores of the Mediterranean Sea. It is abundant on the eastern shores of England, and is found in Scotland and Ireland. The plant is called in England Sea Eryngium, Sea Hyluer, and Sea Holme. According to Erckmann it flowers in May, and the flowers are seen when boiled and eaten like asparagus. The leaves are sweetish, with a warm aromatic flavour. The root also is sweet to the taste, and has an aromatic smell. It has been used in medicine as a tonic, and is now regarded as it is a valuable aperient and diuretic. The root is also supposed to possess aphrodisiac virtues. It is candied and sold in the shops in London as a sweetmeat. There is still an establishment at Colchester, in Essex, where the roots are candied, in which town this preparation was first made. It was made for the first time by Mr. Buxton, an apothecary. It is not now much used by medical men, but at one time it had a reputation in many diseases.
Erysiphe. (Gasteromyctes, C. S.)
ESCROW. (Derd, P. C.)
ESCUCTHEON. (Heraldy, P. C.)
Esox, a genus established by Linnaeus for the reception of the pike and some allied fishes. It is now subdivided, and the resulting genera, with the flying-fishes (Exocoetus), constitute the family Exocidae. The genus Esox, as at present received, has for its type the Esox Lucius of Linnaeus, the common pike. The generic character is the shape and armature of the organs of mastication. The jaws, pia-
tine bones, and vomer are furnished with teeth of various sizes. The head is oblong, obtuse, depressed, and large in proportion to the body. The dorsal fin is placed far back and produces a very slight elevation of the body. The pectoral fins are divided posteriorly into finslets resembling those of a mackerel. Hemiramphus is a curious genus of sea-pikes, in which the upper jaw is extremely short, while the lower one resembles a bird's long, flat bill. Melanocoryphus is distinguished from Esox by Linnaeus. It has the head comparatively short, the dorsal and anal fins placed much farther forward, and the pectoral fins so large as to serve the purpose of wings. It is a very valuable fish, and is caught in the air for some time after it has sprung out of the water. The true or fresh-water pikes are well known fishes, esteemed for food, and remarkable for their voracious and de-

E. campestre has the radical leaves two or three times pin-
natifid, spiny, stalked, the stem leaves embracing the stem, bi-
natifid, the leaves of the involucre lanceolate, spinous, longer than the pedicels. E. campystis, before described, is the claim of this plant to be considered a true native of Great Britain.

E. vitigosa has linear lanceolate leaves, entire, with stellate

Some of the seeds require the greenowing frame, and should be grown in pots. They may be prop-
gated by dividing the roots or by sowing the seed.

This plant is employed in North America for an application to the hite of the rattle-slash, hence its common name.

It is a native of North America, from Pennsylvania to Virginia. It is also found in the Society Islands, California and Buenos Ayres. It inhabits marshes, inundated pastures, and the banks of rivers. A native of Jamaica, Cayenne, Demerasa, Florida, and Brazil, in fields and woods. The negroes and poorer whites in Jamaica regard this plant as a valuable remedy in hysterical fits; hence it is called in the West Indies fitweed. It is administered in the form of a decoction or infusion of the whole plant.

toadstool, the upper leaves mostly seahorse, the pedicels as long as the lower leaves. This plant is found in the forests, and is called treele-mustard. Babbage marks this and all the other species of Erysimum as plants that have been pot-
etted in England, and which have greatly increased since brought into Great Britain, though now looking very like true natives.

E. orientale has elliptical heart-shaped chaste leaves deep-
ing the stem, the radical leaves oblong, smooth, slightly

A. circinatum, a native of Ireland.

E. cheiranthoides, Weed-seed, Treacle-Mustard, has ob-

broadly linear, with parallel nerves; the lower leaves eniform, the floral leaves lanceolate, toothed; the seed has the involucre shorter than the flowers; the stems dichomotypous. It is a native of North America, from Pennsylvania to Virginia.

Nearly one hundred species of this genus have been de-
scribed. They are found in greatest numbers in America, but many are inhabitants of Asia, Africa, and Europe. They are most of them handsome and ornamental plants, and worthy of cultivation. They will grow freely in any common garden soil, but the lighter or more sandy the soil the better they will grow. Some of the seeds require the greenowing frame, and should be grown in pots. They may be prop-
gated by dividing the roots or by sowing the seed.

Dn, Gardener's Dictionary; Babbage, Manual of British Botany; Lindley, Flow Medici-

Erysimum (from erys, to draw), a genus of plants be-

natural order Cruciferae, and to the tribe Sicym-

It has a tetragonal pod, the valves prominently keeled with one longitudinal nerve, the stigma obtuse, entire or slightly emarginate, the seeds in a single row, the funiculus filiform. The species are annual, biennial, or perennial herbs, with variable leaves, and elongated, terminal, many-flowered racemes.

Allaria of Linnaeus, Smith, Schulteh, and others, is

generally now admitted as the type of a new genus, Allaria of Adamson. It differs from Erysimum in not having its valves keeled with a single nerve, but having 3 longitudinal nerves, and in the seeds being striated, and the funiculus flattened and oblong. It is a native of the north countries of Europe and Asia. A. suberosa, the Scandinavian mustard, which is so called, may be easily distinguished from the preceding species by its thicker leaves, longer aerial stems, much smaller flowers, and by the shorter capsules. It is a native of Sweden and Norway, and is found in meadows and pastures. The seeds are rather large, smooth, and brown, and contain a very nourishing oil.

Linnæus says that sheep and cows and poultry eat it, but the horses and goats refuse it. When eaten by cows it gives a disagreeable flavour to the milk. Poultry also which eat it have pained heads, and sometimes suffer from distempering.

The leaves were formerly used as a diaphoretic, and a pol-
tice of them was recommended as an antispetic in gungrous and catarrhal complaints.

A second species of Allaria has been described as A. brac-

E. campystis, before described, is the claim of this plant to be consid-

It is a native of Jamaica, Cayenne, Demerasa, Florida, and Brazil, in fields and woods. The negroes and poorer whites in Jamaica regard this plant as a valuable remedy in hysterical fits; hence it is called in the West Indies fitweed. It is administered in the form of a decoction or infusion of the whole plant.

E. aquaticum, Rattle-slash Weed, has the leaves broadly

with variable leaves, and elongated, terminal, many-flowered racemes.

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The sea-pikes, the gar-fish, and the larynx (Scombersonyx) are not so well known. They are gregarious, and swim near the surface of the water, leaping out of it with great agility, and playing round bodies which float on the surface of the sea. The peculiar formation of the heads of these species, the length of the spines, and the gregarious habits of the young, excited every naturalist; but the question is not yet settled. On the southern coasts of England and Ireland they are common. The bones of the Belone are green: the flesh is firm and white, and has much the flavour of that of the mackerel.

ESSEX, JAMES, the first professional man in the last century who made Gothic architecture his study and practice, was the son of a carpenter in good business at Cambridge, where he was matriculated at King's College, the unrivalled Chapel became the object of his admiration, and finally impressed him with the powers and beauties of a style which was then neither valued nor understood, but scornfully rejected as monkish and barbarous. Except his own eyes and his own judgment, he had nothing to assist or direct him in the study of it—nothing to give him even the slightest insight into its principles. Greatly therefore is it to his credit that his own judgment and perseverance enabled him to arrive in the knowledge of it, and to do in it what he did, instead of being led astray by Battie Langley, who had about that time just published his 'Gothic Architecture improved by Rules and Proportions.' In 1757 he was employed by Beitham to make drawings for his work on Ely Cathedral, and from him he acquired much information relative to the history of Gothic architecture and its leading styles; and of that cathedral itself he altered the choir in 1770, and conducted extensive repairs in other parts for many years. He died of the gout at eighty-four, at the house of his daughter, in Minster, where he erected a stone altar-piece of his own design. Besides various alterations at several of the colleges at Cambridge, he executed some repairs at King's College Chapel, and designed the stone screens about the altar there. A successful librarian of books, he was a distinguished and valued friend of Mr. Wright, in memory of Catherine of Aragon; and improvements in the ancient mansion at Maddingley, Cambridgeshire, the seat of Sir John Hinde Cotton. He also published designs for new buildings at King's, Benet (Corpus Christi), and Emmanuel Colleges, and for a new Public Library at Cambridge. His reputation as an antiquary was considerable, and he was acquainted with most of those who were noted for their attachment to similar studies—Gray the poet, Horace Walpole, Crookshank for house-building, and Mr. Batty Langley, a member of the Society of Antiquaries, he contributed some papers to their Archaeologia, viz. 'Remarks on the antiquities of different modes of brick and stone buildings in England,' vol. iv.; 'Observations on Lincoln Cathedral,' vol. 4.; 'On origin and antiquity of Round Churches,' vol. 6. His name would no doubt have been more generally known had he lived to effect his intention of publishing Plans and Sections of King's College Chapel. He died at Cambridge of a paralytic stroke. He left his only child, and a grandson, just three months after his mother, who reached the age of eighty-four.

ESSINGTON, PORT, is the first and to this day the only existing European settlement on the northern coast of Australia, of the line of establesting this colony in this part of the world appears to have been suggested by the unpreceded rapidity with which the colony of Singapore rose in the year following its establishment, which took place in 1812. [SINGAPORE, P. C., vol. xii. p. 41.] As the trading population of the western portion of the Indian Archipelago had resorted to Singapore for the disposal of their produce and the purchase of European and Indian commodities, it was thought that a similar establishment at the eastern extremity of that archipelago would attract the merchants of the eastern portion of it. But the first attempt was not successful. The record of this year shows that Australia having been surveyed a few years before, the new settlement was founded on the Bay Strait, which separates the islands of Melville and Bathurst, and was called Port Dundas. In 1827 a small establishment was erected at Raffles, on the peninsula of Coburg, and called Singapore. Other European settlements were abandoned in 1828, because none of the Malay traders resorted to them. The climate was found to be rather unfavourable to Europeans, and the soil of an indifferent quality; besides which, Apsley House, the residence of the Governor, and encumbered with shoals. Major Campbell, who was the last commander of Port Dundas, had an opportunity of examining the country in the neighbourhood of these settlements, and he recommended the establishment of a colony at Port Essington, which was made in 1828.

Port Essington is a deep inlet, situated on the northern side of Coburg peninsula, which projects west-north-west from the mainland of Australia, between Mount Norris Bay on the north and Great Artesian's Gulf of the south, and extends in that direction nearly sixty miles. The greatest breadth of the peninsula is fifteen miles, and its narrowest part, where it is joined to the main by a neck of land of five miles in length, is two and a half.

Port Essington lies between 11° 6' and 11° 25' S. lat., and between 132° 5' and 132° 19' E. long. The inlet at its entrance, between Point Smith on the east, and Vasbon Head on the west, is seven miles wide, and extends south by eastward to the estuary of the Dart River, whose mouth is about five miles. Its average breadth is five miles. The depth of water in the port is from six to twelve fathoms, and at the southern end it forms three spacious harbours, each of which extends three miles wide, with a width of about two; the depth of water is five fathoms, with a bottom of stiff mud and sand. These harbours are sheltered from every wind, and afford excellent and secure anchorage for vessels. Indeed the whole port is a secure place of anchorage for vessels of any size, and forms altogether one of the finest harbours in the world. There is no harbour yet known (Port Jackson excepted) to be commanded in the whole extent of Australia, and it may be entered with safety both by night and day. Being within the range of the regular monsoon, it is accessible to the Malay and Bugis trading galleys and to the junkes from China.

The shores of this inlet present a pleasing variety of little bays and sandy beaches, alternating with bold cliffs and steep clay banks. The interior of the peninsula is a continuous forest of trees and underwood, occasionally relieved by small round hills, rising a hundred feet above the general elevation of the land, which rises in gentle undulations from one hundred to two hundred feet above the level of the sea, but in many places only from thirty to sixty feet. The soil is in many places of great fertility, and is watered in the summer by the same heavy rains which fall on the low flats and hollows, and near tracts which are swampy in wet weather. The best land is found on the east of Port Essington. The vegetation is luxuriant. The forest land is clear of underwood; the grounds and hollows produce good grass, even in the middle of the dry season, and it is supposed that most, if not all, the tropical productions could be brought to considerable perfection on Coburg peninsula.

The trees, though not of great dimensions, are of sufficient value. The gums, the turpentine trees, the eucalyptus and from 1825, a large extent of the trees introduced by the settlers thrive very well, especially the orange, lemon, shaddock, coco-nut, and tamarind trees. Fruit-apples are excellent; bananas, pumpkins, and sweet potatoes, succeed well; also the sugar-cane, turmeric, arrow-root, capucins, and culinary vegetables. The vegetation suffers much during the dry season, and requires to be irrigated. There are some indigenous roots which the natives use for food.

The only forest of the peninsula contains buffaloes, wild cattle, ponies, and pigs. They appear to be the offspring of the stock left at Port Raffles when the settlement was broken up, with the exception of the buffaloes, which are met with in considerable numbers, and were brought there long before. There are also kangaroos, emus, cassowaries, pigeons, quails, curlews, wild geese, ducks, and swamp pheasants; and a great variety of perroquets, cockatoos, hawks, herons, cranes, and gulls. The inlet is also well stocked with fish, especially mullet, calves, bronz, gar...
The north-west monsoon brings the rainy season. It is preceded by squalls and variable winds. The time of its commencement varies between three and four weeks. Sometimes it begins the middle of October, and sometimes in November or the beginning of December. The rain during this monsoon falls in torrents, but seldom continues above two or three hours at a time. It generally falls from two to five o’clock in the afternoon or during the night. The general range of the thermometer is from 90° to 96° in the shade. The mean heat at midday is between 87° and 92°, and the extremes 78° and 96°. During this monsoon there is almost daily thunder in the afternoon and evenings. The termination of the north-west monsoon is indicated by squalls, and usually a tempest in the early part of April. The sun then returns to the northward, the wind settles in the north-east, the sky becomes clear, the rains cease, the atmosphere becomes drier, and the weather more temperate. In May the thermometer ranges between 75° and 86°, the nights being cool. June, July, August, and September are the most pleasant season in the year. The mornings and evenings are agreeably cool, and exercise can be freely taken until ten in the morning, and may frequently, with impunity, be taken even in midday. Very few showers fall during these months, but there are heavy dews at night. In exposed places vegetation is completely burnt up. The thermometer during these months is between 68° and 75° at six o’clock in the morning, 74° at three in the afternoon, and 77° at midnight. The extremes are 83° and 90°. Notwithstanding the clearness of the sky during the dry season, the atmosphere contains considerable moisture, which is evident from the great difficulty of keeping provisions dry. The wind blows very frequently at forty miles from the coast. In the interval the winds often blow in the direction of the monsoons, but frequently they are changed into regular sea and land breezes.

In Port Essington these breezes are frequently affected by the tides. After a calm they spring up and blow into the port with the flood, and again fall calm or blow out with the ebb.

Meteorological observations have been made regularly for four years, at six o’clock in the morning and at two o’clock in the afternoon. The following table contains an abstract of them:

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<th>Month</th>
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<td>January</td>
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<td>December</td>
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The average heat of the whole year is 83°, or about that of the equator. The difference of temperature between the observations in the morning and in the afternoon does not generally amount to more than 7 or 8 degrees in the rainy season, but during the winter it is commonly 12 degrees, and frequently even 20.

On the western shores of Port Essington the town of Vis-
who are not on the foundation) and the collegers. The foundation scholars are admissible from the age of eight to sixteen, and unless elected at the age of seventeen, and put on the roll for admission to King's College, Cambridge, another foundation of Henry VI., they are superannuated at eighteen. Those scholars who are elected may continue in college till nineteen; and even at eighteen they may leave the college and continue as opizzians. The annual election is by public act, and the members of the college, in an examination of the upper class by the provosts of Eton and King's College, Cambridge, the vice-provost of Eton, two fellows of King's College, called 'Posers,' and the head master of Eton, are to agree. This system is said to be ruinous, as the candidates are transferred to Cambridge, but remain at school until a vacancy occurs on the foundation of King's College. On their removal to Cambridge the Eton scholars are received on the foundation and maintained out of its endowments, and after three years of residence at Cambridge, the whole of their proceedings at Cambridge averages four yearly. There are two scholarships at Merton College, Oxford, for foundation scholars who are not elected for King's College, Cambridge: the scholars who are sent to Merton College are called "Postmasters." There are some other exhibitions, amongst which are several for supranominated scholars. In 1835 the Duke of Newcastle founded and endowed three scholarships of the value of 50l. each; and in 1842 Prince Albert instituted an annual prize of 50l. which was transferred to Cambridge, but remained at school until a vacancy occurs on the foundation of King's College. On their removal to Cambridge the Eton scholars are received on the foundation and maintained out of its endowments, and after three years of residence at Cambridge, the whole of their proceedings at Cambridge averages four yearly.

Santa shows that the society is supported by the Eton College, Cambridge: the school, which is divided into two parts, consists of the Upper and Lower School. The Upper School consists of the whole of the students, except the principal part of them. The Lower School consists of the principal part of the students, and is under the Inspection of the Provost of Eton. The financial arrangements of the college are such that the governors are able to pay the salaries of the masters and to contribute towards the maintenance of the students. The college is well endowed, and has a large library of books, both ancient and modern. The college has a large number of buildings, including a chapel, a hall, and several other rooms. The college is also well supplied with books, including a large number of works of science, literature, and art. The college is well known for its excellence in education, and is highly esteemed by its students. The college is also well known for its excellence in education, and is highly esteemed by its students. The college is well known for its excellence in education, and is highly esteemed by its students.

EUGENIA CRINITES, a genus of fossil Crinoidea. (Goldfuss.)

EUGNATHUS, a genus of fossil Placoid fishes, from the lac, thirteenth British species. (Agassiz.)

EUROPHALUS, a genus of fossil Gasteropoda, from the Palaeozoic strata, of the 4,5-lobed, 4-5-stemmed inserts in the margin of the disc; 4-5-stemmed inserts in the disc; a single style; the capsule 3-5-celled, 3-5-angled, the dehiscence loculicidal; the seeds solitary, with a viscid aril, 4 A 2.
mostly called the now deep native singular white, and the flowers mostly 4-cleft, and tetranymous, the branches tetranustral, smooth, and even, the leaves elliptic-lanceolate, minutely serrate, the capsule oblongly angular, not winged. It is height of the wood is 15 feet or 30 feet, and is found abundantly in Great Britain. The flowers are small, of a greenish white colour, and give off a slight odour. Its use is for making cuteliers and larding pins. It has, in common with the Cornus sanguineus, the names of Dogwood and Gatteridge Tree; the first name is in allusion to the use of the wood of these trees for making an infusion with which many dogs were washed. It is also known in English by the name of Louse-berry, a name which it has got from its berries being used when powdered as an application to the head for the destruction of lice. The wood of this tree is also used by masons for making stone tools and picks, &c. the branches are cut when the shrub is in blossom, as that is the period when the wood is toughest. Linnæus says that crows, goats, and sheep eat the leaves, but that horses refuse them. The leaves are poisonous in great quantities, vomiting, and purging. Whilst growing wild in hedges and coppices this plant does not attain any great size; but when planted and allowed to grow alone, it becomes a tree, and reaches a height of twenty or thirty feet. Although almost entirely neglected in the planting of pleasure-gardens, it forms a singularly beautiful object in the autumn, when its clusters of red berries are ripe. The seeds are covered with an arillus, which is of a beautiful orange colour.

E. latifolius has smooth branches, broad ovate leaves, trichotomous many-flowered peduncles, oval obuse petals, the lobes of the capsule ovate and wing-formed. It is a deciduous shrub or low tree, a native of Austria, Hungary, and Carinthia. This tree has a singular appearance, and is worthy of cultivation on that account amongst collections.

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The latter was painted, according to Plutarch, with a degree of inspiration; it represented Gryllus, the son of Xenophon, at the head of some Athenian horsemen, deftly evading the Boeotian horsemen under Epaminondas, who is said to have been slain by Gryllus: The Epanorthos and Pausanias call it a cavalry fight; it took place in B.C. 362.

Of the picture of the Twelve Gods, Eustathius relates the following anecdote:—Whilst the picture was in progress Plutarch, at Antwerp, suggested corrections; numerous visits from him were made to the artist. For his Jupiter, when happening to pass the door of the Gymnasion, he heard repeated the celebrated lines of Homer (Iliad, i. 529),

"Kronos spoke, and gave the nod of assent with his hawk eyebrows, And the son of the earth, whose voice was the echo of the king of the well was shaken on his immortal head."

and immediately exclaimed, I have found a model! and went home and painted the head accordingly. However, according to Valerius Maximus, he bestowed so much care upon the head of Neptune, that he exhausted himself, and being unable to exalt the head of Jupiter above it, he is said to have copied the Olympian Jupiter of Phidias. A similar criticism in some respects, with perhaps a little truth, has been often repeated respecting the celebrated picture of the 'Last Supper' at Milan, by Da Vinci: Lomazzo is said to have taken so much pains with the head of St. John that he was forced to leave that of our Saviour unfinished, in despair of surpassing the perfection of the composition. Eustathius says that this picture was a statue of Paris, which was praised, says Pliny, for showing at the same time the judge of the goddesses, the lover of Helen, and even the slayer of Achilles. Pliny mentions also several statues by Euphranor, which were at Rome.

His life and death are described by Pliny (Hist. Nat. xxxiv. 8, 19; xxvii. i. 40; Quintilian, Inst. Orator. xil. 10, 3; Plutarch, De Glor. Athen. 2; Pausanias, i. 3; Eustathius, Ad Iliad. i. 529; Valerius Maximus, vill. 12).

EUPHRAASIA (from ἐφρασία, 'delight'), a genus of plants belonging to the natural order Scrophulariaceae or Scrophularineae. It has a campanulate 4-cleft calyx, the upper lobe of the corolla, the middle lobe emarginate, 4 stamens fertile, the lower lobe of the upper anthers with a long spur; the capsules oblong-ovate, compressed, emarginate, with entire valves; the seeds few.

E. officinalis, Euphrasia, Eyebright, has ovate or cordate-ovate narrowly sessile serrate leaves, the corolla glabrous, the lobes of the lower lip emarginate, of the upper lip patent sinuate-dentate, the anthers unequally nucrocarpous, hairy. It is from 1 to 4 inches high, and is a native of the mountains of Europe, Scandinavia, Cashmere, and all the north of Asia. It is common in Great Britain. This species is peculiarly subject to variation. The leaves are ovate, or cordate-ovate, or cordate-triangular, with the teeth acute or obulate, or both; the flowers also vary much in shape. There is scarcely a character permanent except the pungency of the corolla. This elegant little plant has a slightly bitter and aromatic flavour, and has been employed much in medicine, particularly in diseases of the eye. Its use in these complaints seems to have originated in its bright appearance, and when the doctrine of signs and seals prevailed, this was supposed to indicate its value in brightening the eyes. Although it has lately fallen into disuse, its astringent effect is undescribed in certain diseases of the eye, and will explain the fact that Professor Knanichfeld has related of its being useful in ophthalmic affection of the eye. The expressed juice and distilled water of this plant have been used in many cases in which it has been used as a counter-irritant, and the juice also has been used as a wash for the eyes. E. Odontites has the leaves narrowed from the base, opposite, linear-lanceolate, remotely serrate, the floral leaves longer than the flowers, the corolla pubescent, the lobes of the lower lip oblong obtuse, the anthers with 2 equal points, hairy. Pliny says it is found in the mountainous regions of Great Britain in meadows, corn-fields, and waste places. This plant is the Bartsia Odontites of Hudson, and the Odontites rubra of Persoon.

There are several other species of Euphrasia; although pretty plants, none of them will grow well in cultivation.

(Behington, Manual of British Botany; Lindley, Flora Medica.)

EUODA (from οὐδα, and νεῖκος, νεῖκος, a foot), Latrille's fifth family of tetraxyrous Coleoptera. The great size of the posterior thighs, in many insects of this family, gives rise to the appellation. The genus Sagra, many species of which, re-markable for brilliant red, purple, and green colours, are brought from the East, and the genus Citroceris, are types of subdivisions of the family.

EUPOMPUS [FAMILY].

EUYRALE (after the name of the Gorgons, in allusion to the threatening armed appearance of the plant), a genus of plants belonging to the natural order Nymphaceae. It has a calyx of 4 sepals inserted in the torus and adhering to it; 15-38 stamens. A. 15-20 cm. of fruit half-ferns to the sepal, petals and stamens adhering half-way up. There is but one species of this genus, E. ferox, which is an elegant aquatic covered all over with prickles with large petaloid orbicular leaves, and bluish purple or violet flowers. About the middle of the species is the yellow water-lily. It is a native of the East Indies in the lakes Guntmo and Gogra, also in the province of Kianang in China. This plant presents a very singular appearance. Its petals and calyces are h节假日 with stiff prickles. The leaves are about a foot in diameter. The root or rootstock contains starch, which may be separated as food, or the root may be eaten, as is done by the inhabitants of the districts where it grows.

In cultivation, this plant must be kept in water in a hot bath or oven. It will produce seeds if the pollen of the anthers, when it is in full bloom, be shaken on the stigma. It can only be propagated by means of its seeds.

(Do. Dictionary of Gardening.)

EUBYSNORTUS, a genus of fossil Ganoïd fishes, from the limestone of Burdige House and the shales of Newhaven. (Aragon.)

EUYRUSINUS, a genus of fossil Crinoides, from the mountain limestone of Scotland. (E.)

EUYPTERUS (Hartley), a singular genus of fossil Crassataceae, from North America and Scotland. E. Scouleri occurs in carboniferous limestone at Kirkton, near Glasgow.

EUSEBIUS BIUS (Eleutherus), bishop of Emessus in Phocide, was born in the neighbourhood of Edessæ, and belonged to a very illustrious family. He was from his early youth instructed in the principles of the Christian religion, and had the most distinguished teachers of the time. He afterwards cultivated himself in the study of theology under the direction of the celebrated Eusebius, Bishop of Cæsarea in Cappadocia. However, as he wished to avoid being appointed to any ecclesiastical office too early, he went to Alexandria to spend some time in the study of philosophy. On his return from Alexandria he stayed for some time at Antioch, and formed an intimate friendship with Flaccillus, the bishop of the place. In A.D. 341 Athanasius was deprived by the Synod of Antioch of his bishopric of Alexandria, and Eusebius, to whom it was offered, refused it, though soon afterwards he accepted it. He was distinguished, however, for his leniency of his ordinance the people of Emessae rose against him, charging him with pursuing mathematics and magic. Eusebius took to flight, and for a time he stayed with his pupil, Georgius, but afterwards he returned to Emessus, where he was tolerated, owing to the influence of his friend Georgius. He died at Antioch in A.D. 360. Eusebius was a great favourite of the emperor Constantius, who is said to have been accompanied by him on several military expeditions. Some of his contemporaries charged him with favouring the Sabellian heresies; but Sozomen thinks that this accusation was suggested to his enemies only by their envy of his great virtues. Hieronymus even calls him the ringmaster of the Arian party, a strong expression, which, from the pen of Hieronymus, must be taken with great caution, for as far as we know, all that can be said is that Eusebius had a leaning towards the views of several Arians. We may say that he was a very cultivated mind and great eloquence: he wrote a great number of works which were well received by his contemporaries; but all of them are lost, with the exception of a few still to exist in MS. in some libraries. (Selecte, Hist. Eccle. ii. 9; Sozomen, Hist. eccle. v. 6; Hieronym. de Scriptor. B1; Nicphorum, ix. 5.) His Life written by his friend Georgius of Antioch is lost. There exists, under the name of Eusebius, a collection of fifty homilies, which were published in a Latin translation by J. Gagnèius, Paris, 1625 (reprinted at Antwerp, 1555); but all critics agree that these homilies are the productions of a much later age than that of Eusebius of Emessus.

(Euc, Historia Literaria, vol. i. p. 136, &c.; Fabricius, Bibliaoth. Graece, i. p. 412, &c.)

EVA'GRORAS (Evagoras), king of Salamis in the island of Cyprus, from B.C. 410 to 376. His family, the Teucrid,
had been deprived of the government of Salamis by a Phocian, Abdymb, who, with the view of securing himself against the Greeks, placed his usurped kingdom under the protection of Persia, and promised to reduce the whole island under the same nominations. During the first year of the times in which Evagoras spent his boyhood at Salamis without being molested; but when the usurper had been murdered by one of the Cyprian nobles, Evagoras fled to Soli in Cilicia, for the purpose of being, by himself, an object of some terror to the Trachisians. He was then a very promising youth, and distinguished for his intellect as well as bodily strength. However, Evagoras resolved to recover the kingdom of his ancestors, and, accompanied by a band of fifty fidelity friends, he made a determined effort to second his escape. He precipitated a liquid to a close very honourable to Evagoras. He did not long survive the occasion of his escape, for in n.c. 374, being then at an advanced age, he was murdered by a eunuch whose wife had been seduced by a son of Evagoras. He had been married to Leto, by whom he had fathered a son of his family. He was succeeded by his son Nicocles. (Isocrates, Evagoras; Diod. xiv. 39, 98, 110; x. 2-9, 47; Photius, Bih. Cod., 170; Pausanias, i. 3. 3; Xenophon, Hellen. i. 8. 24; Aristotle, Polit. v. 8; Lucian, Pro inc. 27.)

From this Evagoras we must distinguish another, who was likewise king of Salamis, and, so far as chronology is concerned, may have been either a son or grandson of the first Evagoras. He was deprived of his kingdom by one Evagoras, but recovered it in n.c. 550, with the assistance of Persia. Soon after however, some calumnies against him being brought before the Persian king, he was expelled a second time by Protagoras. Evagoras indeed succeeded in persuading Artaxerxes to order him to be restored to his position of authority, and he received a satrapy as a compensation. In consequence of his bad administration he was obliged to escape: he fled to Cyprus, but was overtaken and put to death. (Diod. xiv. 39.)

EVAPORATION is the transformation of a liquid substance into a gaseous state by the action of heat; according to circumstances the effect may take place slowly and without any apparent movement of the surface of the liquid from which the vapour arises, or may take place rapidly and be accompanied by an elevation. If any liquid be placed in an open vessel, it will be found gradually to diminish in quantity by a sensibly insensible evaporation, and it will at length disappear: the quantity of liquid will be diminished in a ratio which is evidently proportional to the area of the exposed surface; but, with equal temperatures, the escape of vapour from different liquids will be found to take place with different degrees of rapidity. An evaporation of the waters at the surface of the earth is going on at all times, and over the surface of an ocean the aqueous vapour held in the atmosphere amounts to an enormous quantity; much of this vapour is precipitated to the earth in dew, rain, &c., but it is probable that the atmosphere is not the lower plate, its content being subject to evaporation and condensation.

The quantity of water which rises from a liquid having a given surface appears to depend upon the temperature of the liquid; but, in a given time and in the open air, the rate of water which has evaporated is not affected by dryness or moisture: in dry weather, even in winter time, the evaporation is more considerable than in damp weather, but it is greatest when the atmosphere is both dry and warm. At equal temperatures, in a close vessel, the evaporation is the same whether the vessel containing the liquid is also air or have the air exhausted from it; but in the latter case the quantity of water absorbed by a vessel of given degree of heat is capable of raising the upper part of the vessel immediately, whereas in the former a certain time elapses before that quantity is disengaged.

In order to obtain a knowledge of the quantity of water evaporated in the open air, in a given time, the atmosphere being calm, Dr. Dalton determined some in a cylindrical vessel of tin from one end of the beam of a balance and raised it to the temperature of the water evaporated in one minute from the exposed surface. At the boiling-point (212° Fahr.) the evaporation of one square inch of surface was found to be equal to 4.344 grains per minute; and at the temperature of the water evaporated in one minute from the exposed surface. Between these limits the quantities of the evaporation per square inch, in grains, are nearly proportional to the heights, in inches, of the columns of mercury, whose weights are equivalent to the elastic forces of the vapour at the different temperatures.

In these experiments no allowance was made for the ef
E V A

The pressure of the atmosphere on the surface of a liquid, under water, the evaporation of water, and the temperature of the air; the conversion of a liquid into a gas is therefore facilitated by placing the vessel containing the liquid under the receiver of an air-pump and extracting the air: but the vapor itself acts by its elastic force on the surface of the liquid, and impedes, at least for a time, the escape of more than a certain quantity; consequently the cooling process may be greatly accelerated by employing some means of absorbing the vapor as fast as it is formed, thus allowing the evaporation to go on at a more rapid rate. Accomplishing this end were discovered by Sir John Leslie, who placed a shallow open vessel containing sulphuric acid or urine of lime long with the vessel containing the water from which an evaporation was to take place under the receiver of the air-pump. The vessel was closed at the top, and the water was speedily converted into ice. [FREEZING APPARATUS, P. C. S.; see also CRYOPHORES, P. C. S.]

If a glass bottle containing water be covered with a cloth which is kept constantly wet by the application of water the evaporation from the wet cloth will soon diminish the temperature of the water which is in the bottle. A similar effect is produced, but in a higher degree, on moistening the bottle with some spirit, as alcohol; and if a cloth dipped in alcohol be applied to the ball of a thermometer, the mercury in the tube will descend more rapidly; the cooling is found to be so much greater as the spirit is more volatile; and it appears to be the greatest when ether is employed.

The degree of cold thus produced is increased by any means which will accelerate the evaporation: thus, by wrapping a piece of linen dipped in ether round the ball of a mercurial thermometer and exposing the apparatus to a current of air, the mercury in the tube will descend. A similar effect is produced by boiling water, for the generation of steam is found to be so much greater as the spirit is more volatile; and it appears to be the greatest when water is exposed to a current of air. By a similar process, using sulphuret of carbon instead of ether, Dr. Marcot (Phil. Trans. 1813) succeeded in freezing mercury.

EVERTINGEN, ALBERT VAN, a very able Dutch landscape painter and etcher, born at Alkmaar in 1621. He studied under Roland Savery and Peter Molyrn, known as the Cavaliere Tempesta, and he surpassed them both. The wild beauty of the rugged island of Zealand is chiefly from Norwegian scenery; he spent upwards of a year in Norway, and took the greatest delight in sketching the wild scenery of its rugged coast. Everdingen was excellent also in sea-storms, and in all his works showed himself a master of aerial perspective. Some of his landscapes are extremely true and picturesque, and he excelled in figures and animals. He died at Alkmaar in 1675. Everdingen's etchings are numerous, but scarce; among them are a series of one hundred Norwegian landscapes, and a series of fifty-six colo-

EVIDENCE. [EVIDENCE, P. C.]

In 1842 an act was passed (6 and 7 Vict. c. 85), entitled 'An Act for improving the Law of Evidence,' which enacted, 'That no person offered as a witness shall hereafter be excluded by reason of incapacity to testify from giving evidence, either in person or by deposition, according to the practice of the court, on the trial of any issue joined, or of any matter or question or on any inquiry arising in any suit, action, or proceeding civil or criminal, in any court of the United Kingdom or in any court of law or equity, of any judge, sheriff, constable, county officer, or person having, by law or by consent of parties, authority to hear, receive, and examine evidence; but that every person so offered may and shall be admitted to give evidence on oath, or solemn affirmation in those cases wherein affirmation is by law receivable, notwithstanding that such person may or shall have an interest in the matter in question, or in the event of the trial of any issue, matter, question, or injury, or of the suit, action, or proceeding in which such witness is offered as a witness, and notwithstanding that such person offered as a witness may have been previously convicted of any crime or offence: provided that this act shall not render competent any party to any suit, action, or proceeding individually named in the title, or any legatee of the testator, or any tenant or premises sought to be recovered in ejectment, the landlord or other person in whose right any defendant in replevin may make cognizance, or any person in whose immediate and individual interest the suit is brought or defended, either wholly or in part, or the husband or wife of such persons respectively; provided also, that this act shall not repeal any provision in a certain act passed in the session of parliament held in the seventh year of the reign of his late majesty and in the first year of the reign of his present majesty, entitled 'An act to amend the Amendment of the Laws with respect to Wills': provided that in courts of equity any defendant to any cause pending in any such court may be examined as a witness on the behalf of the plaintiff or of any co-defendant in any such cause, saving just exceptions; and that any interest which such de
fendant so to be examined may have in the matters or any of the matters in question in the cause shall not be deemed a just exception to the testimony of such defendant, but shall only be considered as affecting or tending to affect the credit of such defendant as a witness.' This act does not extend to Scotland.

It is provided by numerous statutes that various certificates, official and public documents, and certified copies of such documents, are to be received in courts of justice, but in several cases it is experienced that such documents were genuine. In 1846 an act was therefore passed (8 & 9 Vict. c. 118) which provides that in future official and other documents shall respectively be admitted in evidence, provided they are purport to be sealed or impressed with a stamp, or sealed and signed, or signed alone, as required, or impressed with a stamp and signed, as directed by the respective acts made or to be hereafter made, without any proof of the seal or stamp, where a seal or stamp is necessary, or of the signature, or of the official character of the person appearing to have signed the same, and without any further proof thereof in every case in which the original record could have been received in evidence. This act will apply to the documents or proceedings of any corporation, or joint-stock or other company, or any certified copy of any document, by-law, entry in any register or other book. Courts of justice and persons judicially acting are required by the act to take judicial notice of the signatures or seals, which may be attached to the certificate, order, certificate, or other judicial or official document. Copies of private and local and personal acts which purport to be printed by the Queen's printers are in like manner admissible, also copies of the journals of either House of Parliament, and royal proclamations which purport to be printed by the printers to the crown, or by the printers of either House of Parliament. Persons who forge the seal, stamp, or signature of documents, or print any private act with a fraudulent intent, are guilty of felony and liable to seven years transportation, or imprisonment for a term not less than one and not exceeding three years. The act does not extend to Scotland.

EVO'DIA (from aevus, a sweet smell), a genus of plants belonging to the natural order Rosaceae. It has the calyx 4-6-parted; 4-5 equal petals; 4-5 stamens, smooth; the filaments subulate; the anthers heart-shaped, moveable; the disk cup-shaped, glabrous; the ovary single, deeply 5-lobed, with 2 collateral ovules in each cell; the style single, very short; the stigma terminal, oblong; the cocci 2-valved, 1-seeded, with a separable 2-valved endocarp. The species are shrubs and trees, with a grateful smell.

E. fabriflora is a tree and has trifoliolate leaves, the leaflets mahogany, ovate, and somewhat acuminate at the base; the ovary simple, warty. It is a native of the forests of the province of Minas Geraes in Brazil. The bark and young wood are bitter and astrigent, and are employed by the medical practitioners of Brazil as a tonic and febrifuge.

E. ramosa, or trifoliolate trees, which are pinnate as well as the branches. It is a native of the Friendly Islands and the New Hebrides. E. dopracus has smooth leaflets and a four-seeded drupaceous fruit. It is a native of New Caledonia. The two last are shrubs. All the species are worth cultivation on account of their agreeable scent. They may be grown in a mixture of loam, peat, and sand, and propagated by means of cuttings, which should be allowed to strike root under a glasshouse in heat.

EXCEA/RIA, a genus of plants belonging to the natural order Euphorbiaceae. It has monocious or dioecious amenable flowers; the sterile flowers nothing but staminaless bracteas; the stigma 3-5, united into a short column, all connected at the base; the fertile flowers with the calyx 3-5-fid or absent; the style 3-parted; the capsule 3-coccos.

E. Agallocha is a small crooked stunted tree, with alternate leaves, the pinnate of the branchlets, stalked or ovate, or cordate, but usually heart-shaped at the base; the petiole is very short and remotely and slightly serrate, pointed with two glands at the base, and about two inches long; the petiole about an inch long, smooth, channelled; the stipules small, fine-pointed. The trunk and branchlets of this plant abound in a virulently acid milk, which acts as a powerful poison. Roxburgh says that wood-cutters who accidentally injure this tree have inflammations and ulcerations on those parts of the body where the milk touches. Rochebouët calls the tree "Arbor exandrium," and says every Dutch sailor who was sent ashore at Amyboya to cut down timber became furiously mad from the pain produced by the juice of this tree getting into their eyes, and that some of them lost their sight altogether. This tree is common on various parts of the continent of India, and in the islands, especially near the coast. Its specific name appears to have been given it on the supposition that it was one of the plants which yield the Agallochum, or Aloa-wood, but this is not the case, and this wood is yielded by a different family of plants. [AGALLAEOCHUM, P. C. S.]

Lindley, Plantae.

EXCENTRIC, or ECCENTRIC, in machinery, a kind of wheel, or revolving cam, in which the axis or centre of motion does not coincide with the geometrical centre, or in which the periphery is not circular. A general notice of such contrivances, and a representation of the kind of eccentric employed for working the valves of a steam-engine, are given under Wheels, P. C., p. 315.

Excентricities of various kinds form an important class of mechanical and plants for working one motion into another. They afford means for converting continuous circular motion, in various ways, into alternating or interrupting rectilinear motion, or into curvilinear, though not rotary motion. They also furnish means for producing, from the uniform speed of one revolving shaft, rotary motion of continually varying speed in shafts placed in connexion with it. As an illustration of such an application, Professor Willis, in his 'Principles of Mechanism,' refers to an excentric wheel contrived by Huyghens, to produce some of the complex movements of a planetarium. The subjoined diagram will illustrate the action of this apparatus, a representing the crown-wheel, which is mounted excentrically upon a shaft which revolves with a uniform speed, and b c a pinion driven by it, and made so long that it may be acted upon either by that portion of the perimeter of the crown-wheel which is nearest to its axis, and which describes in its revolutions a path indicated by the small dotted circle, coming in contact with the pinion at b, or by the opposite portion of the periphery, which describes the dotted circle, and engages the pinion at c, where it is intersected by that circle. As the distance from the axis of the crown-wheel to the point b is little more than one-third of the distance from the axis to c, and as the velocity of the axis or shaft is uniform, it follows that the pinion will be driven nearly three times as fast when in contact with that part of the periphery of the crown-wheel which lies farthest from the axis as when in contact with the part which intersects it at b, while every intermediate portion of the periphery of the crown-wheel will impart a different, but intermediate velocity. Such a combination of wheels might be driven by the pinion, in which case, supposing the pinion to have a uniform velocity, that of the crown-wheel, or rather of its axis, will vary. Such variations might be introduced by making the periphery of the crown-wheel of other than a circular form.

Excitäcencies may be driven by bands or straps; but unless the bands be very highly elastic, it is necessary to apply a stretch wheel or roller, which is pressed on the crown-wheel by the action of a weight, to maintain a uniform degree of tension.

EXCENTRIC WHEELS. [WHEELS, P. C., p. 315.]

EXCHANGE. The rules by which operations of ex-
change are to be either the simple rule of three or the chain rule. [CHAIN RULE, P. C. S.]

In the simple and direct operation nothing but the rule of three can be required. Thus, the exchange between Leeds and Paris below three parcels, and between the pound sterling, 6732 francs is converted into English money by finding the fourth term of the following:

| 138l. 14s. 6d. in English money | : 25 : 55 | : 138l. 14s. 6d. | : the answer. |

But in the case of the indirect operation of passing money,

| 25 : 55 | : 1 | 138l. 14s. 6d. | : the answer. |
The plain and recessed, the crowned and gilded, the annulated, and the balastrade and atrium. There are lofty semicircular arches between the pillars, and each arch forms a shop front on the ground floor and window for a floor above, except near the centre, which is recessed, and has an entrance from the south.

The north side differs considerably from the south. The centre part projects a little, and has pilasters similar to those on the south side, but there are no pilasters on what may be called the wings of this south front. In the centre of the projecting part is a colossal statue of the former habitation of the central entrance. The cornice and balustrades are similar to those on the south, but the line is of course broken by the central projection.

The three windows which light the principal rooms of the Royal Exchange from the exterior, form a single range, of similar style on both sides of the building, but with considerable variation in the details.

The length from the portico west to the columns east is 308 feet, and the height of the south front is 110 feet, of the east end 175 feet. The portico is 96 feet wide and 74 feet high to the apex of the pediment; the columns, which are 4 feet 2 inches in diameter at the base, are 41 feet high, including base and capital.

In the interior is a central quadrangular area appropriated to the meetings of the merchants, 170 feet by 112 feet, of which 111 feet by 65 feet is uncovered; the four covered sides form the ambulatory, the ceiling of which is divided by beams and pannelling, and both ceiling and sides have been painted in encaustic by Sang, a German artist and his assistants. The quadrangle is lighted by a set of semicircular arches which spring from square pillars. On the front of each pillar projects a half column with a plain capital, over which are half columns with Ionic capitals, with arches and ornamented windows between, and surmounted by crest and pilasters. Besides the central area, there is a small court at the east end.

The principal floor is occupied by four suites of apartments, of which the east end of the building and the chief part of the north side are appropriated to the use of the Crown, and the west end of Lloyd's, and contains several handsome apartments. The subscribers' room, which extends along the east end, is 100 feet long by 48 feet wide; the commercial club-room, for strangers residing London for mercantile purposes, is on the north side, 80 feet long: these are surrounded by a colonnade.

The greater part of the west end is appropriated to the Royal Exchange Assurance Offices, and most of the south side is occupied by the London Assurance Company.

The best view of the Royal Exchange is from the southwest, where the mass of building is seen obliquely in its whole length along the unbroken line of pilasters and cornice, together with the large portico and sculptured pediment; and thus seen in the simplicity of its outline is a structure of much more striking effect. Viewed more directly, it is still more worthy of admiration. The arches which form the shop- fronts on both sides and at the semicircular corners appear flat and unlighted; the windows above are profusely ornamented, but the columns are such as are not rich but gaudy, not magnificent but heavy. The columns and pilasters of the exterior are Corinthian; and the shafts, which are all plain, do not harmonize well with the profuse decoration of the doors and windows. The sculpture of the pediment is by the younger Westmacott: this group is rich in general effect, but the figures are somewhat too much crowded for distinctness, and there is perhaps too much of the classical forms of drapery in the national costumes which are arranged on the cornice of the central figure of Commerce. The sculpture is executed in close-grained limestone. Most of the figures are detached, the rest in high relief, and the modelling and chiselling are excellent. The clock-tower is not inelligent, but viewed from the exterior it appears small and insignificant, and in most situations is not seen; viewed however from the west side of the interior quadrangle, it looks very well. The clock was made by Dent, under the direction of Professor Airy, and the first stroke of each hour is said to be true to a second of time. The general appearance of the architecture of the interior is not pleasing, though the ornamental mouldings viewed in relation to each other and to the style of architecture, display a good deal of taste. The ceiling is painted by Cipriani, and is a very novel, rich, and agreeable effect. The central area was at first paved with encaustic bricks, but is now flagged, except two small portions on the north and south sides. The flagstones of the ambulatory are of different colours and are arranged in symmetrical forms, but the contrast of colour is not sufficiently strong to produce any striking effect.

In the north-east angle of the ambulatory is a statue of Queen Elizabeth by Watson, and in the south-east angle a statue of Charles II, which stood in the centre of the area of the late Royal Exchange, and escaped with little injury from the fire. In two niches which occupy the place of windows in the projecting front of the north side are two statues, one of Sir Hugh Middleton by Joseph, the other of Sir Richard Jogger by Westmacott: both were placed here on the 8th of December, 1671, and are said to be the work of the best sculptors of the time, and of excellent design and execution. A statue of Sir Thomas Gresham by Beehne is to be placed in a niche at the east end, similar to those of the north front; and a marble statue of Queen Victoria (by Westmacott) ordered by the Royal Academy this year (1844), is to be placed in the centre of the quadrangular court. The drapery of this statue appears heavy and ungraceful. The artist seems to have aimed at a grandeur of effect which was not produced in the exhibition-room, and the present appearance of the statue when the scheme is completed will depend partly on the skill of the workman when the statue is placed upon its pedestal in the central area.

(Wilson's Description of the New Royal Exchange; Compendium of the Almanac, 1842 and 1844.)

EXCHEQUER COURT, C. P. C.

EXCHEQUER COURT. (Exchequer Court, C. P. C.)

Several alterations have been made in this court, the most im-
portant of which is the abolition of the equity side of the court, which was effected by 5 Vict. e. 5. The duties which formerly were the business of the Masters of the court of Exchequer are now performed by the Queen's Remembrancer, whose office was regulated by 5 & 6 Vict. c. 86. [ACCOUNTANT-GENERAL, P. C. S.] This act also abolished certain offices on the revenue side of the court. By a previous act (5 & 6 Vict. c. 44) the keeping of the books of the lord treasurer's remembrancer, the collector, and the surveyor of taxes is abolished.

The cinchona, a plant belonging to the natural order Cinchonaceae, is a genus of plants native to the American tropics. It has an oblong-5-toothed calyx; a corolla with a ripe terete tube, and a 5-parted limb with distinct segments; the anthers linear, entire; the capsule crowned by the calyx, delining from the corolla by a short stalk. The seeds are pressed, the seeds girded by an membranous entire border. The species are trees or shrubs, with lanceolate, short-stalked leaves, and stipples solitary on each side of the petiole.

The leaves of the Cinchona bark are used to produce cinchonine, a bitter, and are used as a febrifuge. The capsules have been used in medicine, particularly for the treatment of malaria.

EXCRETION [SECRETION, P. C.]
EXECUTORY DEVISE. [WILL AND TESTAMENT, P. C.]
EXEMPLIFICATION. [RECORD, P. C.]
EXDYIA. [THREMIANT, P. C.]
EXOSTEMA (from E, meaning, and stoma, a crown), a genus of plants belonging to the natural family Cinnabariaceae. It has an oblong 5-toothed calyx; a corolla with a terete tube, and a 5-parted limb with segments; the anthers linear, entire; the capsule crowned by the calyx, delining from the corolla by a short stalk. The seeds are pressed, the seeds girded by a membranous entire border. The species are trees or shrubs, with lanceolate, short-stalked leaves, and stipples solitary on each side of the petiole.

The leaves of Exostema have been used in medicine, particularly for the treatment of malaria.

The leaves of the Exostema bark are used to produce cinchonine, a bitter, and are used as a febrifuge.
powder in a tube, and the best produced at the same time, create a rapid displacement of the particles of the surrounding atmosphere, and these as rapidly falling back into the vacuum, and about the fire-arm, cause a loud report by their collisions. A pulverizing finish is the cause of a like explosion being produced, by means of the flash, which are set free in consequence merely of the friction of the particles. The explosions which, in the atmosphere, accompany a flash of lightning, are ascribed to the rush of air into the vacuums produced when the aqueous vapours in large portions of space became rapidly condensed. The air which thus occupies a space previously void, by dilating ceases to have the power of holding all the vapour in solution, and much of the latter being condensed, a new vacuum is produced: the neighbouring air being thus deprived of its vapour, and the action of the fire-arm being as before, the air expands often taking place several times successively, and the rolling sound arising from a succession of reports may then be heard. [Thurston, F.C.]

For the explosion produced by chemical combinations see Dystom, F.C.

EXTORTION. "Extortion," says Coke (Co. Litt., 366, b.), "is a great misprision, by wresting or unlawfully taking by any officer, by colour of his office, any money or valuable thing of or from any person, as it is not a joke, or more than is due, or before it is due. It is an offence at common law, punishable by fine and imprisonment at the discretion of the court. Also, money which has been obtained by extortion may be recovered in an action at law. There are various statutes providing for the recovery of money by sheriffs, under-sheriffs, bailiffs, gaolers, clerks of assize, &c.

EXTREME AND MEAN RATIO. To find a line according to extreme and mean ratio, εὐθείαν δείπνου κἀκριβίαν, a very high and exact manner, and to explain from the words of it. The meaning is, to find a straight line in such a manner that the whole shall bear to the greater part the same ratio as the greater part to the less; or to find the segment a mean proportional between the whole and the less: and Euclid shows how to make this section in the 11th proposition of the second book.

If the whole line be divided into two parts, and if x be the fraction which is in the greater segment, we must have

\[ 1 - x = x^2, \quad \text{or} \quad x = \pm \sqrt{1 - x}. \]

In the sense of Euclid, only the value \( \sqrt{1 - x} \) will solve the problem; and the other root, with the sign changed, solves the following problem: To produce a line in such a manner that the part produced may be a mean proportional between the given line itself and the line made up of the given line and the part produced. Any one who examines Euclid's constructions will find the formation of \( \sqrt{a}, \) of \( \sqrt{a+b}, \) and the subtraction of the first from the second.

The fraction \( x \) cannot be expressed arithmetically, and the segments are incommensurable. But if \( a \) and \( b \) be any two numbers, of which \( a \) is the less, and if we form a third by adding twice the second and third, and so on, as in the series \( a, \ a+b, \ a+2b, \ 2a+3b, \ a+5b, \ a+9b, \ a+18b, \ 3a+35b, \ 5a+66b, \ &c., \) it is demonstrable that the farther we go the more nearly does the ratio of any one to the next represent that of the less to the greater segment of a line divided in extreme and mean ratio. If we begin with 1 and 1, we have the series 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, &c. and so on. As in the series 6, 9, 15, 24, 49, 84, 153, &c., it is demonstrable that the farther we go the more nearly does the ratio of any one to the next represent that of the less to the greater segment of a line divided in extreme and mean ratio.

The use of this division in elementary geometry is as a step to dividing four right angles into five equal parts, as in the 10th proposition of the fourth book. In fact, the half of \( \sqrt{5}/2 - \sqrt{5}/4 \) is the sine of 18°, the fifth part of a right angle.

EYCK, HUBERT VAN. This celebrated old Flemish painter, the elder brother and master of John Van Eyck, was born, according to Van Mander, probably at Eyck (now Alden Eyck), a small village near Maaseyck on the Maas. The two brothers established themselves first in Bruges and afterwards in Ghent. The name of Hubert Van Eyck is nearly lost in that of his younger brother and pupil John, apparently from no other reason than that John alone is mentioned by Vasari in his story of the invention of the new method of oil-painting, while he takes no notice whatever of Hubert; John's name therefore appears as the principal or sole name in the later productions relating to the origin of this method of oil-painting, and the joint productions of the two brothers are generally added as the works of John alone.

Whether the discovery in question was the result of their joint experiments or solely the work of John, it is perhaps now impossible to ascertain; yet as the earliest works in oil were their joint productions, it is scarcely just, on no better authority than an anecdote of Vasari's, to deprive Hubert of the merit of a share either in the discovery or its development.

Van Mander says that they must have painted in their new method as early as 1410, and as Hubert did not die until the 18th of September, 1446, according to the inscription on his pedestal in the church of St. John, Ghent, it is clear that a sufficient number of years together to completely develop it in practice. John Van Eyck cannot have been very old in 1426, as, according to an authentic lottery notice of his widow, she died before 1430. The Eycks were undoubtedly the greatest of the 18th century, and soon after 1430, as both, John and Hubert, had been born in 1395, and accordingly we can only find at first little more than the assistant of Hubert in his masterpieces, the great altarpiece of St. Bavon's, Ghent, which was finished by John in 1432. His name is clearly subordinate to Hubert's in the inscription on the work, which is as follows, the last verse being a chronogram:

\[ * \text{Peter Huberti e Eycky, major quo name reprentat} \]
\[ + \text{Incepti} \]
\[ + \text{pensante Johannes ater sequatur} \]
\[ + \text{Pictor perfectus, Joho Vol.} \]
\[ + \text{prince potentissimo.} \]
\[ + \text{Vera &c.} \]
\[ + \text{in Coloniis.} \]

The capitals in the last line when added together according to their value as Roman numerals, make 1432.

The merit of Hubert is still more prominently set forward in the following epigram by Vrintius in Sandarius's "Flandum Illustrat."

\[ * \text{Quous Deo ob vitium pereundi quaest. Apollis} \]
\[ + \text{Eyckiana, hos Vititi rededit sacra petita.} \]
\[ + \text{Ars, necebris magnifica,}\]
\[ + \text{Assumpsit, incipit Pictor, sede indic. Deo.} \]

The altar-piece is about fourteen feet wide by twelve high, and is in two horizontal divisions, each centre covered by revolving wings or doors, two on each side. There are twelve pictures in all; God the Father, with the Virgin, and Saint John the Baptist, as large as life, one on each side in distinct compartments, constitute the upper centre; the extreme wings of this division are full-length naked figures of Adam and Eve, Adam being by the right and the young John the Baptist by the left of the figures. These young men represent, on the right hand, angels singing, on the left, angels playing musical instruments. The lower centre represents in one picture the actual Adoration of the Lamb in small figures; the two wings to the right represent the just judges, Justi Judices, with the soldiers of Christ, Christi milites; the two on the left, the holy hermits, Heyremyn St. and the holy pilgrims, Perigrini St.: there are in all about sixty figures and three hundred heads. An elaborate copy of this was made by Cuan for Philip II. of Spain, and is called, "The Return of the Tresor," by Michael, F. C. S.] The colouring of the whole work is beautiful, and many parts are admirably executed, and the painting is still in excellent preservation, owing to the excellent vehicle discovered by van Eyck.

This medium of the Van Eycks was not merely oil; it was several oils mixed with resins, or some such substances, and pro-

* Jodocus Veld. A B 3
pared by fire. Many useless and interminable discussions have arisen from Vassar's attributing the invention of oil-painting to John Van Eyck, but they are due chiefly to a careless or partial consideration of what Vassar really says. In one passage in the Life of Antonello he fully describes, though in general terms, what the Van Eyck medium was, but in others he merely terms it oil-painting, a term, after what he had said before, sufficiently characteristic and distinctive. The Cave Tamborni, however, in his preface to the treatise of Cennino Cennini (Rome, 1821), has, with as little ability as bonomy, argued solely upon the general expressions of Vassar, and ridiculed the story as an absurd fiction, because mere oil-painting was known! in Italy before it was introduced by Antonello of Messina. [ANTONELLO DA MESSINA, P. C. S.] It is true that Cennino Cennini wrote his book in 1437, and it contains five chapters on oil-painting, but he prefixes his remarks by the following observation:—"I will now teach you to paint in oil, a method much practised by the Germans." The oil-painting which Cennino teaches is no more that of the Van Eycka than tempera painting is; it is the very method which the Van Eycka superseded. An old German monk of the name of Tutilo or Theophilus wrote on the same subject centuries before Cennini. [TUTITO, P. C.] The words of Vassar are—"At last, having tried many things, separately and compounded, be discovered that linseed and nut oils were the most effective: these therefore he boiled with other mixtures, and produced that varnish (vehicle) which be, and indeed every painter in the world, had long desired." This is what the Cav. Tamborni and others have treated as an assertion that John Van Eyck invented and introduced the practice of mixing colours with oil. Several interesting notices of the brothers Van Eyck appeared in the Messager des Sciences et des Arts, Gand, 1824; and in the Kunsblatt in 1824 and 1826; see also Passavant, Konnretze, &c. (In which there is an outline of the altar-piece of Ghent); and Rathgeber, Annalen der Niederländischen Malerei.

EYES, PROPAGATION BY. The power of propagating plants by any other means than seeds depends entirely upon the presence of leaf-buds or "eyes," as they are technically called by gardeners. A plant may in fact be regarded as a congeries of individuals, and each leaf-bud is an individual capable of maintaining an independent existence. Though this is generally true, the buds of all plants will not grow when removed from their parent stock. Many, however, admit of their buds being removed from one branch and placed upon another, which constitutes the process of budding. [BREEDING, P. C.] Others admit of a branch being removed and placed in the ground, when the leaf-buds upon it will develop, and the wood of the branch form roots. Such branches are called cuttings. [CUTTING, P. C.] Few plants admit of single buds being taken and planted in the earth, when they will grow as duplicate plants in the same manner as seeds. It must however be borne in mind in this case that the individual and not the species, as is the case with seeds, is propagated. The plants which are most frequently propagated by eyes are the potato and the vine. It appears that for plants to grow in this manner, the bud requires that a due supply of nutrition should be stored up in the branch or part of the stem to which it is attached. "This is undoubtedly the case in the potato, where a large quantity of amylaceous matter is stored up in the tubers, so that a bud cannot be taken without carrying away fragments of its alimentary secre-

Mr. Knight observed with regard to the buds of the vine, that those grow with most rapidity and strength when were in contact with the largest quantity of albuminous root by which he regards as the nutritious matter of the young buds. The provision, however, of alimentary matter may be in some cases, as has been pointed out by Dr. Lindley, disadvantageous by promoting too great a development of stems and leaves. According to theory, the more nutritious matter there is for the eyes, the greater crop there will be; and that it would seem that it would be more advantageous to plant whole potatoes than portions of the potato or sets. Dr. Lindley proved by a series of numerous experiments, that the weight of potatoes per acre is greater under equal circumstances from sets, than from the whole tubers by upwards of from seven cwt. to three tons per acre, and considerably more on comparison of the clear produce after deducting the weight of sets employed in both cases. He supposes the rashness of the vegetation from the whole tubers to be the cause of the diminished crop; for the stems were unable to support themselves, and were blown about, laid, and broken by the wind. A curious fact with regard to the growth of the eyes on different parts of the potato has been recently pointed out in the 'Gardener's Magazine.' It is well known to the cultivators of potatoes in Lincashire that different eyes germinate and yield their produce at very different times, some being ripe or fit for use as early as the middle of May, and others not till June or July. It is found that it is the sets which are nearest the extremity of the potato which ripen soonest; and these are planted in Lincashire in warm places, in March or the beginning of April, and are ready for the market by the middle of May. The produce of the next sets are ready a fortnight after, and that from the root end still later.

In propagating the vine by this means an eye is taken with a small portion of the stem adhering to it, and is placed in earth with a bottom heat of 75° or 80°. It should be kept in a damp atmosphere, when it speedily shoots upwards into a branch, and at the same time establishes itself in the soil by the development of roots. In order to insure the success of this operation, it is necessary that the bud should be dormant at the time it is removed, and that a small piece of well ripened wood should be separated with it.

There is another mode of propagating plants resembling this, and that is by planting the abortive branches, called 'Knaurs,' and embry buds. [THESES, VEGETABLES, P. C.] This plan is pursued in Italy for the propagation of olive trees. These knobs or abortive branches are produced by other trees besides the olive, and might be made use of for the same purpose. The beech, the poplar, the cedar, and many other trees produce these knobs in abundance in this country.

It has been found that under certain circumstances many leaves are capable of producing buds, and these buds of producing an entire plant. Although it was announced in the beginning of the last century, by Agricola in Germany, and Bradley in England, that plants might be propagated to any extent by means of leaves, there can be no doubt that their object was to impose upon the public, and none of the advantages which they represented to be derived from the system have followed upon its repetition. The fact of buds having been produced upon the veins of leaves is interesting in a morphological point of view, but no practical application has as yet been made of it that we are aware of. (Lindley, Theory of Horticulture: Horticultural Transactions, vol. i. ii. Gardener's Magazine, vol. i. and vi.)
His colouring and execution were excellent for his period, and he was one of the most meritorious artists of his time.

His works, though they were not to be compared with those of Massacio, or even of Fra Giovanni da Fiesole, which they resemble, were an immense improvement upon the rigid and cumbersome forms of Bottini and his school. Gentile taught Jacopo Bellini at Venice, and that painter's son Gentile was Fabriano's namesake.

Gentile was also superior in the theory of his art as its practice: he left writings on the origin and progress of art, on the mixing of colours, and on the art of drawing lines; but whether they still exist, does not appear. He died about 1460. There is some account of Gentile in the Memorie Storiche delle Arti e degli Artisti della Marcia di Anconia, by the Marquis A. Ricci, Macerata, 1854; see also Vasari, Vite de' Pictori, &c.; and the notes to the German translation by Schorn.

FABROT, or FABROTUS, CHARLES-ANNAKEL, a jurist, was born at Aix in Provence, in 1580 or 1581. Is the memoirs of the French jurists the names and conduct of their patrician first known or an important position among those who were instrumental in bringing Fabrot into notice occur the names of two distinguished men, Fabri de Péretès, and Bignon, the avocat-general. With an interval of a short restent, the increased attention which paid Fabrot in the University of Aix from the year 1600 to 1627, when he went to Paris to print his edition of the Institute of Theophilus, or the Greek version of Justinian's Institute ( Institutionum Justiniani Imperatoris Paraphrasia Graecia, etc., recens. et Scholiis Graecis et Latinis; Ann. Fabritii Parisiensi). For his access had been to the MSS. in the possession of Cuajicus, and to others in the public libraries, he long laboured in the preparation of an edition of the ' Basilica,' which contains a version of the several parts of the Corpus juris, and all the additions made under the Eastern emperors, were, unless through the fragments edited in Latin by Hervey, known to the jurists only in MS. Fabrot's edition was published at Paris in 1647, in 7 volumes folio ('Basilicorum Libri Sexaginta, cum Versione Latina C. A. Fabrotii et aliorum'). This edition contains thirty-three complete and ten incomplete books of the sixty. ('Basilica, P. C.') In 1688 Fabrot edited at Paris the works of Cujicus, in 10 volumes folio; a well-known edition, but not well provided with means of reference. The labour connected with this work is said to have occasioned the death of its editor; he died at Paris on the 16th of January, 1759. He wrote several minor works on jurisprudence, and some on the science now called medical jurisprudence, e.g.: Disquisitions de l'homme du Jut de Paris —altera de Numero Pueriperi.' Some of these minor works are in the 'Thesaurus Juris Roman.' of Eversard Otto. The 'Biographie Universelle' attributes to him 'Les Aniquités de la figurin.' and the 'Famille Illustrée,' among other works of the same title, of Jean de Solier, and published in 1615. Taine refers for his memoir of Fabrot to Niceron, and the 'Nouveau Dictionnaire Historique' and other ordinary French works of reference appear to go to the same source. ('Niceron, Mém. des Hommes Illustres, xix. 368-368.) FACTORIALS. The subject treated under this word is one which daily becomes of more importance in mathematical analysis, and takes its rise at the commencement of algebra.
The algebraist knows very well that having proved the equation \( \phi(x, m) = x^m \) to be true whenever \( m \) is an integer, he has not proved it to be true when \( m \) is a fraction; in fact, \( \phi(x, m) = x^m \cos(m\pi) \) would equally satisfy his demonstration, and an infinite number of other solutions might be named.

When we come to reckon numbers of multiplications, we begin from unity, and say, let \( a \) signify that unity is multiplied \( n \) times following by \( a \). Now this says that \( a \) means that when the beginning, distinctly conceivable, whether \( a \) be integer or fractional, under the usual and easy extension to fractions of the idea of multiplication; but it is not, or ought not to be, so intelligible when \( n \) is a fraction. What are four and a half multiplications by \( 36 \)? The beginner will say, four multiplications by \( 36 \), followed by a multiplication by 18; but this mode of defining breaks immediately, for the two half operations would make more than the whole; two successive multiplications by 18 are equivalent to more than a multiplication by 36. It is multiplication by 6 which is the half-operation to multiplication by 36. It is true that we do not apply the phrase fraction of an operation in our descriptive language; but we apply the symbol in our symbols. For just as every \( a^m \) denotes one multiplication by \( a \), every \( a^m \) denotes that multiplication which twice repeated is equivalent to one multiplication by \( a \). In like manner \( a^m \) is the multiplier which, being used \( 2m \) times, gives the same result as \( 2m \) times used. We are not going to give the theory of simple powers, but only to put it in connexion with what follows; and the reader will do well to observe, that in the very first ideas of ratios in mathematics, and in the ancient way of reckoning, the notion of numerical quantity entering as a multiplier in repeated operations was so much in the minds of those who framed Euclid's language, that they spoke of what were really multiplications as if they had been additions. The same thing may be traced in calling 100 the duplicate ratio of that of 10 to 1; 10 to 1 the subordinate ratio of that of 100 to 1: duplicate means double, and subduplicate means half. The beginner must learn to understand numbers with reference to their force as indices of operation, and even the advanced student may require more study of this part of the subject than he suspects himself of wanting.

Again, to establish the equation \( \phi(x, m) = x^m \) when \( m \) is an integer, is not the same thing as establishing

\[ \phi(x, m) = x^m. \]

in fact the symbol \( x^m \) in algebra is well known [Roor, P. C. C.] to be in its complete meaning

\[ 2x^m = \cos(m\pi) \cdot 2e^x + \sqrt{-1}\sin(m\pi) \cdot 2e^x \]

where \( k \) is any integer.

Next after the operations of powers and roots, nothing occurs more in the usual process of calculation and manipulation in which the multiplier is not always the same, as \( 1, 2, 3, \ldots, a(a+b), (a+2b), \ldots, (a+n-1)b \). The various hints which have been given of the interpolation of fractions, such as that of Wallis [Wallis, P. C. C.], and others of Leibnitz and the Bernoullis, Stirling, &c., have been extended with great power by the French and German mathematicians of the last eighty years. Two different lines were taken in the two countries. The Germans first began to consider how the ordinary notation might be extended. Vandermonde has written the symbol \( m(n-1)(n-2) \ldots \) for the product of \( m \) factors by \( n \); the brackets distinguishing it from \( m^n \) in the usual sense. Hindenburg, followed by Kramp and most of the Germans, proposed a much better notation. Considering \( x^n \) as denoting \( m \) unaltered factors, they made room in the symbol for a part expressive of the permanence of the factor, and wrote it \( x^{10} \). Thus it became a particular case of \( x^{10} \), which was made to stand for \( m \) factors, the first of which is \( x \), and which alter at \( a \) at every step; giving

\[ x^{10} = x(x+a)(x+a+2b) \ldots (x+m-1a) = (x-a)(x+2a) \ldots (x+m-1a) \]

by \( x^{10} = x^{(x-a)} \), and \( x^{10} = x^{(a-2a)} \) or \( x^{(x-m-1a)} \)

\[ 1.2.3 \ldots n = \frac{1}{1} \cdot \frac{2}{2} \ldots \frac{n}{n} \]

and so on. This notation certainly opens the road to convenient expression of a large number of striking formulæ. Take its binomial theorem for instance,

\[ (x+y)^n = x^n + y^n + x^{n-1}y + \ldots \]

which is perfectly analogous to the ordinary theorem.

Also the following:

\[ 1 + (mA)^1 + (mA)^2 + (mA)^3 \ldots = \frac{1}{1-(mA)} \]

which is true for all values of \( m \) and gives the binomial theorem if \( A = 1, a = 1 \), and the exponential theorem if \( A = x, a = 0 \). The analogous theorem to Taylor's is

\[ \phi(x+h) = \phi(x) + \frac{\Delta \phi}{\Delta x}h + \frac{\Delta^2 \phi}{\Delta x^2}h^2 + \ldots \]

which is well known.

We think it is to be regretted that this notation has not been more adopted in England: we do not remember at this moment any writer who has made much use of it, except Mr. Peter Nicholson, in his works on Involution and on Increments.

A name was to be found for this extension. The notion of calling \( x^2, x^3, x^4, \&c. \) the powers of \( x \), was an extension of the term as used by Euclid, which applied to the square on a line, or to the square in the plane or space, and the square in the solid. The name \( x \) was so used as the square on a line was originally called its square, but that the power of a line was measured by the capacity of its square. The object of the old geometers was to reduce every area to a square, which enabled them to describe it by one line; and hence a line seems to have been considered as having the shorter, or less perfect space according to its size was greater or less; the power being measured by the magnitude of the square. The phraseology seems to have reached those who were not geometers: thus Diogenes Laertius tells us that Pythagoras discovered that the square subtending a side of a right-angled triangle is as powerful as the two containing sides together. But those who will smile at the idea of the power of a line existing in its square, will laugh outright at the notion of Kramp, who proposed, seeing \( x^2 \) represents the powers of \( x \), that the symbol \( x^n \) should represent its numerical factorials (factorialis).

Again, the difference of \( x^n \) by the name of factorials, a term which has now gained considerable currency among the German writers, and was approved by Kramp himself.

The French, on the other hand, follow Euler and Legendre in connecting the factorials from the outset with definite integrals, and the latter in adopting a specific notion, not derived from that of powers. Legendre signifies \( 1 \cdot 2 \cdot 3 \cdot \ldots \cdot n \) or \( \Gamma(n+1) \), and hence the name of gamma-functions has been applied to them by Euler. We shall give a slight account of the subject so far as it is in the way to be speedily reckoned among the elementary parts of mathematics.

A series or a product of \( n \) terms, is only distinctly conceivable when \( n \) is integral, but if it can be represented by a function in which \( n \) enters as a usual symbol of magnitude, and not as a number of terms or operations, then the function is intelligible, though not the representative of the series, which in a fraction would be absurd to demand the value of \( 1+2+3+\ldots \) \( (n-1)+n \), when \( n \) is a fraction; but this series is \( n(n+1) \), which is always integrable.

The equation

\[ 1+2+3+\ldots+n=n^2 \cdot (n+1) \]

is absurd except when \( n \) is a positive integer. In the times when the phrase 'less than nothing' was invented, it would have been said boldly that 23 terms of this series are \( \frac{1}{3} \times 23 \times 34 \), or 355, and that 7 terms of it are \( \frac{7}{7} \) (7) or 7. All this we should understand that the number of terms when \( n \) is integer, is equal to \( 1+\ldots+n \) becomes 355, and 21, when

* We translate quite literally, to show that Laertius was not geometry enough to know that the substantiating and containing was said of the right edge, not of the triangle. His words are 'or doxouros, which Krusius, who in his lectures was not geometry enough to know what the substantiation of doxouros into Latin, translates inaccurate error. We take Laertius as meaning that the hypotome was as powerful as the two sides together; whether he understood his own phrase, or only caught it from the geometers, is another question.

For other uses of the same phrase, see JERUSALEM, P. C.
n is 2k and \(-7\). Whether we are likely to be the gainers by relaying extensions of language which naturally present themselves, remains to be seen: it seems to us that \(r - 7\) terms of the series \(1 + 2 + \ldots + n\) is a very innocent abbreviation of the value, which, however, is of the function which, when \(n\) is an integer, is always equal to \(1 + 2 + \ldots + n\). But at any rate, mathematicians are now in the habit of passing from expressions in which \(n\) is an index of number of operations, to the equivalents in which \(n\) is only an index of magnitude, and of using the latter in the most general sense.

But there is an infinite number of ways of representing, for example, a function which is \(1 + 2 + \ldots + n\) when \(n\) is an integer. If \(\gamma_n\) be a function which is unity whenever \(n\) is an integer, such as our \(n\ + 1 + 2 + \ldots + n\), then \(\gamma_n\) (n-1) \(\times\gamma_n\ answers the question as well as \(\gamma_n\ (n+1)\). It is usual however to start with a radical function which is free from periodic multipliers, and there is generally no difficulty in deciding upon the selection. In all the cases which are most useful, the radical function is the one which is clear of all signs and cosines.

But it is to be remembered that in this branch of the subject we have not advanced so far as to make it coextensive with the theory of powers: it is in fact precisely in the condition of the theory of powers before the discovery of the multiplicity of values in \(x^n\) when \(n\) is fractional. We are thus limited to an arithmetical view of the subject. Some writers have censured Legendre for employing a new symbol \(\Gamma\ (n+1)\), when I was already in use: if, which may be doubtful, he had heard such before he brought the formula, we would, in our opinion, still have acted judiciously in inventing the additional symbol. He might have argued that it would not be wise to associate the second symbol with notions which are only true of the arithmetical case of it. As soon as the complete theory of the expression shall be given, \(1^{st}\) is ready for it: in the mean while \(\Gamma\ (n+1)\ expresses the arithmetical case of it, just as \(2^n\ expresses that of \(2\). The following are some of the cases, which are strictly intelligible when \(n\ is integer, and in which the radical function remains intelligible when \(n\ is fractional:

\[
\begin{align*}
1 + 1 + 1 + \ldots + 1 \left(\int_{0}^{1} \frac{1 - x^n}{1 - x} \, dx \right) \\
1 \times 2 \times 3 \times \ldots \times n \left(\int_{0}^{1} \frac{1 - x^n}{1 - x} \, dx \right)
\end{align*}
\]

For the second equation, which may be thus written,

\[
\Gamma\ (n) = \int_{0}^{1} \left(1 - x^n\right)^n \, dx
\]

is the most important. The following are its principal properties:

1. \(\Gamma\) is finite when \(n\ is positive, but infinite when \(n\ is 0\ or negative. This draws a great distinction between it and \(x^{1/2}\), for the general formula which connects factorials of positive and negative exponents, with a common exponent, is

\[
x^{1/2} \times \left(2n+1\right)^n = \left(2n+1\right)^n
\]

where \(n\ is positive. The following is a simple formula:

\[
P\ (n+1) = \frac{n!}{(n-1)!} \Gamma\ (n+1)
\]

for every integer value of \(n\). Hence a table of values is sufficient which extends through one unit: and the most convenient interval is that from \(n = 1\ to \(n = 2\). If, for instance, we wanted to calculate from such a table the value of \(\Gamma\ (34)\) we should reduce it to a product \(43 \times 34 \times 33 \times \ldots \times 1\ (\Gamma\ (14)\, and take \(\Gamma\ (4)\ from the table. Similarly \(\Gamma\), when \(n\ is less than unity, would be found from \(\Gamma\ (1+n)\-1\). When \(n\ is very small, \(\Gamma\ is nearly 1\). The labour of calculating the table is much lessened by the following equation:

\[
\Gamma\ (n+1) = \frac{n!}{n!}
\]

which is true when \(n\ lies between 0\ and 1\). One very useful result of it is \(\Gamma\ (n) = \sqrt{n!}\.

4. There is a constant to be introduced, which we shall call \(\gamma\), the importance of which may in time compete with that of \(\pi\ and \(e\). It is the limit of the expression \(1 + \frac{1}{2} + \frac{1}{3} + \ldots + \frac{1}{n}\ as \(n\ is increased without limit; it is also the value of

\[
\int_{0}^{1} \left(1 + \frac{1}{2} + \frac{1}{3} + \ldots + \frac{1}{n}\right) \, dx
\]

d and of

\[
\int_{0}^{1} \left(1 + \frac{1}{2} + \frac{1}{3} + \ldots + \frac{1}{n}\right) \, dx
\]

its value is

\[
\gamma = 0.5772156649015328606065
\]

5. If \(S\ represent \(1 + 2 + 3 + 4 + \ldots + n\), ad infinitum (See SUMMATION, P. C., for some of the values; also l ' Differential Calculus,' Library of Useful Knowledge, p. 554), the logarithm (Naperian) of \(S\ may be found in either of the following ways:

\[
\log\Gamma(1+x) = -\gamma x + \frac{1}{2} \log\left(x - \log\left(x + \frac{1}{2}\right)\right) - \frac{1}{2} \log\left(\frac{1}{2}\right) + (1-x) + \frac{1}{2}(S_{1-x} - 1) + \frac{1}{6}(S_{1-x} - 1)^2 + \ldots
\]

6. A table of the values of common, log. \(\Gamma\ (1+x)\ is given by Legendre, for every thousandth of a unit from \(x = 000\ to \(x = 999:\ an abridgment of this table, with means of completing it, is in the 'Diff. Calcul.' L. U. K. p. 587. This function \(\Gamma\ is a fundamental mode of expression for the results of large classes of definite integrals. [INTEGRALS, DEFINITE, F. C. S.]

7. The function \(\Gamma\ (n+1)\ is the value, or one of the values, of \(1^{st}\ and we have

\[
p^x = e^{x(\psi^1)\ + (\psi^2\ + \ldots + \psi^n)}
\]

which holds whenever the second side is real and finite.

The student who desires to know more of the theory may consult K rimp's 'Analyse des Reffractions Astronomiques,' Strasbourg, 1790, 4 to., and the article 'Factorielles,' in the Supplemental (or third) volume of Montferrand's 'Dictionnaire des Sciences Mathematiques,' Paris, 1840, 4to. Also the article 'Facultat' in Gruner's Supplement to Klippel's 'Worterbuch der Deutschen Mathematik,' Berlin, 1855, 2 vols. 8vo. On the form \(\Gamma\ see Legendre's well known works the 'Exercices du Calcul Integral, and that on Elliptic Functions. Some of the substance of these is in the treatise on the Differential Calculus, in Library of Useful Knowledge FACTORIES. The word 'Factory' has, within the last few years, acquired a more definite and circumscribed meaning than it before held. As a commercial term, it applies to the establishments for conducting trade in certain foreign or colonial parts, such as the 'York Factory' of the Hudson's Bay Company in America, the 'English Factory at Canton, and so forth. As a manufacturing term, it is applied somewhat vaguely to any manufacture or large workshop where industrial operations are carried on. But in a legislative sense, as defined by a recent statute, the word 'Factory' is taken to mean 'all buildings and premises situated within any part of the United Kingdom of Great Britain and Ireland wherein or within the close or curtilage of which steam, water, or any other mechanical power shall be used to move or work any machinery employed in preparing, manufacturing, or finishing, or in any process incident to the manufacture of cotton, wool, hair, silk, flax, hemp, jute, or tow, either separately or mixed together, or mixed with any other material, or any fabric made thereof.' It is in this limited sense that factories will be considered in the present article. LEGISLATIVE PROVISIONS.—In the year 1833 a foundation was laid for the permanent supervision of cotton factories and others of a similar kind. There were, it is true, earlier enactments bearing on the subject. For instance, in 1802 an act was passed for the preservation of the health and
The machinery formed a groundwork for the inspectorship afterwards established by the government when the act was obtained. Four inspectors were appointed, and the British Islands were mapped out into four great divisions; the cotton and woollen district of Yorkshire, Lancashire, and the Irish and Scotch districts of the northern counties of England the 1st; the eastern and southern counties of England the 2nd; some parts of the West of England, nearly the whole of Wales, and the southern half of Ireland, constituting the 3rd; the northern half of Scotland, and the northern and eastern counties of England, the 4th. Each district was placed under one inspector, who made arrangements for forming personally acquainted with every factory in his district employed for textile manufactures. Surgeons were appointed to grant the certificates of fitness required for all children; for the supervision was established; the inspectors communicated with the chief mill-owners on any points of difficulty which occurred; and the schooling of the children was gradually entered upon. One difficult however was this, that many manufactories, as a means of escaping from the provisions of the Act, gradually discharged the children who were within the specified ages, and employed others as an age to which the education and the working-hours clauses did not extend; and many young children were thrown out of employ in consequence.

The Act rendered imperative some sort of schooling for the factory children; but it did not lay down rules for its go-

...
as a school-room for the factory children. It contains, besides private apartments for the master and mistress, a boys' school, measuring eighty feet by thirty-six, a girls' school measuring fifty-five feet by forty-two feet, &c. between the two. One of the rooms contains an organ. In the boys' school there are benches arranged on the class or monitory system, each bench having a kind of shelf beneath it, on which the boys place their caps, and a monitor's seat, which is also a box for containing bended pencils privately for the factory children, yet these schools are open to all children. The machinery, however, is not provided for the children living in the neighbourhood whose parents choose to adopt the regulations laid down for its good governance. In the case of this, the boys and girls in a factory are bound to attend school for a certain period each day; those who work in the forenoon must attend school in the afternoon; those who work in the afternoon are at school in the forenoon. Hence there is a distinction in the schools belonging to Messrs. Marshall between the "half-time" boarders and the other scholars; the former those engaged in the factory, and under the influence of the Factories Act, and the latter being other children living in the neighbourhood. Altogether there are about three hundred and fifty boys, and a hundred and eighty girls, who are under the care of a master and mistress engaged expressly for the school. The school-rooms are comfortably warmed by hot-water apparatus, and there is a large plot of ground outside the building, which serves as a play-ground. (Fenny Magazine, No. 754.)

In 1844 an act was passed (7 & 8 Vict. c. 15) which came into operation in October of the same year, and effected certain changes in the machinery of the Factories. Office of Factory Inspectors is to be established in London. Persons being engaged to occupy a factory must send notice of it to this office. The powers of inspectors to enter factories and schools is increased. The certifying surgeons are to be appointed by the inspectors; and the certificates are to have a definite form and expression. The whitewashing or painting of a factory is placed under strict regulations. Provision is made for the protection of children from the effects of the water in "wet-flax spinning," and from accidents by the machinery while engaged. Children must be employed at a certain age (the former minimum having been nine years). The maximum amount of daily work for each child is seven hours, subject to diminution in certain cases. All females are regarded in the same light as "young persons" (i.e. from thirteen to eighteen years of age), in respect to the limitation of the hours of work. The recovery of lost time by the stoppage of machinery, the regulation of the meals-times in the factories, the holidays given to the children, the control of their attendance, &c., may be admitted and employed as machinery, and many other points, are modified or extended in this act; which however preserves the general character of the act of 1833.

Statistical Details.—One result of the act just alluded to, viz. that of 1833, has been a more intimate knowledge of the statistics of factory operations than would otherwise have been obtainable.

The number of power-looms employed is, to a certain degree, an index to the extent of factory operations; since the substitution of a power-loom for a hand-loom involves the substitution of a large and well-organized factory for, perhaps, the humble cottage of the hand-loom weaver. In a return made to government, two or three years after the appointment of the factory inspectors (Fact. Pop. 1838, vol. XIV. p. 14), the number of power-looms then employed is stated to have been—

<table>
<thead>
<tr>
<th>Cotton</th>
<th>Wool</th>
<th>Silk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>Females</td>
<td>Total</td>
</tr>
<tr>
<td>47,020</td>
<td>3,128</td>
<td>50,148</td>
</tr>
</tbody>
</table>

In and near Manchester. |

Clothing District of Yorkshire: |

Cotton | Wool | Silk |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>Females</td>
<td>Total</td>
</tr>
<tr>
<td>5,114</td>
<td>0</td>
<td>5,114</td>
</tr>
</tbody>
</table>

Cotswold and Derbyshire: |

Cotton | Wool | Silk |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>Females</td>
<td>Total</td>
</tr>
<tr>
<td>12,849</td>
<td>0</td>
<td>12,849</td>
</tr>
</tbody>
</table>

Sheffield: |

Cotton | Wool | Silk |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>Females</td>
<td>Total</td>
</tr>
<tr>
<td>12,251</td>
<td>0</td>
<td>12,251</td>
</tr>
</tbody>
</table>

together with a small number scattered in other districts.

The same volume (p. 51) gives a return of the number of factories, and of the persons working therein, in 1836. For brevity we will call the four districts, into which the kingdom is divided in respect to factory inspectorship, the East Anglican, the West Anglican, the North Anglican, and the Scotch.

Cotton | Wool | Silk |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>Females</td>
<td>Total</td>
</tr>
<tr>
<td>East Anglian District:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18,109</td>
<td>9,543</td>
<td>18,109</td>
</tr>
<tr>
<td>West Anglian:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11,125</td>
<td>5,100</td>
<td>11,125</td>
</tr>
<tr>
<td>North Anglian:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11,853</td>
<td>6,000</td>
<td>11,853</td>
</tr>
<tr>
<td>Scotch:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18,725</td>
<td>11,000</td>
<td>18,725</td>
</tr>
</tbody>
</table>

By the commencement of 1839 (Fact. Pop. 1839, vol. xiii.) the numbers had thus risen:—

<table>
<thead>
<tr>
<th>Cotton</th>
<th>Wool</th>
<th>Silk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>Females</td>
<td>Total</td>
</tr>
<tr>
<td>East Anglian District:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30,833</td>
<td>15,416</td>
<td>30,833</td>
</tr>
<tr>
<td>West Anglian:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>23,125</td>
<td>11,000</td>
<td>23,125</td>
</tr>
<tr>
<td>North Anglian:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>32,125</td>
<td>16,000</td>
<td>32,125</td>
</tr>
<tr>
<td>Scotch:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40,198</td>
<td>22,000</td>
<td>40,198</td>
</tr>
</tbody>
</table>

Another return (Fact. Pop. 1843, vol. iv. p. 256) gives a series of numbers under different points of view:—the first being classified according to the kind of textile material; the second, according to the location in different parts of the empire; and the third, according to the ages and sexes of the workpeople.

In a work published in 1840 (Cotton Manufacture of the United States,) by James Montgomery a comparison is drawn between certain features of the factory-system as observable in America and England:—In every department the rate of wages is generally higher in the United States than in Britain; and, do I know that it will for many years to come be higher in this country as in Great Britain. The price of living here is higher, and the hours of labour longer; besides, the greater part of the factory workers being connected with farming, whenever wages become reduced so as to cease to operate as an inducement to prefer factory labour above any other to which they can turn their attention, then a great many factories will have to shut up. During a stagnation of trade, it is common for the manufacturers here to stop a part or the whole of their factories, and then the workers retire to their farms; while in Britain, as the case was in 1827, when a vast number of factories were entirely shut up. Yet it seemed not to affect the workers materially: indeed, many of the girls who had been some time in a factory seemed to rejoice and to regard it as a time of recreation (p. 187). Factories may be shut up in England, or work half-time, but the workers do not turn their hands again to agriculture. The whole tenor of the evidence collected by the Commissioners and Inspectors seems to show, that however low factory wages may be, it is very rarely indeed that any of the workers turn to field employment. Although it was so late as 1790 that the cotton manufacture was established in the United States, there were in 1831, in full operation 801 factories; containing 33,483 looms and 1,546,708 spindles; employing 18,500 adult males, 38,597 adult females, and 4691 children; and consuming 77,457,816 pounds of cotton yearly.

The factories at Lowell in Massachusetts exemplify not only any others the rapid progress of factory labour in America. The territory of Lowell, comprising an area of four square miles, was until the year 1819 a barren spot, but provided with good water-power, Mr. Boardman, a merchant, discovered its resources, and established a company for turning them to account. This was followed by the
FAI 563 FAL

formation of other companies, by whom the textile manufac-
ture was carried on with great energy. A period of ten
two years repeated in distinct from one state to the
Wooden.—Number of fulling-mills, 2586; woollen factories, 1202; value of manufactured goods, 20,696,999 dollars; per-
sons employed, 21,342; capital invested, $15,765,124 dollars.

FAGOPYRUM, a genus of plants belonging to the
natural order Polygonaceae. It has a 5-parted perianth, 8 sta-
men, 3 styles, 1-seeded trigonous nut, a central embryo, and
these follicous, contorto-plicate cotyledons. There is
but 1 British species of this plant, the F. esculentum.
This is the Polygonum Fagopyrum of Smith, and known as the com-
non Buck-Wheat. It has an erect stem without prickles, the
flowers in cyme panicles, 5 stamens, leaves cordate, sagittate
acute, a trigonous acute nut with straight angles. This is a vi-
able plant, as it grows on the worst and poorest soils, and is
often seen as food for game. Though now admitted into the
British Floras, there can be no doubt that it was originally a
native Plant to other Asiatic countries. It was introduced to
Europe by the Crusaders; and hence in many parts of France,
where it is commonly grown, is called Saracen Corn; and so
much is it esteemed in Belgium, that M. Bory St. Vincent
says he was the tomb of the person who is reported to have
first brought it into that country. [Buck-Wheat, P. C.]
(Rebington, Manual of British Botany; Burnett, Outlines
of Botany.)

FAHRENHEIT, GABRIEL DANIEL, an able ex-
ponent of natural philosophy, was born at Danzig near
the end of the seventeenth, but little is known of the
year of his birth is unknown. His father intended that he should
engage in a mercantile occupation, but his own taste inclining
strongly to scientific pursuits, he used every opportunity of
gaining knowledge, in such physical researches as his circum-
stances permitted.

Having travelled through different parts of Germany in
order to acquire information respecting the subjects of his
studies, he came to Holland, and established himself at Am-
sterdam as a maker of philosophical instruments.

He considerably improved the arsometre (ARSOMETER,
P. S. C.), but he is chiefly distinguished for the invention of
that particular scale which he applied to thermometers
[temperatures]. The scale was thus arranged in this country.
The fluid which he employed in the
construction of the thermometer was mercury; and to the
bulb, instead of a globular, he gave a cylindrical form. The
measures were generally executed on paper which was
wrapped about and made to adhere to the case; the
arsometre was contained in a glass cylinder.

Fahrenheit was elected a Fellow of the Royal Society of
London in 1724; and in the 'Philosophical Transactions' for
difamous for the year after he was 60 years old, and his state
of emolument, on the freezing of water in vacuo; on the
specific gravity of certain bodies; also on an improved baro-
 meter and arsometre. He contrived a machine which he
intended to be used for the purpose of draining marshes; but
his death, which took place in 1799, pre-empted this
enterprise.

FAITHMORE, WILLIAM. This distinguished English
painter of the time of Charles 1. was born in London, but in
what year is not known. He was instructed by Mr. B., after-
wards Sir Robert Peake, painter and printseller, with whom
he worked three or four years before the breaking out of the
rebellion; and when Sir Robert Peake was made Lieutenant-
Colonel, and intrusted with a command in Basing-House,
Faithmore enlisted under him, and they were both taken pri-
ced. The Prince of Orange was then confined in Aldersgate, where he resumed the graver; he
was however shortly afterwards released and permitted to go
France. He returned about 1659, and opened a print-shop
in the Strand, near Temple Bar, and prosecuted his art at
the same time. A few years afterwards he gave up gravure, moved to
Printing-House Yard, Blackfriars, and in addition to engraving
pursued portrait-painting in crayons. He died in 1691,
and was buried in St. Anne's, Blackfriars.

Walpole has given a considerable list of Faithmore's prints,
of which the following are some of the best:—His own head
looking over his shoulder, with long hair; Sir William Paston,
Bart., 1659, which Walpole terms his most perfect work;
her husband by Paston, about 1661; the Portrait of Sir
Smith, widow of Sir Edward Herbert, after Vandyck;
Montagu Bertie, second Earl of Lindsey, after Vandyck;
Sanderson, 1658, prefixed to his Graphica, after Zout; Anne
Bridges, Countess of Exeter, after Vandyck; Thomas Hobbes,
Countess Marja, with melancholy expression of countenance
in Paris; a large full-length emblematical print of Cromwell, in
armour; Queen Catherine, in the dress in which she arrived
in England; Barbara, Countess of Castlemaine; Prince Ru-
per, after Dobbs; Mrs. Herbert, eldest daughter of Sir
Thomas Fairfax, after Walker; John Milton, stat. sixty-two,
drawn by Faithmore himself, &c.; &c.; and four illustrations to
Taylor's 'Life of Christ,' the Last Supper, Christ Praying in
the Garden, the Scouring, and the Marriage of Cana. His
works were chiefly portraits. His son William, called Sir
William Faithmore the Younger, engraved portraits in mezzotins,
but he was of dissipated habits, and he died towards the close
of the seventeenth century, aged about thirty. There are
headings by him of Colour-Plate, A. of Anne, Prince George of Denmark, Charles XII. of Sweden, Dry-
den, &c. (Walpole, Catalogue of Engravers, &c.)

FALCONET, ETIENNE MORICE, a sculptor of
considerable, but transient, reputation; was born of poor parents
at Vevey in Switzerland, in 1716. He studied several years
under Lemoine, and first made himself known by a group
of Milo destroyed by the Lion, for which he was elected a mem-
ber of the French Academy of Painting and Sculpture in
1748, and of which he was subsequently made a professor, and
eventually rector.

In 1766 Falconet was invited by Catherine II. to St.
Petersburg; and here he executed his most celebrated work,
the colossal equestrian statue of Peter the Great, which is
erected on a large pedestal, in the place of arms in
Isaac's Church; it occupied him three years. He returned
to Paris in 1778, and died there in 1791. Falconet wrote
several theoretical works upon the arts, as 'Reflections sur la
Sculpture,' &c., which appeared originally separately, but were
published together at Lausanne, in 6 vols. 8vo. in 1782, and
at Paris in 3 vols. 8vo. a few years afterwards. He was a
zealous critic, and frequently very warm in the expression of
his opinions, especially his censures. But in his own practice
he preferred nature and originality of expression or character of the antique. He never was in Italy.

(Biographia Universalis.)

FALKLAND, LUCIUS CARY, VISCOUNT, was the
oldest son of Henry Cary, Viscount Falkland [FALKLAND,
HENRY CARY, VISCOUNT, P. C.], and he was born in
1574. His father was Lord-Deputy of Ireland from 1622 till 1629,
and during this time he was educated at Trinity College,
Dublin, but afterwards at St. John's College, Cambridge.
He inherited an ample fortune from his grandfather, and soon afterwards went over to the Nether-
lands, with the intention of taking a command, but finding
the campaign inactive, he returned to England. Having con-
ceived a desire to be able to read accurately the Greek authors,
he concluded his tour in a journey to the great university
of Paris, and prosecuted his design with such vigorous industry
that he became a master of the language in an incredibly short time.
His house was only about ten miles from Oxford, and Chil-

42
lingworth and other learned men of the University were at this time in the h-hit not only of visiting him, but of residing with him. In 1791 he joined an extinct whig party against Scott. His peerage, being Scotch, did not entitle him to sit in the House of Lords, and in 1640 he was elected member for Newport, Isle of Wight, in the parliament which assembled on the 15th of April, and was again elected to the same parliament which met on the 3rd of Nov-

Lord Falkland was free from any party bias, and thinking that the leaders of the popular party were in certain instances pushed to extremities to an excessively deplorable and fraught with danger, he opposed them strenuously: hence he came to be regarded as an advocate of the court, and Charles I. invited him to become one of his privy council, and offered to make him a knight of the garter. He refused it all. Sir Isaac Vane, from whom the king had dismissed. Lord Falkland was much disinclined to associate himself with the court party, but after much persuasion by Lord Clarendon and other personal friends, he was prevailed upon to accept the king's offers. His severity of moral principle was ill fitted to harmonise with Charles's duplicity and unconstitutional designs, but the civil war having commenced, he adhered to him with inflexible firmness, using every effort to reconcile the contending parties, and though with a heavy heart, attended the king on all occasions of conflict or danger. But his acracy of spirit had deserted him, and when sitting among his friends, after long silence and frequent sighs, he would ejaculate, 'Peace, Peace,' in a monotone, a most pathosimply pathetic at the very awfulness of the war, and the view of the calamities and desolation the kingdom did and must endure, took his sleep from him, and would shortly break his heart.' He insisted on making one in the first rank of Lord Byron's cavalry at the battle of Rush- bury, September 20, 1648, and on the first encounter was shot in the belly with a musket-ball; he instantly fell from his horse, and his body was not found till the following day.

Lord Clarendon, who was his intimate friend, has pronounced a long and eloquent eulogy on his character, which indeed appears to have been worthy of the highest admiration. His chief work was 'A Discourse on the Infallibility of the Church of Rome,' which Swift, in his 'Letter to a Young Clergyman,' praises for its purity and simplicity of style.

Falkland islands. Since the article Falkland islands was published in the P. C., much new information about them has been obtained, and these islands have been made a British colony. They are situated between 51° and 53° S. lat. and between 57° and 62° W. long., and form a group of islands in the Southern Atlantic, consisting of two principal islands, the South Falkland, and a considerable number of smaller islands clustered around them and in the straits between them. East Falkland is about 90 miles long, and on an average 40 miles wide; West Falkland is about 80 miles long with a mean width of about 28 miles. The smaller islands are not described in considerable detail, from sixteen nales in length and width to mere islets of half a mile in diameter. East Falkland is computed to contain 3000 square miles; West Falkland is estimated at 3000 square miles. If the adjacent islands are included, the whole group may be estimated to contain about 6000 square miles, or nearly two hundred more than Yorkshire.

Tides and currents. The rise of tide is about four feet at neap and eight feet at spring tides. The principal swell coming in from the east, causes the tides off the south-east coast of East Falkland. But along the south, east, and west shores it increases in strength, until among the Jason Islands it runs six miles an hour, and causes heavy breakers. The tide flows from both openings into Falkland Sound, or the Straits separating East and West Falkland, and meets near the Swan Islands. There is a perpetual current setting past the group from south-west to north-east, which continually brings drift-wood to the island. On all parts of the islands the waves of the open sea are, as those that are exposed to the south-west, the beaches or rocks are covered with trees, which have drifted from Staten Land or Tierra del Fuego. This current continues to a distance of two hundred miles to the north-east-southwest coast, as is indicated by great quantities of drift-keel, water-worn trunks, and branches of trees, which are carried so far. But this current never runs more than two knots an hour, and in all probability its usual rate is even less than one knot.

Coasts. The whole group is deeply indented by sounds, bays, harbours, creeks and inlets. Perhaps there is no coast in the world which presents a more extensive and picturesque view. They are so low that they cannot be seen from the deck of a vessel several miles distant.

Surface and soil. We know very little of West Falkland. Pitroyt states that the average height of it is greater than that of the whole of England, and that it is a chief spot in the last-mentioned island, with which we have become pretty well acquainted within the last twenty years. A chain of high hills, called the Wickham Heights, runs across it in a due east and west direction, and as high as from 900 to 1000 feet above the general level. That portion of the island which lies south of the Wickham Hills may be considered as a level plain, gently declining towards the southern shores. This plain is traversed by a number of wide and shallow depressions and lakes, the waters of which may be seen draining off into the sea. They are frequently a mile and more wide, and the tracts between them rise on an average fifty or sixty feet above their bottoms. Thus the country exhibits an undulating surface. Governor Mooney says that this is the best beet of land that he has seen in the Falkland Islands.

In some parts of the island the bottoms of the valleys are covered by great angular fragments of quartz rocks. The blocks vary in size from that of a man's chest to ten or twenty times as large, and occasionally they are still larger. They do not occur in irregular piles, but are spread out in level sheets or great streams. These streams of stones vary from a hundred feet to a mile in width. The bottom of a valley about ten miles from Port Louis is entirely covered with such stones, an area of about three miles and a half by one mile.

A view of the country from one of the heights is dismal in deed. Moorland and black bog extend as far as eye can discern, intersected by numerous streams and pools of yellowish brown water. On that account the earlier voyagers have spoken with contempt of these islands; but when it was known that the cattle which had been left there by the European settlers had not only increased in number, but also in size, it was evident that the soil possessed a capacity of yielding fertility. The general description of soil is of a very fine dark, almost black, peaty quality, compact, and from a few inches to two feet in depth, lying upon a subsoil of red gravel clay where the underlyng rocks consist of clay-size. The last-mentioned districts are dry and arid, and the soils of fertility are more common in the valleys and lower parts of the island, where the soil is of a deep yellow and the grasses remarkable thick and verdant. This kind of soil ascends south of the Wickham Heights.

Rivers and Lakes. There are few rivers. The San Carlos is the largest. It winds very much, and is only about thirty miles in length and navigable for boats about eight miles from its mouth. It is divided into many arms by small islands, and contains many fresh-water lakes or ponds, varying in size from thirty yards to three or four miles in circumference.

Climate. The climate resembles that of England, but is still more like that of Devonshire and Berkshire. Summers are not so warm, and winters not so cold. The temperature ranges in general between 30° and 50° in winter, and between 45° and 70° in summer; sometimes, but rarely, it rises to 80°, and descends to 25° or even 20°. There is little snow or ice in winter; the
is seldom exceeds half an inch in thickness, and the snow is rarely more than ankle-deep, and remains a very short time upon the lower lands. There is very little foggy weather, and thunder and lightning are extremely rare. Light passing showers of rain and sleet are frequent, and are generally like small snow-flakes. The total amount of rain which falls in the year is probably less than in England, and certainly not more. The prevalent direction of the wind is westerly, shifting between west and south-west, but it is very variable. Northerly winds are more frequent, and they bring gloomy wet weather. Hard geese blow from between south-east and south-west, but they rarely last more than twenty-four hours. The westerly winds commonly commence at nine o'clock, blow with a force increasing east by north all through the day, and die away about four or five in the afternoon. The nights are generally calm, and the contrast of the bright, still, early mornings and calm evenings with the stormy mid-day is very great and striking. Gale and stormy weather are much more frequent in summer than in winter.

Productions.—There are no trees in these islands; but it is thought that some of those which grow in Tierra del Fuego would succeed here, if properly managed. There are, however, three different kinds of bushes which are used as fuel. But the numerous pea moors yield a fuel of a dark black colour, which is of excellent quality. The grasses, which are the principal production of the group, are long and apparently coarse, but they possess very nourishing qualities. One of them, called *tussac* has especially attracted the attention of naturalists and graziers. It is a gigantic sedgy grass of the genus *Bolboschoenus*, and grows in immense beds in length and three-quarters of an inch in width. It covers the great mosses, and grows on the worst soil, but in its natural state is only found near the sea, and it hardly ever extends more than half a mile from the beach. Another grass of very nutritious quality, the *arundo alopecurus*, is more abundant and universally distributed over the whole country. Of other natural vegetable productions useful to me we may mention the balsa bong (*Bolboschoenus*), the wild rye (*Elymus*), and the gorse (*Ulex*), from which the sheep are fed, and the wild turnips (*Brassica oleracea*), whose leaves are used as a substitute for the Chinese herb, the little cress (*Cardamine scutata*), the scurvy-grass (*Oxalis emaphylly*), and the native spinach, a species of *Adonis*.

The attempts to introduce our vegetables have generally succeeded: turnips, cabbages of all sorts, lettuce, radishes, and potatoes grow to perfection, and it is thought that with proper attention, cultivation, and good seed, all the common products of other climates except wine-grapes, especially wheat, will grow well. It has been proved that flax will grow well, but hemp has not been tried. Indigenous animals are not numerous. The only quadrupeds are a species of the species against which are found in this archipelago. It is about the size of an English hound, but slender, with long legs. Rats and mice had unintentionally been introduced by the Europeans. The other animals which are found in a wild state have been brought there with the intention of being left, or remained there when the European settlers were broken up. The most important are the wild cattle, which met with everywhere: the number in East Falkland is stated to amount to 30,000, but though large numbers have been killed by the crew of whaling-vessels, or others which have resorted to the numerous harbours of the islands. The animals appear to be at least equal in size to the best English breeds. Wild horses are only found on East Falkland, north of Wickham Heights. They are of a small breed, about 14 hands high, and in general ugly animals. Sheep thrive admirably in these islands; their number is stated to be about three thousand. Wild pigs are only found on some of the smaller islands. Rabbits are found in considerable numbers at several places, and their skins are exported.

Wild fowl is abundant,—two kinds of wild swans, three kinds of geese, four or five kinds of ducks, two kinds of snipe, teal, shags, penguins, rock-hoppers, sand-pipers, gulls, Cape-hawks and rooks, with some other smaller species. Hair and fur seals, which were formerly so abundant about these islands, have considerably decreased in number. Black flying-fish, used for fish bait, is abundant on a scale where many American and French vessels are employed in taking them, and appear sometimes even in Berkeley Sound.

The supply of fish is abundant, but there is no great variety. The most common are a kind of mullet and the smelt; the former attains a large size. There are no frogs or reptiles of any kind, and only a few flies and spiders.

The Flora of the Falkland Islands is not very extensive, but is abundant and interesting. There are several curious and curious flowers found, particularly south of the river Plate; and excellent plant occurs almost everywhere.

**History and Settlement.**—It must remain doubtful if American, Vespucius, on a voyage of exploration in 1829, was the first to have been identified with that of Pedro Alvarez Cabral, had seen the Falkland Islands. The latitude given by Vespucci agrees pretty well, but the description of the country is so much at variance with the physical geography of the group that it has been supposed that Captain Pinkney of the vessel *Zephyr* had seen New Georgia. We know with certainty that these islands were seen in 1692 by Dr. John Davis, who accompanied Cavendish in his second voyage; and Hawkins, who sailed along them in 1694, called them Hawkiny's Manderland. In 1690 Strong sailed through the channel which separates East and West Falkland, and called it Falkland Sound, which name afterwards was transferred to the whole archipelago. Several vessels from St. Malo passed near the islands between 1706 and 1714, and from these they were named by the French, Isles Malouines. In 1764 the French, under the auspices of the famous navigator Bougainville, established a colony on one of the harbours of Berkeley Island, called St. Vincent Harbour. Three-quarters of a century afterwards the British formed a settlement on West Falkland, under Captain Macbride, on the inlet, called Port Egmont. Soon afterwards the French, in 1767, ceded their settlement, from political motives, to the Spaniards, who in 1770 attacked and destroyed it, and were driven out by the British. Nine years later the British formed a settlement on West Falkland, under Captain Macbride, on the inlet, called Port Egmont. Soon afterwards the French, in 1767, ceded their settlement, from political motives, to the Spaniards, who in 1770 attacked and destroyed it, and were driven out by the British. Nine years later the British formed a settlement on West Falkland, under Captain Macbride, on the inlet, called Port Egmont. Soon afterwards the French, in 1767, ceded their settlement, from political motives, to the Spaniards, who in 1770 attacked and destroyed it, and were driven out by the British. Nine years later the British formed a settlement on West Falkland, under Captain Macbride, on the inlet, called Port Egmont. Soon afterwards the French, in 1767, ceded their settlement, from political motives, to the Spaniards, who in 1770 attacked and destroyed it, and were driven out by the British. Nine years later the British formed a settlement on West Falkland, under Captain Macbride, on the inlet, called Port Egmont. Soon afterwards the French, in 1767, ceded their settlement, from political motives, to the Spaniards, who in 1770 attacked and destroyed it, and were driven out by the British. Nine years later the British formed a settlement on West Falkland, under Captain Macbride, on the inlet, called Port Egmont. Soon afterwards the French, in 1767, ceded their settlement, from political motives, to the Spaniards, who in 1770 attacked and destroyed it, and were driven out by the British. Nine years later the British formed a settlement on West Falkland, under Captain Macbride, on the inlet, called Port Egmont. Soon afterwards the French, in 1767, ceded their settlement, from political motives, to the Spaniards, who in 1770 attacked and destroyed it, and were driven out by the British. Nine years later the British formed a settlement on West Falkland, under Captain Macbride, on the inlet, called Port Egmont.

In the beginning of this century, the whaling fishery in the Southern Atlantic began to be prosecuted on an extensive scale by some European nations and the North Americans. Most of these vessels visited the Falkland Islands, especially to kill wild cattle and refresh their crews. They soon discovered that the islands were visited by a great number of hair and fur seals, and these animals attracted a considerable number of ships. The seal fisheries at the islands were almost always found on Berkeley Sound. This induced the government of the newly established republic of Buenos Ayres to take possession of the island in 1820. England supported the claim of Buenos Ayres to a settlement in 1822. In 1833, Governor of Buenos Ayres had formed a settlement at Port Louis in 1825, but Great Britain asserted its rights, and the colony was given up to the English in 1833. For some years only a lieutenant of the navy with a boat's crew resided at Port Louis, but as it appeared that this force was unable to keep in order the numerous crews of the whaling and sealing vessels which resorted to the island, the British government resolved in 1840 to colonize this group, and to send there a governor and a small force. They settled at the old establishment in Port Louis; but on examining the country in its vicinity, it was found that Port William, south of Berkeley Sound, offered greater advantages as a naval station and port of refuge, and in 1844 Governor Moody laid out a town on the southern shores of Stanley Harbour, a land-locked inlet, sheltered from every wind. The settlement at Port Louis, called Anson, however, is also to be preserved.
diction in the matter, a bailiff or officer who arrests a party in execution of it may excuse himself in an action for false imprisonment by showing that that part of the writ in which it was alleged by the court out of which the process issues has no proper cognizance of the cause, then, as the whole proceedings are corum non juro, the officer will be liable. If an arrest be made by one who is not a legal officer, or who has not at the time a warrant, or is not named in it, it is a false imprisonment, for which an action lies. If a sheriff or his bailiff arrest a man out of his county, or upon a warrant of a justice whose commission has expired, or arrests the wrong party, he is liable.

Mere irregularities in lawful process may constitute false imprisonment, and the judges will discharge the party upon condition of his waiving his right of action. All persons concerned in a wrongful imprisonment are liable in an action of false imprisonment, and the party aggrieved may sue any one of them. Thus, if the plaintiff in a suit brings an unlawful warrant to the sheriff, or if he bring a good warrant, but direct the sheriff to the wrong man, the action will lie against both.

FAMILIES OF PLANTS. The word family in botany is mostly applied to a group of plants of the same value as a natural order. In this sense it has been mostly employed throughout the pages of this work. At the same time, in the arrangements of many writers, a family is made a group of less value than an order, whilst in the writings of others the term is loosely applied to distinguish any group of plants of higher value than a single species. It is thus sometimes employed synonymously with genus. The names of natural orders being usually those of a genus, which serves as a type for the rest of the group, are easily Englished by adding the word family. Thus the order Gentianaceae is called in English the Gentian family, and so on. By this means the word family is sometimes restricted to the species of a genus. Another word used synonymously with natural order by Dr. Lindley is tribe. In his natural system, all the orders having typical genera with English names have been called tribes, with the English names attached. Thus, Cinchonaceae, the Caffe tribe; Fumariaceae, the Hawkweed tribe; Euphorbiaceae, the Spurge tribe. At the same time tribe is frequently used to express a group of less value than an order, as in the larger orders, Umbelliferae, Leguminosae, Composite, Cruciferae, &c. The following plan will give an idea of the relative value of terms used in the subdivisions of plants:

**CLASS.**

Subclass.

Order.

Suborder.

Tribe.

Subtribe.

Division.

Subdivision.

Genus.

Subgenus or Section.

Species.

The divisions, groups, and alliances between the subclass and order are adopted by Lindley in his natural system, and frequently occur in this work. It is only a few orders, such as Composite, that require the subordinate divisions above, and only the larger genera require to be divided into subgenera or sections.

FAN, an instrument or machine for agitating the air by the wafting or revolving motion of a broad surface, for the purpose of producing artificial currents. Large revolving fans, driven by machinery, are frequently used either to facilitate the cooling of fluids or the process of winnowing, or as blowing-machines to urge the combustion of a fire, or to assist in ventilation. Another application of such an apparatus is for the purpose of regulating or checking, by the resistance of air, the rapid motion, the velocity of lights, or machinery. A familiar example of such a use is afforded by the revolving fans of a musical snuff-box.

In its more ordinary acceptation the name fan is limited to the well-known instrument employed by ladies for producing refreshing coolness, the use of which under the names *falt-ebellum* or *faltellibum* in Latin, or *phriss* or *phriss纽* (diminutive, *phrissιν* in Greek, was well known to the ancients, whose fans, however, according to the article 'Faltellum' in the 'Dictionary of Greek and Roman Antiquities,' edited by Dr. Smith, were not, like most of those now used, so constructed as to have the court had jurisdiction; but it would appear that while antique fans were often of elegant forms, of delicate colours, and of costly and splendid materials, such as peacock's feathers, they were stiff and of a fixed shape.

Among the various kinds of separate fans the most generally used, and further united by a thread passing along their hips, and another tied to the middle of the shaft of each fan; others appear to have been made by fastening together, back to back, the two wings of a bird, and attaching a handle at their base; while others again were formed of linen strings* in a light frame. They were usually held by female slaves, beautiful boys, or eunuchs, whose duty it was to wave them so as to produce a cooling breeze; and the employment of such attendants was not confined to ladies, for we read in Suetonius that the Emperor Augustus had a slave to fan him while asleep. Fans of a softer kind, to which the name of *muscarium* or *muscothib* was applied, were used for driving off flies from living persons, from articles of food, and from other objects. The materials employed for this purpose were generally a grass which was tied to a stem, and employed for urging the combustion of a fire, a practice which, to conclude our quotations from the source already indicated, 'gave origin among classical writers to expressions corresponding to the modern saying, meaning to fan the flames of hope, of love, or of sedition.'

Fans are much used in China, India, and other Eastern countries, and those of the Chinese are made to fold up in the same way as those commonly used by European ladies. Among these, few fans are used by both sexes; a fan is closed in a worked silk sheath being one of their frequent accoutrements. Representations of such a fan with its sheath, and of a top making use of one, are given in Davis's 'Chinese,' (Weekly Volume edition, vol. ii. pp. 86 and 41). These appear to be of either paper or silk, but with the Chinese, as well as the Europeans, fans are sometimes made of elegantly carved or perforated slices of ivory. Whatever be the materials employed, much skill is often displayed in the decoration of fans, and in some cases artistic talent of a high order has been applied in painting them. The mode in which they are constructed to open or fold together at pleasure is too well known to need description.

In the ceremony of ordaining deacons in the Greek church a fan is put into their hands, to indicate the duty which devolves upon them of keeping flies off the priests during the sacraments.

FARODAZZI. [FARTO, ANTONIO DI, P. C. S.] FARINATTI, PAOLO, a celebrated painter of Verona, where he was born in 1622. He studied first under Nicolò Giofato, at Verona, and afterwards under Giorgione and Titian at Venice. There are several excellent works in fresco and in oils in the principal churches of Verona; the most celebrated is the portrait of a man and his wife, in the Church of St. Mary, where he and his wife died, in 1606, on the same day. His style of design is robust and vigorous, similar to that of Giulio Romano, and his colouring has much of the character of that of the Venetian school. He etched a few designs from sacred and mythological history: they are signed by Bartsch.


FARRIERY. [HORSE, P. C. S.] FARM, a term employed by naturalists to express the whole of the members of the animal kingdom living in a particular district or at a particular time. Thus all the animals living in Great Britain constitute the British Fauna. Those inhabiting the land form the terrestrial Fauna; those found in the seas constitute the marine Fauna. They are applied collectively to all the animals of the world, the extinct species constituting the fossil Fauna, and the living species the recent Fauna of the world. The word is derived from the Latin *fauna*, the <i>Fauna</i> or wild animals, (P. C. S.), who were supposed to be the patrons of wild animals.

The word Flora is also applied in the same way, to comprehend the whole of the plants of a district, and admits of the same applications as the term Fauna. It is derived from Flora, one of the Graces of the Greek mythology, (P. C. S.).

FAVORITES, a genus of fossil Zoophyta, common in the Silurian strata of Norway and Wales (Murchison, *Sil. System*).

FAVULARIA, a generic title of certain fossil plants.
allied to Sigillaria, as F. tesselata, from the coal formation (Steenbruggen).

FEATHERS, considered anatomically, as the covering of the bird, are treated of under BRADY, P. C., p. 426. We may here add a few words on the uses to which they are applied as an article of trade, a subject which is more fully treated of in two articles on the nature and uses of feathers, in Nos. 606 and 807 of the 'Penny Magazine,' to which, and to the articles in the transactions of the Dublin Society of Arts, we are chiefly indebted for the following particulars.

The principal uses to which feathers are applied are for personal decoration, as plumes for ladies' head-dresses, or for the wearing of them, as those of the wild duck are used for filling beds, cushions, and pillows; or, in the case of the larger quill-feathers, as writing-pens, or small tubes for the manufacture of hair-pencils, or similar purposes. For the first of these purposes their elegant appearance is their great recommendation; for the second, to which only the smaller feathers are applied, their exquisite softness, and that elasticity and peculiarity of structure which renders them less liable to clot together, under the influence of pressure, than any kind of woolly or hairy substance which is applied to the same purpose; while the last-mentioned use depends on their possession of a hollow quill or barrel of a horny texture, which, though found in all feathers, is only sufficiently large and strong in those of the wings and tail to be useful for such a purpose.

Of the various kinds of feathers employed as plumes for head-dresses, the most important are those of the ostrich (Struthio-nidae, P. C., p. 141), of which there are various kinds, differing in size, by which they are distinguished. 'Dr. Ure is of opinion that the white ostrich-feathers are preferred, as being the whitest and most beautiful; those upon the back and above the wings being considered the best, those of the wings next in quality, and the tail-feathers the least valuable. The down, which is black in the males and grey in the females, consists of the smaller feathers from other parts of the body, which vary in length from four to fourteen inches. The finest white feathers of the female bird are somewhat grey towards the end, which lessens their value when exposed to its use. The feathers of the male are preferred by the plumassiers, and prepared in the same way. They are first washed or scoured by rubbing with the hand (being previously tied up in bundles) in a father of white soap and water, and subsequently in clear water, as hot as they can be sufficiently boiled; after which the feathers are rinsed in three clear waters in succession; the second, which is termed assaying, to pass them quickly through a vessel of cold water containing a little indigo tied up in a fine cloth; and the third, subhurping, or exposing them in a close vessel to the vapour of burning sulphur, in the same way as in the bleaching of straw hats and bonnets. The feathers are then dried by hanging upon cords, during which they are shaken from time to time to separate their fibres. To increase their pliancy the ribs are scraped with a bit of glass cut circularly; and to impart the requisite curly form to the filaments or fibres, the edge of a blunt knife is drawn through them. The directions for dyeing we need not quote, further than that, for all colours except black, the feathers should be previously well bleached by exposure to the action of sun and dew, which is effected by cutting the end of the quill or tube to a sharp point, and sticking or piercing, during which they are shaken singly in grass ground, where they are left for fifteen days.

We find from allusions to feather-beds in a statute of the reign of Henry VII., quoted in the 'Penny Magazine,' as above, that they were anciently in use among the lower classes of the age. Goose feathers, which, owing to their superior elasticity, are preferred for this purpose, are considered best when they are plucked from the living bird; and in the districts where geese are chiefly kept, this cuspl operation is commonly practiced by the women of the house. The quill is repeated from three to five times in a year. While most writers condemn this practice for its apparent barbarity, and

some assert that, in cold weather, many birds die in consequence of being subjected to it, it is asserted in the article 'Lincolnshire,' in the recent edition of the Encyclopædia Britannica, that the breeders deplore the imputation of cruelty, and say that they, for their own profit, pluck only such feathers as are very near falling off, and the removal of which consequently gives but little pain, because as such as are firmly fixed have a little blood at the end, they are less liable to be injured. However this may be, a plan may be proposed to restrain the custom of the season as practised by the more humane or enlightened breeders, there is evidence enough of the barbarity of the practice in other cases. Young birds are plucked as soon as they hatch; the males are presented to the public, and the females are put to market, with a view, as early as possible, to promote the rapid growth of the feathers. Goose feathers are divided into white and grey, the former being deemed the most valuable. The less valuable kind of feathers, known by the general name of poultry feathers, are obtained from turkeys, ducks, and Fowls. They are of more variable value, and are used for the soft and elastic, but their value is inspired by the great difficulty of removing the disagreeable odour of the animal oil which they contain. Various methods are practised of cleansing feathers from their oil, and the Society of Arts presented a reward of twenty guineas in 1806 to Mrs. Richardson for a process considered superior to any then practised, in which the feathers were immersed for three or four days in lime-water compounded of 1 lb. of quicklime to 2 gallons of water. When the feathers were taken off the plate they were placed on a sieve, to allow the lime-water to drain away; they were then washed with clear water and spread upon nets to dry, the whole being shaken from time to time, until they were perfectly clean. The nets were then removed off, and the whole process occupied about three weeks, and at its conclusion the feathers were said only to require beating for use. Lime is used by the Irish in the preparation of feathers, but, being applied too plentifully, they become loaded with dust, and consequently bear an inferior character in the market. In small quantity it appears likely to aid in the preservation of the feathers, to which small portions of animal fibre will occasionally adhere; but Dr. Ure seems to think that blue-water is a bad thing, as they can never be freed from white dust afterwards. 'Their only preparation,' he states, 'when cleanly gathered, is a slight beating to clear away the loose matter, but for this purpose they must be first well dried either by the sun or a stove.' Judging however from the communications made to the Society of Arts (Transactions, vol. xliii. pp. 210-215), it would appear that the plan above described was successful in cleaning some feathers in a perfectly raw state, observation showing that, after being steeped in the usual period of three days, retained their unpleasant smell.

The purification of bed-feathers by the agency of steam has recently been practised on an extensive scale in London by Mr. Herrig. By this process employed, which is secured either to the public, or to the proprietor of the bed, the feathers as have become deteriorated by use, the feathers are so greatly improved in softness and elasticity that a much less quantity of them than of feathers prepared in the ordinary way suffices to make a good bed. To this effect the testimony of Mr. Herris, to the patentee by Dr. Ure, it appears that the surplus feathers, removed in consequence of this improved elasticity, from three beds which were submitted to this process, were found sufficient to make a fourth bed of excellent quality, of 40lbs. weight.

The softest and finest kind of feathers employed for bedding are those from the breast of the eider-duck, known in commerce as eider-down, of which an account is given under BRADFORD, P. C., p. 227. Dr. Ure says, 'Quills or eider-down should never be slept upon, as it thereby loses its elasticity, but should be used only as a covering. A similar substance, though in less quantity, is procured from the swan, the goose, and some other birds.'

For the third of the above-mentioned uses of feathers the quills of the goose are most generally employed; those of the turkey and swan are highly prized. When geese are plucked several times in the year, the feathers of the male are only taken at the first plucking, about the end of March. As taken from the hind, the horney substance of the barrel of the quill is covered, both internally and externally, with a vascular membrane, which adheres very closely to it, and the feathers are very easily detached upon the quill is must therefore be subjected to certain operations by which the membranes may be detached and dried up, and the barrel
rendered transparent, hard, and somewhat brittle; previous to which they are sorted into pri\'mes, seconds, and barrelled quills, and the others of such possess these characteristics in a less degree. They are further sorted into right and left wings. There are no less than one hundred and fifty different sorts, which have the same curvature; and before tying up for sale the barb, or feather proper, is usually stripped off from the inner edge of the stem, in order that they may lie compactly together. When it is desired to tie them with a stem and exterior quills, which are fit for making pens, and of these the first is the hardest and roundest, but the shortest, and the second and third are considered the best.

Dutch quills, observes Dr. Ure, 'have been highly esteemed; with which were the first who hit upon the art of preparing them well, by clearenting, both inside and outside, from a fatty humour with which they are naturally impregnated, and which prevents the ink from flowing freely along the pens made with them.' 'The Dutch,' he adds, 'for a long time employed hot cinders or ashes to attain this end; and their secret was preserved very carefully, but it at length transpired, and the process was then improved.' In the improved method the barrel end of the quill is plunged for a few seconds in a sand-bath, heated to about 140° Fahr., and then rubbed strongly with a piece of flannel. After this it appears white and transparent. 'Both carbonate of potash and sulphuric acid,' observes our authority, 'have been tried to obtain this, but with the least success. The process is, however, sometimes followed by a brief immersion in dilute muriatic acid, which gives the appearance of age to the quills. They must afterwards be made perfectly dry. The above is described by Dr. Ure as the French process; he states that modes adopted in Londonquilts from the first of which is styled the Dutch method. In it the workman, who is styled a Dutchet, sits before a small stove fire, into which he thrusts the barrel of the quill for about a second. Immediately upon withdrawing it from the fire, he draws it under the edge of a large blunt-edged knife, called a hook (shaped somewhat like a patten-maker's knife, and, like it, having a fulcrum at one end, formed by a hook and staple, and a handle at the other end, by which pressure may be applied thereto,) in which it is then cut, and a block or plate of iron, heated to about 350° Fahr. By this process the barrel, which is rendered soft and elastic by the heat, is pressed flat, and stripped of its outer membrane, without danger of splitting. It springs back to its natural form, and the dressing is completed by scratching with a piece of rough dog-fish skin. The principal workman employed in this operation can pass 2000 quills through his hands in a day of ten hours. In the other method alluded to, which is more inferior to the Dutch method, the quills for pen-making, although it makes them somewhat more pleasing to the eye, the quills are first stained yellow by steeping them for a night in a decoction of turmeric, then dried by the sun, and subsequently scraped by the Dutchet in the manner above described. Several hours' work have also been suggested as a good mode of dressing or preparing quills. By whatever process the external membrane is removed, that inside the quill remains, separated from it, and shrivelled up in the centre of the barrel, until it is cut open to convert it into a pen.

FEDERICI, CAMILLO, an Italian dramatic writer of note (born at Garcezo in Piedmont, April 9th, 1740), whose real name, Giovanni Battista Visiasso, is, like that of Poquelin (Molière), quite lost in one which is given him by his company of actors and beginning to write for the stage, and which he took from the title of his first dramatic effort, 'Camillo e Federico.' Intended by his family for either the church or the bar, he was educated accordingly at Turin, but with a passionate taste for the theatre, which had captivated his imagination while he was yet in his boyhood, prevailed over all other considerations, and urged him to a step which he after all felt regretted, only because it had distressed his parents more especially. He had lived for some years in different companies in the double capacity of a performer upon the stage and a writer for it, he had, in 1777, the good fortune to find an excellent wife in the widow of these favours. It had not only been fortunate to him as a manager. The union was a happy one on both sides, for his wife was not only an amiable, but an intelligent and well-educated woman, possessing considerable literary talent. Cured of his youthful illusions and desires of enjoying the repose of domestic life, Federici quitted the boards, and settled at Padua, where he employed himself in compassing a succession of new pieces for the theatres of both that city and Venice. The juncture was a favourable one, for Goldoni's popularity was upon the wane, Gozzi (Gozzi, Carlo, P. C.) had ceased to write for the stage, and Chiarini and other minor dramatists were at that time occupying the field. Aided by the skill of Goldoni, Federici showed himself a worthy successor to him, inferior in comic force, but equally fertile in invention, and more varied in his subjects, many of his pieces being of a serious and dramatic character. 'The.it is a scene of domestic life in Germany—accordingly answering better to the taste of domestic drama than comedy. Federici's fame was not confined to the applause of the public whose favour he had more immediately in view, for his pieces were brought out with equal success in Paris and London. But the effect of his full tide of prosperity, which might else have gone on unabated, was suddenly checked by a calumny that human prudence could neither foresee nor avert. He was attacked in 1791 by a malady of the eyst, that rendered it incapable of all exertion, either bodily or mental; nor did he ever afterwards recover from it further than to be able to dictate either to his wife or one of his sons, who scoured him as annuaries. To add to his distress, soon after his disorder first seised him, he learnt that Bellandi, the manager of one of the companies for which he had written, had surreptitiously sold twenty-nine of his pieces to a publisher at Turin—an injury which the increased celebrity which brought to his name could hardly soften. The importance of the error was increased by the duration of the protracted suffering to which he was doomed while yet in the meridian of life, was that afforded him by the affectionate attentions of his wife and his two sons (Carlo and Giuseppe, who, after distinguishing themselves at the University of Padua, were at last raised to a high order in the medical career). Federici died December 23rd, 1802, leaving a more unblemished moral character than can usually be claimed for writers of his class. Amiable and unassuming, he had invariably resisted the pressure of his becoming a member of any literary or learned society, but he could not prevent one public mark of honour being paid him, namely, a medal being struck, with the head of Aliferi on one side, and his own on the other—as the effigies of the two dramatists were sometimes inscribed in the annals of the city of Padua, to which the other is in his medical career. The high reputation he obtained did not rest upon what might else pass for the undue partiality of his countrymen, since it has been confirmed by the testimony of foreign critics. One quality that recommends his productions is the healthy tone of morality which generally pervades them; neither is it the least of his merits, that he enlarged the resources of the Italian stage, by bringing subjects upon it that were calculated to amend and improve as well as amuse. Be it what it may, the plays of Aliferi belong to the class of those which are not confined to any one rank of society—he produced a few tragedies, which would, however, hardly have associated him in the manner above-mentioned with Aliferi. The most celebrated collection of his works that published under the title of ' Opere Teatrali di Camillo Federici, Padova e Venezia, 1802-16, in fourteen volumes.'
Dumbness this.

applying and parts,

existence cantharides,

irritants,

sleep... prose.

Diseased symptoms and phantiasis, as haemorrhoids, sore fauces, and ulcers are produced by various scab plants, as ranunculus acris and secundus, and by the tormentil, malformations, and hemmorhoids, are imitated by affixing in various classes of animals, the intestines and other viscera to the parts of the body in which these diseases occur. Cancer has been imitated by a cow’s spleen, and by a sponge moistened with milk for applying to the skin. Of these body are feigned by obstinate and long-continued flexion of the part, aided by inaction and the use of tight bandages. Sometimes these contractions are accompanied by a wound, in order to prove that they have been effected by a burn. Many means have been proposed for imitating this class of impostures, such as compressing with a tourniquet the nerves that supply the contracted muscles; applying a wet bandage tightly round the limb, so that when it becomes dry it may overcome the contraction; moving the contracted limb during the sleep or that produced by narcotics; or making extension whilst the person is under the influence of an emetic, or when his attention is directed to other objects, recommending the coast of Africa, or some other disagreeable thing, as a cure. Wounds and sores are produced in a variety of ways. Wounds, when self-inflicted, will always be in positions where persons can get at the spot where they exist, with their own hands. Accomplices are however sometimes engaged even in this. Ulcers have been feigned by burning with a hot iron, by caustics, as corrosive acid and alkali, and the juices of various plants, as of the ranunculus acris and secundus, the spurge-laurel, the euphorbium, arum maculatum, and juniper. Where persons are suspected of having operated upon themselves, the toes or fingers, or the legs in a box and locking them up will allow the ulcers to heal.

The various forms of cutaneous disease are produced by the application of irritants to the skin, as pounded garlic, euphorbium, celandine, gunpowder, nitric acid, hay salt, &c. The discoloration of jundice is imitated by various dyes, as well as the appearance of bruises. Ophthalmia is a disease often feigned, and is commonly produced by the application of irritants, as snuff, pepper, tobacco, blue vitrol, salt, alum, &c. The discoloration of mind is imitated by the quinine and copper; usually more rapid than in the idiopathic form. It is mostly also confined to one eye, for obvious reasons; and when occurring in the army it may be suspected, if epidemic, when it only comes on in private, and not accommodated officers. Diseased discharges are often simulated. Vomiting is effected by pressing on the pit of the stomach, by swallowing air, by strong and sudden action of the abdominal muscles, by tickling the fauces, and the use of emetics. Diarrhœa and dysentery are the suspected scenes of some impostors, and the excretion of phlegm, blood, mucus, perspiration, powders, and other articles, and the urine, which has really been brought on by the taking of sawdust, camphor, and turpentine. Spitting of blood is a favorite assumed disease. It is simulated by placing a sponge in the mouth filled with bulllock’s blood, by cutting the mouth and gums, and by seeking blood from other parts of the body. A vomiting of urine and faeces have taken place by the stealthy introduction of the contents of the bladder and rectum into the stomach.

The spasmodic diseases to which the system is subject have been imitated with great success, and none more so than epilepsy. It has for its peculiar recommendation, that the person who is subject to it may be well in some parts, but be seized by the attacks when it best suits him. The best effect of imposition is the want of the total unsensibility which characterizes the true fits. In the feigned disease the application of irritants will seldom fail to elicit indications of sensibility. Harrington or burning sulphur may be inserted in the nose; alcohol and turpentine may be dropped into the eye, and mustard or common salt placed in the mouth. Pricking the skin with sharp-pointed instruments has also been recommended. This mode of detection is recommended 'fecking' the foot with a wet towel. He says be has by this means aroused a patient from a mesmeric slumber when all other mechanical stimulants and cold affusions had failed. Convulsions are often imitated; but where they are fictitious they cannot be sustained for a length of time without great exhaustion. Cobre is also often imitated. Electricity and cold affusions are the best remedies for this disease, and are likely to be effectual in the case of impostures. Of tonic spasms, stammering, strasphias, and difficulty of swallowing, are other diseases of the nervous system which are often imitated. Paralytic affections are also frequently simulated. The treatment resorted to for the cure of these diseases, when they are diagnosed for impostures, is to employ the most impostors. Cases however are related in which impostors have resisted the most active treatment; and a case of simulated lethargy is on record, in which an individual resisted the operations of the physicians.

Another class of feigned diseases are those which depend chiefly upon the description given by the impostor. These are all embraced in increased and diminished sensations. Increased pain of one or more organs is commonly feigned. It is easily assumed but not detected, as is many times the case, as that of tic douloureux, come on in an apparently healthy state of the system; and many pains of a severe character are dependent on exceedingly obscure causes. There are no rules which can be laid down for the detection of simulated pain; and it is only those who have extensively observed the effects of real pain on the system, that can readily distinguish that which is pretended. Of diminished sensations, blindness and deafness are those most frequently feigned. Amnesia may be really produced for a time by the application of belladonna, henbane, spurge laurate, and tobacco; but under these circumstances it disappears when the impostor is carefully watched. Deafness is often assumed, but it may be detected by comparing the voice of the impostor with that of the individual, by calling him by name when asleep, or letting a piece of money fall close to him. Dumbness has been successfully feigned, and cases are recorded which resisted every attempt at discovery. It may be frequently detected by giving a word to the person a sudden and unexpected knock, or a prick with a pin.

Sometimes general diseases are assumed, embracing a collection of symptoms. Of these, the most frequently assumed are fever, ague, rheumatism, phthisis, asthma, dyspepsia, jaundice, inflammations of the bowels, stomach, and kidneys. These feigned diseases are only to be detected by a knowledge of the real diseases, when a correct diagnosis is not often difficult. Of diseases involving complicated symptoms, that of unaccountable pain and malaise, may be feigned.

The success however does not depend so much on the ease with which the symptoms of true insanity are imitated, as upon the ignorance that prevails of the distinguishing characters of real disease. When the impostor is assumed an impostor may be easily detected. The most frequent form of assumed madness is general mania. In addition to the characters of the true disease, special tests have been proposed, such as the use of the whirling chair, and 'repeating the same words.' (Guy.)

The following general rules for detecting feigned diseases have been given by Zracchius:

1. The first is, that the physician must in all suspected cases inquire of the relatives and friends of the suspected individual what are his physical and moral habits. He must ascertain the state of his affairs, and inquire what may possibly
be the motive for feasting disease, particularly whether he is not in immediate danger of some punishment from which this sickness may excuse him.

3. From the same source under examination with the causes capable of producing it—such as the age, temperament, and mode of life of the patient. Thus artifices might be suspected if a person in high health and correct in his diet should suddenly begin to cough; cachexia, fever, and again if insanity should suddenly supervene without any of its premonitory symptoms. It is contrary to experience to find such diseases occur without some previous indications.

3. The third rule is derived from the aversion of persons feasting disease to take the proper remedies. This indeed will occur in real sickness, but it rarely happens when severe pain is present. Anything that promises relief is generally acceptable in such cases; those on the contrary who feign delusions are prudently to be avoided.

4. Particular attention should be paid to the symptoms present, and whether they necessarily belong to the disease. An expert physician may thus cause a patient to fall into contradiction, and lead him to a statement which is incompatible with the nature of the complaint. To effect this it is necessary to visit him frequently and unexpectedly.

5. The last direction is to follow the course of the complaint and attend to the circumstances which successively occur.

(Boek, Medical Jurisprudence; Thomson, A. T., Lectures on Medical Jurisprudence; Guy, W. A., Principles of Forensic Medicine.)


FEME COVERT. [Witse, P. C.]

FENESTELLA, a beautiful and abundant genus of fossil Zoophyta, allied to Porifera, which occurs in the whole Paleozoic series (Lonsdale, Syst. System. &c.)

FERN. [Flinders, P. C. S. 8.]

FERonia, the name of a genus of plants belonging to the natural order Acanthaceae. The flowers are often plicate, and 8-petalled; the seeds are usually small, occasionally 4 or 6, spreading. The calyx is flat and 5-toothed. Stamina 10; filaments dilated and united at the base; anthers linear-oblong, tetragonal. The ovary is seated on the elevated disk, 5-occasionally 6-celled; ovules numerous in each cell. It has scarcely any style and an oblong stigma. The fruit is enclosed in a hard rind, 5-celled and many seeded, which seeds are immersed in a fleshy pulp. The leaves are pinnated with 5 to 7 leaflets nearly or quite sessile, very slightly 3-angled, or nearly pinnately 6-toothed, sometimes spirally dotted elsewhere; the racemes are axillary, terminal, and few-flowered.

F. elephantum is the Elephant or wood apple of the Corozol, and is very generally eaten. The branches of this tree are armed with small spines. The leaflets, which vary in number from five to seven, are small, obovate and smooth; when very young they are thin, and when matured have a most fragrant smell resembling arose. The native practitioners of India consider them stomachic and carminative.

After a certain age however the leaves become tough and almost coriaceous. The fruit is fleshy, and extremely acid before it arrives at maturity; but when ripe, it contains a dark brown agreeable subacid pulp. In appearance the fruit is large, spherical, ragged, and often wanted externally; the seeds are in five parcels and are flat and woolly, adhering to the brachiated placentae by means of long coria.

A transparent oily fluid exudes from the trunk of this tree when the bark is opened, or when the wood is cut, and colours their mixing their colours. A clear white gum may also be obtained from the tree very much resembling gum-arabic. The wood is likewise valuable on account of its durability, whiteness, and hardiness.

F. bellidea has leaves full of transparent dots; the common petiole round, pubescent: this tree usually attains a height of twenty feet, and is a native of the East Indies, where the fruit is generally eaten. The flowers are white.

F. coriaria, the leaves of which are a mixture of turfy luscious and ripe: and ripened cuttings will strike root in sand under a glass exposed to heat.

(Fernq, Flora Medicca: Don, Gardener’s Dictionary.)

FERRATI, GAUDENZIO, a celebrated Lombard painter and architect, born at Mino near Lodi, March 1, 1570, died at Vicenza, in 1630.

He was born in Valdugia in 1484, was instructed by Luini, and worked under Raphael at Rome. He is enumerated by his countryman Lonzano among the seven greatest painters of modern times, which is an absurd edicly. He was correct in his forms, though not very careful in his details; his colour is brilliant in his colouring; but his works are quite void of sense, though his figures are well rounded, and he can have had no knowledge of or feeling for harmony of colour. His outline is also hard, and the accessory parts, though labourous, are very forceful in their effect. He was a very curious old man, amusingly gay, but he used the positive or primary colours beyond all natural proportion. His principal works are in Milan, and are exclusively illustrative of the origin or mysteries of Christianity. He died in Milan in 1550. Cruikshank, Smith, and many of them have been engraved. He died at Rome in 1689.

(Baldinucci, Notizie dei Professori del Disegno, &c.; Lanzi, Storia Pittorica, &c.)

FETI, DOMENICO, called Il Manzoni, was born at Rome in 1571, but died in 1620. He was the scholar of Cigoli, but was appointed his court painter by Ferdinando Gonzaga, Duke of Mantua, whither he removed from Rome; whence his name of Mantuano. He died at Venice in 1624, aged only thirty-five.

Feti executed several works at Mantus, of which his c$c pictures were the best; many have been engraved: his masterpiece is the Feeding of the Five Thousand, in the Academy of Mantua.

(Bagnole, Vita de’ Pittori, &c.; Lanzi, Storia Pitorica, &c.)

FEUILLEA, a genus of plants belonging to the natural order Cucurbitaceae, and named in honour of Louis Feuillée, a traveller in Chili, the author of several works on botany. They are annuals or biennials, generally climbing. The flowers have the calyx 5-cleft beyond the middle; 5 petals joined at the base; 5 stamens inserted with the petals, and alternating with them; sometimes there are 10 stamens, but when this occurs 5 of them are always sterile. The pistilliferous flowers have the tube of the calyx adnate to the ovary, with a 15-cleft limb. They have 5 petals, distinct or joined at the base, and oblong; 3 styles. Stigma broad and bluntly hirt. Fruit globose, fleshy, with a circular scar round its middle. The vegetable is yellow, white, and black, and a large fleshy trigonal central axis. The ovules are numerous, standing erect upon the axis. The seeds oval and compressed. Cotyledons flat and fleshy. This genus is native to Asia. The flowers of several species are fruits, enzymatic herbs. They have alternate, stalked, cordate, smooth leaves, and small flowers. The tendrils are axillary, spirally twisted, in place of peduncles. The seeds are oily and of a bitter taste; their unicous matter causes them to be used for burning, and their exhibited bitterness renders them good astringent medicines; they are also cathartic.

F. punctata has 3-lobed or terete leaves, beset with glandular dots on both surfaces along the nerves, but more especially beneath. The lobes of the leaves are lanceolate and rather cut. It is a native of St. Domingo.

F. tribolata has leaves which are rather glandular on both surfaces, 3-parted or trifid, the lower lobes obuse, the upper ones acute. This species is a native of Brazil. It is the variety of the preceding species, growing in the dense forest and generally in the firbobs or Gambia of South America, where it is held in great repute as an antidote to various poisons, animal and vegetable. The natives employ it not only against serpent bites, but use it to counteract the baneful effects of the Manoah and Manchineel. It is a shrub, or after having made experiments expressly to test its power, states that animals poisoned with hemlock, nux- vomica, the Rhus Toxicodendron, &c. were restored by the administration of the seeds of this plant. He asserts that the seeds have been found by him that this antidote is equally efficacious as an antidote whether taken internally or applied to a poisoned wound. These seeds act with great rapidity as emetics and purgatives.

F. coriolus has glandless, cordate, acuminate leaves, somewhat 3-toothed, and very much resembling another species of the West Indies, and like to the last species, is a very powerful antidote against the ill effects of vegetable poisons.
Fiesole, a Mugello.

The portrait of the Feuillea is as large as an apple, and from a lost drawing, it is called the 'slashing-box.'

A light rich soil is found near the coast of Feuillea, and cuttings will easily take root in a hot-bed or glass frame exposed to heat. Being creeping plants, they are well adapted for training up rurals in stores.

(Collie's Supplement; Lindley, Flora Medica; Burnett, Outlines of Botany.)

FIAMMINGO. [CALVET, DENIS, P. C. S.]

FICARIA. [RANUNCULUS, P. C. S.]

FIELD, NATURALIST. [TATTINGHAM, F. C. S.]

FIELD, NATURALIST. This is for several reasons interesting in the history of the old English drama, was professionally a player. As early as the year 1600 he was one of the Children of the Chapel, afterwards called Children of the Bawls, youths who were trained to act plays before the court, and he continued in that company till after 1609. He then became a member of Shakespeare's company, the players of the Globe and Blackfriars theatres, among whom he is named in the list prefixed to the folio of Shakespeare's works. He is known to have acted in 'Hamlet,' and in 1641 he is mentioned as 'gone,' which probably means that he was then dead. Besides these circumstances, the only ones known in his history as such show him to have been popular, and suggests that he was the writer of the 'prodigious begging-letter,' addressed to Remer, in 1657, by Daboone, Philip Massinger: and among Henslowe's papers are two other letters of the same melancholy tenor. Field wrote a part, and perhaps Gifford does less than justice to the quantity he ascribes to him, of the fine tragedy of 'The Fatal Dowry,' printed among the works of his other poet Massinger. He is also the author of two comedies, both good, and one of them excellent, both of which were written between 1605 and 1610. A woman is a Weathercock,' first printed in 1612, and 'Amours of Lady Eastward first printed in 1618, and again in 1639. Both are included in a small collection, 'The Old English Drama,' 4 vols. 12mo., 1839; and in Collie's 'Supplement to Dodson's Old Plays,' 1833. They abound in spirit, incident, and variety.

FIE'SOLE, FRA GIOVANNI DA, frequently called, from his character, Beato Angelico, is one of the most celebrated of the early Italian painters. His real name was, according to Vasari, Giovanni Guido, and he was a distinguished member of the Franciscan order of Friars of the Third Order, of Fiesole. His name is however variously given, as for instance, Santo Tosi, and Giovanni di Pietro di Mugello. He was apparently born in Mugello in 1387, and he entered the order of the Franciscans in 1400. Whatever may be his further history, is known either of his origin or his education. He early distinguished himself for his miniatures illuminations of religious books, of which there are still some in the convent of San Martino at Florence, where he painted several works for Cosimo de' Medici, of which the history of the Passion of Christ in the refectory is still in comparative preservation. Giovanni learnt the art of illuminating or miniatures painting from an elder brother, Fra Benedetto di Pietro di Mugello, or, Latinized, Benedictus Petre di Mugello. He painted also many admirable works in the Carthusian church, in Santa Maria Novella, and in the Numizata and other churches in Florence; in San Domenico at Fiesole; in the cathedral of Orvieto; at Cortona; and in the chapel of San Pietro in Montevergine at Ravello. He was invited to Rome by Pope Niccolò V., who offered him the high dignity of the archbishopric of Florence, which however Giovanni was too modest to accept; he pleaded that to govern or to lead was alike incompatible with his nature. The appointment was given to another member of the same order as Giovanni, Fra Antonio, who was canonized by Adrian VI.

The frescoes in the chapel of Niccolò V. are in great part the work of state preservation, though they have been restored. The chapel was long neglected, and public attention was first called to these frescoes by Hofstätter, in 1851, of Berlin. The principal subjects represent the leading events of the life of the saint, and the last judgment. In the martyrdoms; on the ceiling are the four evangelists, around the chapel also are the doctors and fathers of the church, Saints Thomas Aquinas, Bonaventura, Athanasius, and John Chry-
where any intricacy of shape precluded the operation of grinding. He considers that, great as is the antiquity of the revolving grindstone, the file must have preceded it, and refers, in confirmation of this opinion, to the passage in the fable of Samoyed (chap. xiii. v. 21), in which the file is mentioned as the means of sharpening the mattocks, cutters, and other edged instruments of the Israelites. He also refers to a passage in the Odyssey in which Vulcan is represented as using the file and file in fanning the fire which he was to use to cut the braided hairs and Venus, as a proof of the great antiquity of this tool.

Files always are, or should be, made of steel of superior quality. In this country, the few instruments which are deficient in metal is so completely destructive of utility. An axe, saw, or almost any other cutting instrument, though of inferior metal, may be made to do its duty by repeated whetting; but for a bad file, as Holland observes, there is no remedy,—no power of the time or the body to be acted upon, fly off with every stroke; the file thenceforward becoming, if not quite useless, certainly a coarse irregular rubber.

The importance, therefore, of a guarantee of excellent quality gives a high value to files bearing the marks of manufacturers. I have known much less repute attach to such marks than is deservedly the case with the names of tradesmen to imitate them. One of the most famous of these marks, Holland observes, was that granted many years ago by the corporation of Sheffield to Daniel Brammall; and as this, at the present time, may be attributed to the fact that Sir John 1825 the right guerd obtained a verdict of 2000L damages against a Birmingham file-maker for having stuck it fraudulently on articles made by himself.

Steel for making files, being required to be of unusual hardness, is more highly converted than for other purposes, and is sometimes said to be double converted. Small files, according to Dr. Ure, are mostly made of cast steel, which, he says, would be the best for all others, though its higher price prevents its use for the hammer, the handle of which is so small that the operator can, while making a blow, pull the hammer rather than the file. If the file be flat, or have one or more flat surfaces, the operator places the steel chisel at it a particular angle, and, by a gentle pressure of the hammer, and by making an indentation or furrow, completely across its face, from side to side, but most commonly in an oblique direction, the metal displaced by this operation not being taken away, but thrown up in the form of a prominent angular ridge, with a sharp cutting edge, on one side of the furrow. He then moves the chisel a little, and by a second stroke cuts another precisely similar furrow parallel to, and at a very short distance from, the first; and so on, until the whole surface of the file is covered with furrows, beginning at the point and ending at the tang-end. In the course of cutting, the file is gradually moved from the operator by relaxing the pressure of the strap from time to time. In this state, the file is said to be single cut, or single-furrowed; and is applied to the metal to be wrought on, which are liable to clog a file of any other kind. For working iron and other materials, double-cut or cross-cut files are used, in which the first row or series of cuts is crossed at an obtuse angle by a second; the effect of which is to impart to the surface, which is in a single-cut consists of a succession of minute parallel scrapers, into a collection of very small angular teeth, admirably adapted for the abrasion of hard substances. In making cross-cut files, a fine file is gently passed over the first series of cuts or teeth to reduce the prominences to an even surface before the second set is cut. Files for wood are usually cut with a triangular pointed punch or chisel, instead of one with a flat edge reaching across the whole width of the file, the cuts or indentations thus produced produce single independent teeth, which are ranged in row, the teeth of one row being opposite to the intervals of the other. Such files, as well as some of the deepest and coarsest cross-cuts, are called rasps. If the file be round or half-round, or have any curved surface, it is still cut with the same kind of tool; but as a straight-edged cutting tool can only make a short indentation upon a convex surface, it is necessary to go round the file by degrees, making several rows or ranges of minute cuts contiguous to the previous one. If the file is flat, or the cutting on the side, but as most files are cut upon two or more sides, it is necessary to make some provision for protecting the surface first cut from injury while cutting the others. This is done by (in some respects, at least, in its simplicity) the other side being smothered with ashes, every aperture by which air could enter the oven is carefully closed, and the whole is left to cool gradually. The access of air during the heating tends to the oxidation of the steel, and is consequently injurious. A better plan, therefore, is to inclose the files in a box or bag, and when required to use them, to place them in the fire and to cause the fire to play as gradually and uniformly as possible around it, until the whole mass becomes red-hot. The cooling, in this, as in the other process, must be gradual; and if the cover be not removed until the whole is quite cold, the steel will be annealed in a state of freedom from defects produced by oxidation, and of a silverly-white colour. If it be suspected that the steel is too fine, or has too little carbon, powdered charcoal may either be substituted for, or interstratified with, the sand, by which means the file is hardened more quickly.

After annealing, the surface of the metal must be rendered very smooth and even before cutting the teeth. This may be done either by striking, or filing, first across, and afterwards along the surface, or by grinding upon very large grindstones. The striping process, which is tedious and laborious, is formerly in common use, and is still practised by some file-makers, especially in Lancashire, where excellent files are manufactured; but the other is now the most common. The production of a level or even face being the principal end of this operation, it has been questioned whether equal perfection could be attained by grinding as by the use of the file; but this is a matter mainly dependent on the skill of the operator, and the greater expense of the stripping process is sufficiently compensated by the greater durability of the finished file.
groove in which the file will lie steadily, is used in like way.

In addition to variations in the form and arrangement of the teeth of files, their size varies extremely. The largest and coarsest smooth files are called rubbers; and others, arranged in a way to secure the refuse of metal, are called bastard or second-cut, smooth, and dead-smooth files, the latter producing so fine a surface when applied to metal that the subsequent application of a burnisher is sufficient to polish it.

In the art of file-cutting, as observed by Mr. Dodd in the words of the learned man, 'there are many points worthy of remark.' In the first place, the angle at which the cuts are made depends greatly on the purpose to which the file is to be applied, and is made an essential object of the cutter's attention. In the next place, the number and length of the cuts, the manner of their arrangement, may have a considerable influence on their form; it is a triangular groove of particular shape, the production of which requires a most discriminating tact in the management both of the hammer and of the cutting-tool. Then, again, the strict parallelism of the several cuts can only be brought about by practised accuracy of hand and eye, since there is no guide, gauge, or other contrivance for regulating the distance. In a round file, too, the several rows or cuts are brought side by side in such a manner that it shall be impossible for them to be formed singly and by hand.'

"We may," he adds, "adduce as an instance of what skill and long practice can effect in this respect, a file about ten inches long, flat on one side and round on the other; the flat side is cut with a hundred and twenty-five teeth to the inch; and the number of toothings for the whole file there are twenty-two thousand cuts, each made with a separate blow of the hammer, and the cutting-tool being shifted after each blow.'

The degree of fineness indicated in this example may be said to be unusual; but the calculation refers only to the single set of cuts, and consequently, were the same file cut double with teeth of half the degree of fineness, the number of cuts required would be the same.

Several highly ingenious machines have been contrived for superintending the tedious operation of file-cutting by hand, and descriptions of some of these are given in the works referred to at the end of this article; but, suited as the process may appear to be for the use of machinery, it has been found to present such great difficulties that we believe no file-cutting engine has been brought successfully or extensively into operation. One very serious difficulty arises from the circumstance that if one part of the file he a little softer than the adjacent parts, or narrower, so as to present less resistance, it will be cut off very hard, even if the file be so shaped that the perfect uniformity of its stroke, make a deeper cut there than elsewhere; whereas, as Dodd observes, "a workman who has been employed in the trade of a boy (and none other, it is said) can acquire the art of cutting by heart, and instantly when he arrives at any variation in the quality or condition of the steel, and at once adapts the weight of his blow to it." Holland, after describing one of the machines contrived for this purpose, observes, that the applicability of such an apparatus to the tootling of extremely fine-faced files seems conceivable, because 'in such the set or direction of the teeth is a matter of much less importance than perfect equality of surface;' thus intimating that a great difficulty arises in this apparatus in the division of the files of every sort. 'If, in addition,' he adds, 'exhibit such a beautiful uniformity of delineation when examined with a magnifier, that no doubt seems to be entertained, by many persons conversant with the art, of their being cut by machinery of some sort. But although the French are so successful in the production of this exquisitely delicate cutting, they are not equally so in the execution of the rougher sorts; and, consequently, English files are in high reputation in Paris, whither large quantities are imported and the quality of the steel is such that the manufacturer of watchmakers' files, some of which, cut in the common manner, but with exquisite neatness, by his daughters, were regarded with suspicion by many, simply from the opinion that they must be machine cut. Such files have been, in general, of importance, as they cannot be ground down, and the hardening of the steel, a process in which different manufacturers vary in practice.

'Some descriptions of rasps,' observes Holland, 'especially such as are used upon wood and other soft substances, are left in their soft state after being cut, not only because little hardness is required, but mainly that they may be sharpened up with a file occasionally,' Some sorts, too, he adds, 'have been made of iron, and case-hardened.' The carbonaceous matter for such a process of case-hardening may be obtained from blood, or from any of the soft parts of animals, and the use of this method is the most convenient. After the volatile parts of such a file have been distilled over, from an iron still, a bright shining coal is left behind, which, when reduced to a powder, is fit to be mixed with the salt in combination with which it is to be hardened. The mixture can alone be hardened, if the salt may be mixed with water to the consistency of cream, or the carbon may be mixed with a saturated solution of salt to the same consistency. Steel files, when intended to be very hard, are exposed to the action of the quenching-water, which can be curetts, or such composition previous to the hardening process; and by this means, a file made of iron, which is incapable of hardening, acquire a superficial hardness sufficient to answer the purposes of any file whatever. 'Files of this kind,' says Holland, quoting his account from some other work, 'though he does not say what, 'may be bent into any form, and, in consequence, are rendered useful to sculptors and die-sinkers.'

In the ordinary process of hardening steel files three things must be particularly attended to, first, to cover the surface of the file with some composition which, being afterwards exposed to the intensest varnish to it, may guard it from oxidation and scaling when exposed to the action of the fire, that the sharpness of the teeth may not be impaired, nor the surface rendered rough, which would cause the file to stick when in use. If it be brought very uniformly throughout to a red heat; and, thirdly, to cool it suddenly, by immersion in the freshest and coldest water, in such a manner as to impart the greatest degree of hardness, and to prevent the tendency to warping, which in long thin files is a difficulty of the utmost importance, and usually used for the first-mentioned purpose consists of the grounds of malt liquor, yeast, and common salt. Formerly the ale grounds were applied alone, and powdered salt was thrown on the file. The plan of dipping the file, before heating the salt in the liquor is the best and most economical. In the present plan the salt is dissolved in water to saturation, which requires about three pounds of salt to a gallon of water; and ale grounds, or the cheapest kind of flour, such as that of beans, is mixed with the liquid to bring it to the consistency of thick cream. The use of the flour or grounds is chiefly to enable the files to retain a greater quantity of salt, which fuses, and forms a protecting varnish when in the fire; for, as Dr. Ure observes, the carbonaceous matter of vegetable substances does not combine with iron with sufficient facility to produce any effect during the brief application of heat in hardening. Animal carbon, applied in the way above described, forms a very desirable addition to the mixture for all files intended to be hardened. A file well，并 to the file, and immersed effectually in an open fire of clean cokes, the file, being small, being held by the tongue in a pair of tongs, and frequently withdrawn, to see that no part becomes overheated. The proper degree of heat is indicated when the file is immersed in quickly; those of a flat, square, triangular, or round form, being plunged perpendicularly into the water, while the half-round, though kept perpendicularly, should be moved a little horizontally in the direction of the round stroke, for the present of its becoming crooked. With every precaution the files are liable to take some degree of warp or curvature in this process, to remove which they are withdrawn from the water before they become quite cold, and being placed, the point under a water, will cool quickly, that the workman leans with his weight upon the opposite or tang end, meanwhile lading the water with his hand upon the superior surface.' By this means,' observes Holland, whose account we have quoted, 'a degree of curvature is given to some cases to which it is least serviceable, as such a foot, in effectually reduced; and what appears most remarkable in this manipulation, is the file in this partly cooled but absolutely hardened state never breaks under a stress more than fifty times sufficient to snap it when cold. This photo-
nomenon of latent temper.' he adds, 'is more particularly observable in the hardening of half-bound files, which, in order to counteract the superior contraction of the convex side during the immersion, are previously bent to about the same extent in the opposite direction, and plunged horizontally; at the same time often requiring a very violent effort on the part of the workman to overcome the distortion.' Owing to their hardness, files are unavoidably brittle, and they are especially liable to break or 'go out' when reduced substance, to remedy which some makers temper the tang end by dipping it in a bath of melted lead.

During the war of the French Revolution, the supply of English-made files, which had been expected, the French file-makers, were excited to great efforts to supply the deficiency, and, according to an article published in the ' Repository of Arts' for 1801, translated from the register of the French Lyceum, it would appear that many makers employed successively in producing files so as to keep them from or to make the best English files which, in a series of public experiments, were brought into competition with them. Holland, who quotes the particulars of the trial, says it was the opinion of Mr. Gill, a most competent authority in such matters, that the files of Raoul owed their superiority to being dipped or quenched in a composition of two pounds of mutton suet, not rendered, but simply chopped small, two pounds of hog's lard, and two ounces of white arsenic in powder. These ingredients being put into a crucible with a coating of fat, a quantity of cold or warm water suitable of mouse powder (Hieracium pilosella), fresh gathered, and which had been put into the mixture at first, shall become crisp and float on the surface, a proof that all moisture is driven out of the crucible. The operation, as well as that of quenching the files in the composition, must be performed under the hood of a smith's forge-hearth, to carry off the noxious arsenical fumes, and the operator should cover his mouth and nostrils to avoid inhaling them.

After hardening, the files are scoured with a brush dipped in water mixed with a little sand or coke-dust; then thoroughly washed to remove any saline particles which might tend to rust the file, and dipped in water in which quick-lime has been previously boiled, in order to neutralise the effect which may yet remain; and finally dried before the fire, brushed over with oil, or, according to some authorities, a mixture of olive oil and turpentine, and wrapped up in oiled brown paper for sale. Before packing, files are sometimes tested by striking them gently on a piece of hard steel, and also rubbing them gently from end to end, in doing which an experienced person can detect by the sound whether the internal quality of the steel is good, and can judge of the hardness of the file by the quickness and tremulous motion communicated to the fingers and wrist.

In using files to produce a smooth surface, the coarser kinds are employed first, and succeeded by the finer; and it is a general rule to lean heavy in the forward stroke, because the teeth are formed backwards, and the operation preparatory to a second stroke, to lift it above the work, so as to prevent it from cutting or rubbing.

When files, otherwise of good quality, are reduced to an useless state by wear, they are sometimes re-cut, the old teeth being completely removed by grinding. Previous to grinding they must be softened or annealed in the same way as in the original process of manufacture; and the subsequent processes of cutting and re-hardening are also conducted in the same way as at first. Re-cut files are, of course, somewhat thinner than when first made, 'not in all other respects they may be equally good, it the process is properly conducted. Owing to the superior quality of the steel, worn-out files bearing a comparatively high value as old metal, and many are bought up for the purpose of converting them into screwdrivers.

(Holland, 'Manufactures in Metal, in Lardner's 'Cabinet Cyclopaedia,' vol. 1. pp. 297-315; Dodd, British Manufacturers, Metals, in Knight's 'Wealth of Nations,' vol. 6. pp. 67-74; Dr. Ure, Diction. Art, &c.; Hebert, Engineer's and Mechanic's Encyclopedia.)

FILATION, ORDER OF. [BASTARD, F. C. and F. P.]

FILICES, or FILICA/CEAE, a natural order of plants, being the highest group of the class Cryptogama or Acro- gens. The species are flowerless plants, consisting of leafy fronds, which are produced from a rhizoma unfolding in a spiral manner, by means of which form divisions of parts on the under surface, and produce unisporous, rarely multispore, cases containing reproductive sporel.
Tribe, Aspidiaceae, the soris nearly circular, covered by an indusium.

Lactea. Polystachyum, Ctenanthe.

Tribe, Aspleniales, the soris oblong or linear, covered by an indusium, opening longitudinally on one side.

Athyrium. Asplenium.

Tribe, Grammitidaceae, the soris elongate, without an indusium. Ceterach.

Tribe. Adiantaraceae, the thecia covered by a marginal or sub-marginal elongated part of the hold, or by a separated portion of the cuticle, forming an indusium. Blechnum. Pteridium. Adiantum.

Sub-order, Osmundaceae. Osmunda, the vernation circinate; the rachis solid; the thecae stalked.

Genus, Ophioglossum. Botrychium.

The ferns have a wide geographical distribution. The herbageous and shrubby kind being found towards the north and south poles; whilst the true ferns rival the gigantic palms in the forests of tropical climates. It is these last which give a peculiar character to the vegetation of the countries where they grow, as their foliage and stems differ altogether from any that are met with amongst 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 28 to 122; in New Ireland as 18 to 60; in the Sandwich Islands as 40 to 150. On continents they are less numerous. In equatorial America 1 to 86; in New Holland 1 to 37; in France 1 to 63; in Portugal 1 to 116; in the Greek Archipelago 1 to 227; in Egypt 1 to 971. In the north their proportions are greater; they form in Scotland 1 to 31; in Sweden 1 to 52; 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 rhizomes, and some of which food may be prepared. The roots of Nephrolepis esculenta are eaten in Nepal; those of Angiopteris everts are used in the same manner in the Sandwich Islands. Diplazium esculentum, Cyathea medullaris, Pieris esculenta, and Glichicchnia dichotoma, all yield starch, and are employed as food in different countries. [CYATHEA, P. C. S.] The Adiantum Capillus Veneris yields astrigent and aromatic secretions. [DIANTHUM, P. C.] Some of the American polypodians are said to possess powerful medicinal effects, and are used as anti-rheumatic, anti-parasitical, and febrifugal remedies. The Angiopteris everts yields an aromatic oil, which is used in the Sandwich Islands to perfume the fixed oils, as cocoa-nut oil. The stems of many species contain bitter principles, and have hence been used as tonics. Species of Asplenium and Aspleniaceae have been used in European medicine. [ASPENIUM, P. C. S.; ASPLENIUM, P. C. S.] The Brazilian negroos form tubes for their pipes from the stems of Mertensia dichotoma. Osmunda regalis had at one time the great reputation in medicine. [BAGGINGTON, Manual of Domestic Botany; Lindley, Natural System; Hooker, Species Filicium; J. Smith, The Genera of Ferns; Journal of Botany, vol. iv.; Newman, History of British Ferns; Burnett, Outlines of Botany; Meyen, Egyptian Geography.]

FILIPPE, SANDRO or ALESSANDRO, commonly called Botticelli, from the name of a goldsmith to whom he was apprenticed, was born at Florence in 1497. He studied painting under Filippo Lippi, and became one of the first painters of his time, though his chief excellence was in his invention and expression. He painted many pictures for the churches of Florence, some of which are still preserved, and are now in the gallery of the Florentine academy. He painted a small picture for the church of Santa Maria Nov., representing the life of St. Nicholas. The pictures were portraits of Cosmo, Julian, and Cosmo's son, Giovanni Medici. This was one of Sandro's masterpieces, and was, in the early part of this century, in the possession of Mr. Young Otley, the author of the 'Inquiry into the early history of Engraving.' Sandro painted also for Sixtus IV., in the Capella Sistina, at Rome, three pictures from the history of Moses and the Israelites, his largest and best works. After the completion of these works he retired to Florence, and died there in 1528. He gave himself up to Savonarola, and to Dante's 'Inferno,' which he illustrated, and he attempted himself to engrave his designs; it is not known exactly how many he engraved, but the engravings which are miserably executed, they are however scarce, and fetch very high prices. They were all engraved for an edition of Dante published by Nicolo di Lorenzo at Florence, in 1481, but they were nearly all engraved by Baldini from Sandro's designs. [BALDINI, D'ACORO, P. C. S.] Sandro, after his connection with Savonarola, neglected his worldly concerns to that degree that he would probably have starved had it not been for the bounty of Lorenzo de' Medici; he survived Savonarola many years, and died at Florence in 1518.

FILIPPE, Sandro, the name of the last of the old Italian or quattrocento school of painting, which passed away at the appearance of the grand works of great cinquecentisti, Da Vinci, Michael Angelo, and Raphael. There are some works by Sandro in good preservation in the imperial gallery of Florence, in the gallery of the Academy; in the former is his picture of Calammy, from Lucian's description of the picture by Apelles of Ephesus. [ANTHIPHILLIUS, P. C. S.] (Vasari, Vite de' Pittori, &c.; Lanzi, Storia Pictorica, &c.; Rumohr, Italienische Forschungen; Otley, History of Engraving.)

FILTER, FILTRATION. In addition to what is given on this subject under Filter, P. C. p. 269, we may refer to Intra-Work, P. C. pp. 125, 126, for a notice of plans for the filtration of water by an extensive improvement. A. لك. P. C. p. 230, for an account of a vacuum filter for separating molasses and colouring matter from sugar. Further details on the various modes of filtering water, oil, and other liquids, with representations of several kinds of apparatus employed for the purpose, are given in Dr. Ure's 'Dictionary of Arts, &c.;' and Hebert's 'Engineer's and Mechanic's Encyclopaedia.' Among these, some have for their object the maintenance of a uniform pressure of the fluid upon the filtering particles by a self-regulating device, so that it may be admitted from a reservoir just as fast as it passes off through the filter. On a small scale this may be done by inverting a bottle, filled with the liquid to be filtered, with its open neck or mouth in the funnel. The air is forced out of the bottom of the vessel, the materials are placed. So long as the fluid in the funnel is above the level of the mouth of the bottle, no fluid will flow from the bottle into the funnel; because no air can enter the bottle to take its place; but so soon as, by the process of filtration, the fluid in the funnel falls below the mouth of the bottle, air enters it, and consequently liquid flows out into the funnel until it rises high enough again to prevent the admission of air. An apparatus on the same principle, adapted for use on a large scale, is represented by Dr. Ure. In other cases, the admission of fluid to the filter is regulated by a ball-cock, or valve connected with a float. In some cases, as in the vacuum filter above referred to, hydrostatic or pneumatic pressure is employed to increase the rapidity of filtration, by closing the filtering cylinder, and forcing the fluid into it either by a force-pump, or by a pipe from an elevated cistern; by producing pressure by air or steam upon the surface of the fluid; or by occasioning a partial vacuum beneath the filter, in the vessel which receives the fluid after it has passed through it. When such pressure is applied, the air or other fluid is sometimes caused to ascend through the filtering materials, or to pass through them horizontally, or in any required direction. In some filters, the action is continued beyond the filtering cylinder, or filtering fluid, by which arrangement the fluid may be compelled to pass through a great quantity of filtering material in a small space. Hebert gives the details of a kind of ascending filter designed for removing the salt from sea-water, by forcing it through a mass of compressed sand; but though the contrivance is simple, and well adapted for purifying water from
floating impiurities, the chemical combination of the saline constituents of sea-water would probably, as he apprehends, render it insufficient for the intended purpose. He likewise represents a kind of filter, which is so constructed that no pollution is caused when without any exposure to the access of air; both the vessel into which the impure fluid is put, and which receives it after filtration, being hermetically closed. These two vessels are connected together by a pipe, through which the air in the upper vessel from the lower vessel by the dropping of the fluid into it ascends into the upper vessel to occupy the space which it has just vacated. The process therefore is conducted without the contact of any more air than the vessels contain at its beginning; and without the escape of any vapours from the fluid; so that the most volatile liquids may be filtered without loss, and the injurious effects which in other cases might arise from the free admission of air are avoided.

[Fir Bote, p. 483.]

Fiorillo, Johann Dominick, a distinguished German painter and author, was born at Hamburg in 1748. He went to Rome in 1761, and was for four years the pupil of Pompeo Batoni; he studied also some time at Bologna, where he was elected a member of the academy in 1769. In 1784 he was appointed to the professorship of art in the university of Göttingen, where he died in 1821. He is the author of several essays relative to the history of modern art, but of all his writings the most interesting is the 'Description of the Mahlersey' (History of Painting) in Italy, France, Spain, and England, in five volumes, and the 'History of the Zeichenden Kunst in Deutschland und den Vereinigten Niederlanden' (History of the Arts of Design in Germany and the United Netherlands), in five volumes.

The whole forms a very useful compilation; but he has introduced notices of so many artists of utter historical insignificance, that he has not been able to give sufficient space to the important artists, and the first five volumes are a mere chronological series of short biographies, but they contain much interesting matter of the latter centuries of the middle ages.

The German portion is a work of great research, merit, and utility, especially where he treats of early times.

Mr. Hebert, last but not least, may be allowed to execute many pictures: his master-piece is considered a large picture of the 'Surrender of Briares to the Hawks of Agamemnon,' from Homer.

(Musee, Miscellaneum Artistichen Inhalts; Nagler, Kunsterverzeichn.)

FIRE-BOTE. [Estovers, P. C.; Common, Right of, P. C.]

FIRE-PROOF BUILDINGS. The most obvious method of rendering houses and other buildings indestructible by fire, is to construct them entirely of incombustible materials, such as stone, brick, and iron, to the exclusion of timber, at least in the framing and floors. Such a mode of construction, however, is only practicable for some classes of buildings, where cost of construction is not an object, and where domestic comforts and conveniences are not required, of very limited application. The use of iron, and especially of cast-iron, in buildings, has indeed increased very much, and many plans for the construction of dwelling-houses almost entirely of that material have been brought forward, although the great advantages which they promise have not succeeded in dissipating the popular prejudices which oppose the introduction of cast-iron. It was stated in No. 351 of the 'Literary Gazette,' in 1842, in a paragraph quoted in No. 662 of the 'Penny Magazine,' that a large number of cast-iron houses were then about to be manufactured in Belgium and England for the citizens of Hamburg, whose habitations had been burnt in May of that year; and it was remarked that, as the walls of such houses would be hollow, they might be easily warmed by a single stove placed in the kitchen. A three-storey house, containing ten or twelve rooms, it is observed, will not exceed more than 1000l., regard being had to the price of the materials, which may be obtainable at any cost. This description may be taken to pieces and transported from one place to another at a very moderate expense.

Nicholson, in his 'Architectural Dictionary,' dismisses the subject of fire-proofing in very few words. He says that in their construction, vaulted or cast-iron roofs and floors should be employed in every apartment, and observes, that while vaulting is well adapted to the lower story of a building, if it be used in the upper stories the walling must be carried up very thick, in order to resist the thrust of the arches, and this extra substance not only darkens the apartments, but also occasions enormous expense. The most convenient substitute, he says, is a floor sustained by cast-iron joists, the intermediate spaces between which are either filled with incombustible material, or are spanned by wooden joists, and keyed together. A much fuller account of various plans of fire-proof construction is given in Hebert's 'Engineer's and Mechanic's Encyclopedia,' article 'Fire, Prevention of.

These and some others we may briefly notice under two heads: first, that of the air of incombustible materials in lieu of timber; and the second, of methods for rendering timber itself incombustible.

Brickwork forms in this country the chief material of the external walls, and has the advantages of being both cheap and solid. The use of cast-iron, or wrought-iron, in the form of tie-rods, to prevent the lateral thrust on the walls, and the spandrels, which, owing to the nature of the arches, or the large windows, are of necessity filled up with concrete, so as to produce a solid level surface, upon which a flag or tile pavement, or a floor of cement, may be laid. In private houses it is usual to surmount the vaulting by a floor of wood, supported by the iron beams or ribs, which, in some cases, rises as high as the crown of the arches. [Floos, P. C. S.]

In Farrow's patent method of fire-proof building, described by Hebert, the floors are supported upon joists of wrought-iron, formed with a lateral projecting flange on each side, which is riveted to flat iron plates, stretching between flat stones from two inches to two inches and a half thick, the upper surfaces of which lie flush with the upper edges of the joists. These produce a level stone floor, interlined with thin iron plates, which have to support the floors and planks. The ends of the joists are turned down and jet into bond stone laid upon the walls, and cemented or run in with lead, which mode of fastening, combined with the weight of the superimposed walls, prevents the joists from sagging, and consequently enables them, though slender, to bear an enormous weight. The advantages of such a mode of construction may be seen from the experiments of Mr. Smart, noticed under 'Tuscaning, P. C.,' p. 319, so far as the strength of the floor is concerned; but it is further advantageous as a means of tying the walls together. When it is intended to cover the floor with boards, provision may readily be made for securing them down in their place, and dovelling them together, without any nails or visible fastenings. The under surface of the stones may be studded or made rough, so that plaster may be applied immediately to it without the intervention of laths. A floor thus formed occurs a depth of from four to five inches only. Such floors have been successfully adopted in some super-refineries, and other buildings of a similar nature, and an application of this principle is applicable to roofs, and the patentee considers that a roof so constructed, and covered with mastic, is the cheapest roof ever invented, in addition to the combined advantages of durability and lightness.

Mr. Frost, another of the experimentists on fire-proof building, has invented a mode of constructing floors and roofs of hollow square earthenware tubes, laid in strata crossing each other in direction, and united with cement in such a way as to form a continuous mass; and this mass is said to be not one-fifth that of stone, while...
strength is asserted to be equal to that of timber. The tubes are made of brick earth, carefully prepared by machinery; and the earth floor is composed of a mixture of sand and chalk, protecting various parts of a building from the action of fire, consists of chalk mixed with about thirty per cent, of clay, both being ground in water, and the finer portions floated off to a reservoir. The moisture is drained off, the residue allowed to dry, and the composition set in motion by the heat which burst in a kiln, ground to powder, and packed in casks ready for use. Another mode of constructing fire-proof floors and roofs, employed in the building of Buckingham Palace, but invented and adopted together with the whole of the timber-work by Sir George Gilbert Scott, Knight's Hill, near Dulwich, consists in the use of arches composed of hollow earthen coombs or pots, springing from stone abutments resting upon the flanges of iron girders. The spandrils, in a roof constructed on this plan, are filled up with the same material, so as to form a levelling surface through which hot cement composed of chalk, coal-tar, and sand. The first cost of cement is levied with heated iron, and suffered to harden, after which a second coat is laid, and slates are imbued in it before it cools. The use of earthen pots in building, as may be seen by referring to Cusack, P.C., pp. 197, 199, was known to the Romans. Fire-proof roofs are perhaps, in ordinary buildings, less important than fire-proof floors; but they are easily constructed in various other ways. In the building of houses, ignorant of the principles of ancient architecture, and some light metallic covering. The staircase, although it is one of the most important parts to secure from fire, is too often one of the chief means of communicating it from one part of a building to another. While the 'Penny House' was being built, there, a stone staircase, with a metallic balustrade or hand-rail, or, under certain circumstances, a staircase formed entirely of iron, is highly desirable as a means of security against fire. The cheapness of timber, the facility with which it may be worked, the shapes which it can assume, and the ideas of domestic comfort connected with the use of wood for floors and other parts of a house, combine to render very important any method by which it may be rendered incomincable. Solutions of muriate of ammonia, muriate of soda (common salt), sal-ammoniac, borax, alum, and several other salts and alkalies, with which wood may be impregnated, or which may be applied to its surface, possess this quality in a limited degree; and by Payne's wood-preserving process (Timmer, Pemmery, 1840, p. 51), the whole of a house, was purchased near London, and the whole of the timbers, floors, ceilings, stairs, and other portions of wood-work were completely coated with a certain composition. When this was dried, some of the rooms were furnished with the common articles of domestic furniture, small in value, but of the usual nature as to combustibility, &c. A large quantity of shavings and pieces of wood were strewn on the floors of the several rooms; and on a given day each room was set on fire. Every article in each room was completely consumed; but in no case did the fire penetrate to the woodwork of the room, or pass from one room to another: some gunpowder was placed between the ceiling of one room and the floor of the one above it; but neither the fire above nor that beneath had any effect on the gunpowder. We may close this article with the concluding remarks of the paper above quoted, that public attention is now so much directed to this subject 'that we may fairly expect the time to be not far distant when the principle of fire-prevention will form part of the system by which most houses will be built'; and that 'until this is done, we may look for the repetition of the same kind of distressing calamity by fire which so often occurs before the public eye.'

FIRE-SHIP is a vessel laden with combustible materials, which is sent, or left, in a burning state among the ships of a hostile fleet for the purpose of setting them on fire. The Greek fire, which is said to have been discovered by a third-century Egyptian engineer named Ptolemy, and which has been employed for the destruction of ships in naval actions, also for dispersing troops in engagements on land, and for setting fire to houses in besieged towns. It is supposed to have been a composition of sulfur, bitumen, and naphtha, which, being contained in an earthen vessel, was thrown by a hand or projected from some engine. The writers in the time of the crusades describe the missile as resembling a great dragon flying through the air with a stream of fire issuing from its mouth, and they speak of the fire formed by the hydrogen of Giambelli, an Italian engineer; and this 'infernal machine,' as it was designated, was employed in 1585 to destroy the bridge laid across the Scheld, when Antwerp was besieged by the Prince of Parma (Stroma, De Bellis Bellopi, decima secunda, lib. iv.); three weeks after the battle of Pavia, the anchor off Calais, was dispersed by eight fire-ships which the English admiral sent against it. Fire-ships were also used by the English and Dutch at the sieges of St. Malo, Havre-de-Grace, and Dunkirk, in the reign of William the Third. But none of these appear to have succeeded. One of these ships was described as having the lower hold filled with sand, above which were barrels containing in all 20,000 pounds of powder: over these were laid a bed of stones and a quantity of loaded
shells and carasses: these were also covered with stones, and above the latter were barrels containing wood and tar.

In first-class vessels there is a broad deck, on both sides, a stage four feet wide, consisting of timbers four inches square, disposed horizontally with intervals between them equal to their breadth: these timbers are attached at one end to the ship's sides, and at the other they rest on another timber with which they are set up at intervals along the ship. On this stage is a groove six inches wide and three inches deep, which goes quite round the ship; and timbers, in which are similar grooves, extend at intervals along it; these grooves in which the hose carrying the powder by which fire is to be communicated to the materials; and when the hose is placed in them, they are covered with planks.

The stage is entirely covered with a tarpauline on which is stretched a powder, and on this are placed the combustible materials. These consist of faggots of wood and bundles of hemp steeped in a mixture of resin, turpentine, saltpetre, and mealed gunpowder; hollies of wood dipped in saltpetre and pitch; casks filled with charred wood mixed with pitch and turpentine; and among these are distributed loaded shells and carasses. Faggots soaked in pitch are also fastened to the sides of the ship and are bound with copper wire about the props supporting the stage; and previously to lighting the fire, it is placed, in order that the explosion may be increased by a current of air between decks.

The bowsprit and the ends of the yards are furnished with grapples, which are suspended by ropes, in order that by swinging about they may take hold of the hulls or rigging of other vessels to join to.

A fire-grate is fixed near the stern; and when the commander has brought his ship in contact with one of those which belong to the enemy, he orders the crew to pass through a port in the stern into a boat, which is provided for this purpose: he then puts fire to the wood in the grate; and, as soon as he has ascertained that the train of powder has begun to burn he quits the ship: the boat is then rowed off as fast as possible.

Fire-ships can only, with a prospect of success, be sent among such as, in an action, have been dismasted or otherwise rendered incapable of maneuvering; or among ships in a port, which consequently are unable, from want of room, to avoid the port in the stern. It is thus the Turkish fleet, having been defeated by the Russians, was entirely destroyed by fire-ships sent into it, while at anchor in the bay of Tchernie, in which it had taken shelter. Fire-ships are now, however, seldom used in warfare; and perhaps they ought only to be sent against a line which refuse to strike after having been rendered incapable of continuing the action.

FIRENZUOLA, AGNOLO, was born September 28, 1493, in the city of Florence (Firenze). He was christened Michele, but his name was subsequently changed to Agnolo (Angelo). The family name was taken from the small town of Fiorenzuola, in Tuscany, between Florence and Bologna, in a valley among the Apennines, near the source of the Santeiro. Negri, Niceron, and others who have followed them, appear to have been mistaken in stating that the family name was Nannini. Agnolo's father, Bastiano Giovannini da Fiorenzuola, and his grandfather Carlo da Fiorenzuola, were citizens of Florence, and both of them held offices of trust in the city under the patronage of Cosimo de' Medici.

Agnolo Fiorenzuola lived in his native city devoted to the study of elegant literature till the age of sixteen, when he went to Siena, where he studied law with much labour but little success. He returned to Florence, but his name was changed to Agnolo (Angelo). He was afterwards appointed abbot of San Salvatore, at Prato, where he chiefly resided during the rest of his short life. The year of his death is not known, but it was probably about 1543 or 1545, since he dates the dedication of his Tomb to December, 1544. Lorenzo Scala, who published the work in 1548, speaks of his death as having occurred a few years before 1548. Tira- bochi doubts if Fiorenzuola ever was an abbot, but gives no reason for doubting the authority of the documents, than that his life was not sufficiently pure for the sacred office: a very insufficient reason as applied to the dignitaries of the church of Rome in those times. Scala calls him 'Il Reverendo Abate Messer Agnolo Fiorenzuola.' and addressing himself to Pandolfo Pucci, speaks of Agnolo as his 'clementissima ecclesiastic.'

His works were published in 1548, as already stated, partly by Lorenzo Scala and partly by Carlo Fiorenzuola, Agnolo's brother: they consist of: 'Discorsi degli Animali,' 'La Ragionamenti di Novelle;' a 'Epistola in Lode dello Donna;' 'Discorsi del Battista della Donna;' 'Discorsi del Battista della Donna;' 'Discorsi di Nuove Lettere;' two comedies, 'I Lucidi' and 'La Traversa;' 'Asino d'Oro d'Apulejo rifatto in Lingua Fiorentina, ed a Roma.'

Fiorenzuola is entitled to a high place among the early Italian writers. His works have been frequently reprinted, both separately and collectively, and are still much read. His two comedies, regarded merely as specimens of dramatic dialogue, are not surpassed by anything in the language. He was one of the circle of Machiavelli, and Divizio (Cardinal Bibbiena), who immediately preceded him, and Gelli, who was his contemporary; but his dialogue is always natural, spiritual, appropriate to the characters, and in purity of idiomatic Tuscan is surpassed by any other Italian author. He is one of the 'testi d'ingegno,' or writers of the highest authority in the language, and is thus frequently quoted in the 'Vocabolario' of the Academy della Crusca. 'I Lucidi is an adaptation of the 'Menachmi' of Cicero, and 'La Traversa' is a translation into Italian of certain of Plautus' comedies, as appears to have been invented by himself, except that the character of Rovino seems to have been modelled on that of Calandro, in the 'Calandrini,' of Cardinal Bibbiena.

Fiorenzuola's version of the 'Golden Ass' of Apuleius is partly adapted and partly translated. The translation is from the 2nd century to the 15th; the Greek towns were converted into Italian towns, and the Lucas of the original work becomes Agnolo in the version. The leading circumstances are retained, but altered as far as is necessary to suit the change of time and country; the alteration however is so means an improvement of the original narrative, though the composition, as a specimen of Italian prose, is admirable.

Fiorenzuola's other prose works which are mostly in the form of dialogue, are delightfully written; his 'Dialogo delle Bellezze della Donna' especially, abounds in descriptions of exceeding delicacy, conveyed in a style so graceful and elegant, that his brother Bonsi has afterwards written a version of an interesting narrative. The 'Discacciamenti' was written in opposition to the party who were then attempting to introduce certain letters not previously in use into the Florentine alphabet, such as the letter K. 'Fiorenzuola, in a sonnet, addresses the literary reformers as 'il candido ingegn.'

As a writer of verse Fiorenzuola has considerable merit; his sonnets, indeed, are less delicate in thought and expression than those of Petrarch, but his satirical verses are of a high class, very effective, and in elegance and facility hardly inferior to those of Berni.

(Vita di Agnolo Fiorenzuola, prefixed to his Opera, 8. vol. 18mo., 1816; Ginguen, in 'Biographie Universel.' Tiraboschi, 'Storia della Letteratura Italiana.')

FISCHER VON ERLACH, JOHANN BERNHARD, together with his son Joseph Emanuel, Baron von Erlach, distinguished architects, designed or superintended the building of all the principal public and private edifices which were erected at Vienna in their time. Johann the father was born at Weilach, in the county of Berndorf, in the year 1711, and was educated at Rome, and all his works are in the style of that architect. His first work was the palace of Schönbrunn, commenced in 1696 for Joseph I., to whom, and Charles VI., he was court architect. It was commenced in 1797.

Joseph finished the works which his father left incomplete, the principal of which is the magnificent church of St. Kari Borromaeus, finished in 1757. He was created Baron von
difficult of interpretation, which occur in the various stratified rocks, we are almost wholly indebted to one naturalist. It is to M. Agassiz, following in the footsteps of Cuvier, that we owe the remarkable progress which has been made in this branch of Palaeontology. The systematic thread by which this author has cleared away the obscurities of the subject of fossil fishes is already explained in the article Ichthyology, P. C., so we propose here to give an enumeration of the genera and their geological distribution, far as they relate to the British Islands. The list is compiled from the reports of M. Agassiz to the British Association in the years 1843 and 1844. The geological classification is that developed in the Cyclopaedia, articles Palaeozoic Series and Silurian System.

TABLE I.—General Distribution of the Orders of Fossil Fishes.

<table>
<thead>
<tr>
<th>Cenozoic Strata</th>
<th>Mesozoic Strata</th>
<th>Palaeozoic Strata</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Upper</strong></td>
<td><strong>Middle</strong></td>
<td><strong>Lower</strong></td>
</tr>
<tr>
<td><strong>Upper</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Middle</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Lower</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Hence it appears that the two orders of Ctenoid and Cycloid fishes, which are the most abundant in existing nature, have no representatives yet discovered in the Palaeozoic strata.

If we divide the two groups of Mesozoic and Palaeozoic strata into their constituent parts we shall have additional results.

TABLE II.—Distribution of the Orders of Fossil Fishes in Mesozoic and Palaeozoic Strata.

<table>
<thead>
<tr>
<th>Mesozoic</th>
<th>Palaeozoic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ctenoid</td>
<td>Cycloid</td>
</tr>
<tr>
<td>Upper</td>
<td>Upper</td>
</tr>
<tr>
<td>Middle</td>
<td>Middle</td>
</tr>
<tr>
<td>Lower</td>
<td>Lower</td>
</tr>
</tbody>
</table>

Hence it would appear that the Placoid fishes (Onchus, &c.) are, geologically speaking, the most antient of the finny races; for the Cenozoic Ctenoid and Cycloid series, and the Palaeozoic only the upper Mesozoic (Cretaceous) group. It is however very possible that this last statement may be modified by further search in the works already examined. A partial distribution of the Ctenoid and Cycloid fishes is given in the following table, which is thought to favour the notion of the almost Ctenoid character of that deposit.

In the next four Tables (Tables III., IV., V., VI.) we give the geological distribution of the several families (some are merely provisional) under which M. Agassiz has ranged the British Fossil Placoid fishes.

TABLE III.—Distribution of the Families of Placoid Fishes.

<table>
<thead>
<tr>
<th>Ctenoid</th>
<th>Cycloid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper</td>
<td>Upper</td>
</tr>
<tr>
<td>Middle</td>
<td>Middle</td>
</tr>
<tr>
<td>Lower</td>
<td>Lower</td>
</tr>
</tbody>
</table>

Fishes, fossil. For the successful investigation of the numerous specimens of fishes, generally imperfect, and
Hence the most prolific periods for Placoid fishes seem to be the upper Paleozoic, the middle and upper Mesozoic, and the lower Cainozoic strata.

### TABLE IV.—Distribution of the Families of Ganoid Fishes.

<table>
<thead>
<tr>
<th>System</th>
<th>Lower</th>
<th>Middle</th>
<th>Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cainozoic</strong></td>
<td>Lower</td>
<td>Middle</td>
<td>Upper</td>
</tr>
<tr>
<td>Paleozoic</td>
<td>Lower</td>
<td>Middle</td>
<td>Upper</td>
</tr>
</tbody>
</table>

The Ganoid fishes (singular forms, however) begin to abound in the middle Paleozoic series, and become rare above the lower Cainozoic series. They are also rare in existing nature. M. Agassiz once included the Glyptcephalus of Shespey among the Ganoids, but in his later catalogue he has joined it to the Cycloids.

### TABLE V.—Distribution of the Families of Ctenoid Fishes.

<table>
<thead>
<tr>
<th>System</th>
<th>Lower</th>
<th>Middle</th>
<th>Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cainozoic</strong></td>
<td>Lower</td>
<td>Middle</td>
<td>Upper</td>
</tr>
<tr>
<td>Paleozoic</td>
<td>Lower</td>
<td>Middle</td>
<td>Upper</td>
</tr>
</tbody>
</table>

The account of the Ctenoid fishes in the lower Cainozoic strata is from the report of M. Agassiz to the British Association in 1844.

### TABLE VI.—Distribution of the Families of Cycloid Fishes.

<table>
<thead>
<tr>
<th>System</th>
<th>Lower</th>
<th>Middle</th>
<th>Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cainozoic</strong></td>
<td>Lower</td>
<td>Middle</td>
<td>Upper</td>
</tr>
<tr>
<td>Paleozoic</td>
<td>Lower</td>
<td>Middle</td>
<td>Upper</td>
</tr>
</tbody>
</table>

To complete this view of the geological distribution of fossil fishes, we append an abstract of the catalogues of M. Agassiz, which have been already referred to.
Ctenophora, one species
Stomias, one species
Ctenophorids.

Ctenocephalides, one species
Chimerids.
Chinmars, fourteen species. (This includes several general groups of Eggerton.)

Ganoidea, one species
Lepidids.
Dedapids, seven species
Tétragonopsids, fourteen species
Centrolophids, one species
Amblyurids, one species
Seminodonts, one species
Lepidosomids, thirteen species
Pholidophorids, twelve species
Notosomids, one species
Ophiopids, two species.

Raites.
Myliobatids, six species
Zygobatids, one species
Aetobatids, two species
Pristis, three species
Raja, one species.

Squids.
Notitubid, one species
Glyptcephalids, one species
Caracodrines, two species
Otodids, one species
Lamnids, one species
Chimerids.
Elasmobranchids, one species
Edaphodids, three species
Passalodids, one species
Fistuloids, one species.

Ganoidea, one species
Pycnodontids.
Pycnodontids, one species
Periodontids, one species
Gnathodontids, one species.

Acipenserids.
Chondrosteids, one species

Craticulidae, one species
Placodonta, one species.
Icthyodruses, one species
Psocodons, five species
Hybodonts, one species
Cimmerons, one species
Spirals, one species.

Ctenocephalids.
Psychos, five species
Acrodonts, one species
Strophodont, two species.

Squalids.
Squalo, one species
Notidanus, two species
Corax, one species
Otodids, one species
Oxyrhina, one species
Lamens, three species.

Chimerids.
Chimera, five species.

Ganoidea, one species
Lepidids.
Lepidosomids, one species.

Saurids.
Caturids, one species
Ctenacanthids.
Macropods, two species

Pycnodontids.
Acrodonts, one species
Gnathodonts, five species

Notidanus, five species
Psychos, five species
Pycnodonts, five species
Saurids, one species.
Caturids, one species
Ctenacanthids.

Macropods, two species
Sphenodonts, two species
Sauropsids, two species

Ctenophora, one species
Squalia, one species.

Ctenocephalides.

Beryx, three species.

Ctenocephalides.

Hypomorpha, one species
Enchodus, one species
Saurocephalus, two species
Saurodon, one species
Tetrapods, one species
Acrognathus, one species
Autolepis, one species
Osteolepis, two species.

Tertiary System.
Placodonta, one species.

Raites.
Myliobatids, six species
Zygobatids, one species
Aetobatids, two species
Pristis, three species
Raja, one species.

Squids.
Notitubid, one species
Glyptcephalids, one species
Caracodrines, two species
Otodids, one species
Lamnids, one species
Chimerids.
Elasmobranchids, one species
Edaphodids, three species
Passalodids, one species
Fistuloids, one species.

Ganoidea, one species
Pycnodontids.
Pycnodonts, one species
Periodonts, one species
Gnathodonts, one species.

Acipenserids.
Acipenser, one species.

Ctenocephalides.

Pycnodonts.
Myripristis, one species
Colopera, one species
Eurygnath, one species
Podocephalus, one species
Synaphys, one species
Brachygnath, one species
Pterasontas, one species.

Sparoids.
Sciaenids, two species.

Teuthids.
Psychodus, one species
Pomphractides, one species
Calopoma, one species.

Cycloid (Ctenocephalidean) Fishes.

Cycloides, one species
Cyphus, one species
Cyprinids, one species
Colopoma, two species
Belonids, three species
Belonids, three species
Belonids, three species
Belonids, three species.

Cycloid (Mallotopiformes).

Gymnotus, one species
Analgolobus, one species
Gnathodus, one species.

Anguilliformes.
Rhynchobatus, one species

Distribuides.
Auchenilabrus, one species

Labridae.

Scomberesos, one species

Clupeides.

Halecopsis, one species
Megalepis, one species

Auchenilabrus, one species

Labridae.

Scomberesos, one species

Clupeides.

Halecopsis, one species
Megalepis, one species

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Labridae.

Scomberesos, one species

Clupeides.

Halecopsis, one species
Megalepis, one species

Auchenilabrus, one species

Labridae.

Scomberesos, one species

Clupeides.
But things attached to the freehold for agricultural purposes only are not removable.

The following lists, given by Mr. Chitty, in his treatise on the Law of Contracts, p. 359, show what fixtures have been decided or considered, according to judicial dicta, to be removable or not as between landlord and tenant.

1. List of things held not to be Removable by the Tenant:

- Agricultural erections: Fuel-house
- Alehouse bar
- Barns fixed in the ground
- Beast-house
- Benches
- Box planted in garden
- Bricks fixed with mortar
- Carpenter's shop
- Cart-house
- Chimney-pieces (in general)
- Conservatories
- Cornices, if fixed substantially
- Doors
- Dressers
- Flowers
- Foldyard walls
- Fruit trees

2. List of things held to be Removable by the Tenant:

- Arras hangings
- Barn on blocks
- Beds fastened to ceiling
- Bells
- Bins
- Blinds
- Bookcases
- Buildings on blocks
- Rollers, pillars, &c.
- Cabinets
- Chimney backs
- Chimney-pieces (ornamental)
- Cider houses
- Cisterns
- Clock-cases
- Coffee-mills
- Cooling coppers
- Coolers
- Cornices, ornamental, fixed with screws only
- Cupboards
- Dutch barns
- Furnaces
- Furniture, fixtures put up as
- Granite on pillars
- Grates
- Hangings
- Iron backs to chimneys
- Iron plates
- Iron mills, and
- Iron ovens

3. List of Trade Fixtures decided or said to be Removable by the Tenant:

- Acrassary, buildings that is, necessary to a removable
- Iron safes
- Brewhouse and pipes
- Machinery, let into caps or
- Cider-mills
- steps of timber
- Cisterns
- Partitions
- Closets
- Plants and pipes of brewers,
- Colliery machines
- Distillers, &c.
- Copperers
- Pumps
- Counters
- Reservoirs
- Cranes
- Salt-pans
- Crucks
- Shelves
- Drawers
- Shrub planted for sale
- Drawers
- Soap works, fixtures in
- Dutch barns
- Steam-engines
- Engines
- Still
- Engines
- Trees planted for sale
- Fire-engines
- Varnish-house
- Furnaces
- Vats
- Gas-pipes

There are also certain fixtures as to which the right of removal is unsought, but has been the subject of discussion, in determining some of the cases already referred to: of the doubtful articles the subjoined is a list:

- Brick-kills
- Melting, doors, stoves, &c.
- Cornices
- Furnaces in nursery grounds
- Frames in smelting and
- Glass-houses
- Furnaces in melting and
- Glass-houses
- Furnaces in nursing grounds
- Glass-houses
- Green-houses
- Windows or water mills
- Hot-houses
- Workshops
- Lime-kills

It must not however be assumed that no circumstances can except the enumerated articles from the decisions respecting them. The particular circumstances of each case, the state or position of the fixtures in question, and the consideration of the degree of injury to be caused by their removal, are so much regarded by the courts that few decisions can be regarded as absolute authorities for other cases, even with respect to fixtures of a similar description.

The general rule is, that a tenant must remove his fixtures before the expiration of his tenancy, for he is not at liberty to insist on his claim afterwards. But it seems that if a tenant continue in possession after the end of the term, even against the will of his landlord, he is entitled to remove fixtures not previously taken away. And if the interest of the tenant of uncertain character, as of a tenant strictly at will, or per

autre vie, it is the common opinion that he will be entitled to a reasonable time after the determination of his tenancy to remove his fixtures.

The rights both of landlord and tenant with respect to fixtures are frequently modified and controlled by the terms of the demise, according to the general principle that parties may, by entering into a special contract, vary their legal rights with respect to each other. Thus, a covenant by the tenant to keep in repair all erections and buildings erected and built, and thereafter to be erected and held, and to surrender them at the end of the term, will preclude him from removing erections put up by himself, and which, but for the covenant, might have been legally removed as trade fixtures. And therefore a tenant, before severing an article from the free-

hold, must consider his right not only under the general law of fixtures, but as it may be affected by any express or implied covenant in his lease.

It should be observed that any erection or building, whatever be its purpose, and however substantial it be in itself, unless it be affixed to the freehold according to the definition of a fixture before given, will not belong to the landlord at the end of the term. Thus, if the tenant erects a barn, granary, stable, or any other building upon blocks, rollers, pillars, or the like, the landlord will not be entitled to it as part of his freehold. The tenant may therefore, by adopting appropriate modes of construction, make many valuable additions to premises without losing his property in them, and at the same time avoid the effect of a covenant to repair erections which are put up by him during the term.

2. As to the law of fixtures between tenants for life or in tail, or their personal representatives, and the remainder-man or reversioner.

There are only few cases in which the claims of tenants for life or in tail to fixtures have come before the courts; but it appears generally from the authorities, that fixtures set up either wholly or partially for the purposes of trade form part of the personal estate of a tenant for life or in tail, and are excepted out of the general rule in favour of the inheritance; and it may be inferred from the analogy of decision in cases between husband and ex-husband, that the exception will extend to certain articles put up for ornament or convenience, provided they are not united to the freehold by any permanent or substantial mode of annexation.

It is necessary to distinguish between the rights of tenants for life and in tail under the law of fixtures from those which they possess under the general principles of tenure as incident to their estates. A tenant in tail, by reason of the nature of his estate, may, independently of the law of fixtures, take anything he has affixed to the premises. A tenant for life, again, is not in general entitled to commit any kind of waste: but if he holds his estate without impediment of waste, he possesses powers arising out of his estate similar to those of the tenant in tail. [Warner, R.C.] But in either case, the powers must be exercised during the life of the tenant, as they cease at his death, and nothing survives to his representatives except his right under the law of fixtures.
Exclusion persons are considered as tenants for life of their benefactors, and in such cases their representatives with respect to annexations made by them to the freehold resemble very nearly those of other tenants for life.

3. As to the law of fixtures between heir and executor.

There appears to be more uncertainty in the doctrine of fixtures, than in anything else, except perhaps in the cases between parties who do not desire to be bound by the law. In the case of a few, answers put in by the tenant, or similar conduct, are evidence of the existence of a fixture. Such cases are decided by the courts of chancery. In the case of freehold, it has been held, as between the tenant and executor, whether the fixture be so construed in the opinion of the court.

It may however be inferred from them generally, that as between the heir and executor, whether the fixture be in use, or otherwise, is governed by the same principles. If the fixture be made by the tenant in the possession of the estate, it is tenable; if by the executor, it is not. The rule is, that fixtures in use are tenable; fixtures in use not in use, are not.

In questions with respect to fixtures, whether between landlord and tenant, tenant for life or in tail and the person entitled in remainder or reversion, or between heir and executor, much will frequently depend, not only upon the nature of the fixture, but also upon the previous conduct of the parties, and their agreement or understanding as to the nature of the fixture.

In cases where the fixture is made by the tenant in the possession of the estate, it is tenable; if by the executor, it is not. The rule is, that fixtures in use are tenable; fixtures in use not in use, are not.

With respect to the transfer of fixtures the general rule is, that a conveyance or mortgage in general terms of lands and houses includes personal chattels attached thereto, though such chattels might otherwise have been removed under the law of fixtures. When the conveyance is not general, but contains a stipulation that the fixtures are to be taken at a valuation, or that they are to be paid for or otherwise disposed of as the vendor shall direct, the valuation or disposition is to be determined by the relative situation in which the fixtures are placed by the conveyance. If the conveyance be an absolute sale, then those articles only should be valued which would be fixtures as between the tenant and the vendor, and not subject to the facts or circumstances of a lease, the value of the fixtures should extend to all that would be considered tenant's fixtures as between landlord and tenant. If the description of the premises in the renewal of a lease contain the general terms 'lands, buildings, erections,' &c., the fixtures are considered to be included in the demise, and the tenant cannot afterwards remove them, whatever his rights before the new lease was granted.

It is now settled that contracts exclusively for the sale of fixtures, and leases of sickness, sickness, or a day, as well as a week, are not included in the 4th section of the Statute of Frauds (29 Car. II. c. 8); though if the slightest interest in the realty be intended to pass, the statute will apply. It would seem, too, that a contract for the sale of fixtures is not within the 17th section of the statute as a contract for the sale of goods and chattels.

(See the Treatise of Messrs. Amos and Ferard on the law of Fixtures.)

FLABELLARIA, a generic title for some fossil plants, as F. acumens, from the coal formation. (Stemberg.)

FLACOURTIA/C.E., or FLACOURTIA/NEE., a natural order of plants belonging to Lindley's parasitic group of Polyptichaceae. It has from 4-7 definite sepal phyllaries as between the her and the executor, there being no disagreement between the parties. The sepal are alternate with them, sometimes wanting; the stamens hypogynous, equaling the petals, or twice as many or some multiple of them, and sometimes appearing as scales forming a nectary; the ovary roundish, distinct, sessile or slightly stalked; the style absent or filiform; the stigma equal in number to the petals or more, more or less distinct from each other; the fruit 1-celled, sometimes insident and flat, sometimes capular, 4-6-valved filled with a single pulp inside; the seeds few, thick, usually enveloped in a pellicle formed by the withered pulp, the albumen flaky, the endosperm soft, and the testa thin. Hence the radicle turned to the hilum, and therefore usually superior; the cotyledons flat, foliaceous. This order consists of shrubs and small trees, with alternate simple coriaceous leaves on short stalks, and sometimes profusely pedunculate umbels.

The affinities of this order are strongest with Capparidaceae, with which they agree in a number of particulars. De Candolle says they approach Passifloraceae by means of their parietal placentation and the presence of a series of barbary or splints at the angles of the ovary. This order has also a relation to Santalaceae. They may however be distinguished from all other plants by their unilocular fruit having their inside wholly covered with the placenta. About 15 small genera are referred to this order. Of these, three constitute Blume's order Flacouriae; but the plants composing it are little known at present.

These plants are natives of the hottest parts of the East Indies and Africa. Three of the general, Flacouria, Hydrocosmos, and Pedda Vahl., are plants used by man; few, if any, are cultivated for ornament.

Flacouria, the type of the order, was named in honour of Etienne de Flacourt, a director of the French East India Company, and of commander of an expedition to Madagascar in 1648, of which he gave an account in 1659. This plant is dioecious; the staminiereous flowers have their stamens densely crowded, an hemispherical receptacle, and are glandless at the base; the pistilliferous flowers have the calyx 4-5-dec, deciduous; the pericarp is elongated in a longitudinal furrow above; the seeds long. The species are thorny shrubs, with whitish sepals and yellow stamens.

F. ramontichi, has roundish ovary, acute creased leaves. This shrub attains a height of eight feet, and is a native of the island of Mauritius. It is called Flacouria. The fruit, which is edibie, is about the size of a small plum, is red when ripe, at length becoming violet-coloured. It has a sweet and acid taste. There is a small island off the coast of Madagascar which is covered with these trees. This island is called by English sailors Plum-tree Island; by the French, Ile aux Fruits.

F. capense has elliptical leaves, serrated, blunting at both extremities. It is a native of the mountainous districts of the East Indies. The fruit is about the size of a common currant, and of a red colour. The fruit is eaten by the natives, and the tree is called by the Telingese Pedea Cauere.

F. ischmus has elliptical crenato-serrated leaves, with short axillary accessory flowers; it is a native of the Island of Mauritius. It is called Chaulmoogra. The fruit, which is edible, is about the size of a small plum, is red when ripe, at length becoming violet-coloured. It has a sweet and acid taste. It is a native of the Moluccas, where it is also extensively cultivated for the sake of its fruit. There are several other species of Flacouria, all of them yielding edible fruit.

Hydrocosmus (from hydro, a river, and cosmus, a fruit) has dicycious flowers, the staminiereous ones with 5 stamens, 5 sepals, the two outer ones being ovate, 5 petals with villous margins furnished with a scale on the inside; the berry is spherical, terminated by four reflexed tubercles. There is only one species of this genus, which is a tree about thirty feet in height, the H. venemata of Guertner, and H. inebriata of Vahl. It is a native of Ceylon. The fruit when eaten produces dysentery. It is greenly covered by fleshes, which become stripped, but when taken in this way they produce poisonous effects as food. Chaulmoogra is a dicycious genus; the staminiereous flowers with a 4-5-lobed calyx, 5 petals with a scale at the base of each; the pistilliferous flowers have the calyx 4-5-dec, 5 petals, 5 ovary, each furnished with a longitudinal furrow above; the seeds long. The species are thorny shrubs, with whitish sepals and yellow stamens.

F. odorata has short-stalked, alternate, bifarious, drooping, lanceolate, entire, acuminate, smooth, exstipulate leaves, 6 to 10 inches long, 14 to 24 inches broad. It is a native of Ceylon. The seeds are employed extensively by the natives of India for medicinal purposes. It is a remedy for scirrhous swellings. The outer fleshy skin is usually removed externally; the seeds being removed from the seed box, the perisperm is beaten up with clarified butter into a soft mass, and applied to the part affected three times a day. The Indian names of this plant are Chaulmoogra and Pecaturu.
The other genera belonging to this order are Rypaena, named by Vabi after John Ryan, who collected plants in Guyana; *Petrica*, named after M. Patris, who collected plants in Guyana; *Roume*, after Philippe Rose Roumier of St. Lucan in the French Island of St. Domingo, who was of great service to Poitou, who travelled there; *Kjellgren*, after Francis Kjellgren, a Dutch botanist of the seventeenth century; *Staphylites*, *Erythraea*, and *Vano*.

(Dox. Gardener's Dictionary; Lindley, Natural System; Lindley, Flora Medica; Burnett, Outlines of Botany.)

FLAGSTONE. A variety of sandstone, in which the laminated structure prevails, is thin-bodied. Other laminations are shown in certain limestones and some argillaceous beds of the Silurian series, receive the same title. The laminations of flagstone arise from peculiarity of deposition; the laminations of slate (properly so called) arise from a new system of cleavage, that of deposition, and possess certain symmetry and relations to lines and axes, which are at least analogous to crystalline arrangements.

FLEET PRISON, the name of a metropolitan prison, now abolished, so called from its being situated by the side of the river Fleet, now covered over. It was the prison to which persons were committed by the ecclesiastical courts, courts of equity, Exchequer, and Common Pleas. It was governed by an officer called the warden, who was responsible for the conduct of all prisoners, and was also responsible for the conduct of the courts whose prisoners were sent there for any abuse of authority, extortion, or other misbehavior.

The Fleet Prison was abolished by the 5 & 6 Vict. c. 22, which established the Queen's Bench Prison, the Bridge House Prison, the Baring Prison, the Fleet Prison for debtors, bankrupts, and other persons who might formerly have been imprisoned in the Queen's Bench Prison, the Fleet Prison, or the Marshall's Prison. The prison was pulled down in 1845.

FLEXIBILITY is a property of bodies by which they yield transversely, on the application of some power; this property is distinct from elasticity, as it does not necessarily follow that the bodies acted on recover their original figures when the power is removed.

Flexible are silk, hair, and the like, possess this property in a high degree; rods of wood, metal, and stone are flexible, and those of the two last materials are more particularly so when heated. The property is so much the more sensible as the fibres or rods are longer.

The deflexions of beams or bars in vertical and in horizontal positions, when strained by weights, have been noticed in Materials, Strength of, P.C.; and the employment of the fibres of hemp and of iron or copper wire in the formation of ropes is explained under Ropes..Params made of metal are said to be even more flexible than those made of hemp, the capabilities of suspending weights being equal, and the former being, of course, less in circumference than the latter.

The mathematical theory for the vibrations which may take place in a thread which is perfectly flexible, when small forces are applied to all its points; and the investigation of formulae for determining the position and velocities of the points at the end of a given time, may be seen in Poisson's Traité de Mécanique, No. 462, &c., vol. v. 1833.

FLEXURE OF COLUMNS. If the particles of which a column is composed were equal spheres in contact with each other and arranged in lines parallel to the axis of the column, a weight diffused uniformly over the top of the column, when the latter is in a vertical position, would probably produce no flexure: but if the particles be supposed to have any tendency to slide laterally, particularly if they are irregularly distributed so that they are not the least in contact with one another below them, it must follow, from the action of the weight at the top of the column, either that the particles thrust one another laterally outwards all round the axis, producing in the column a swell which is a diameter of it, or that, the compression of the particles being greater on one side than on another, the column is diminished in length, on the compressed side; the weight being made to act obliquely upon it, a general bend of the whole column in one direction is produced.

This effect takes place in pillars of iron, stone, and wood; and when the bend, which in a pillar of uniform dimensions is generally greatest in the middle, becomes considerable, a rupture of the column, as is so frequently the case, is a plane inclined to the axis; but often a swelling appears near the middle, on the concave side, and, at the instant of rupture, a fragment in the form of a wedge is detached. The fibres of wooden pillars are generally of serpentine form, and they adhere together laterally with, comparatively, a small side thrust. In a pillar, when compressed longitudinally by a weight, the latter must, according to the nature of the fibres; and thus a pillar of wood becomes bent sooner than one formed of the other materials.

When a column is bent by a weight applied at the upper end, it is evident that, on the side which concaves outwards, the particles extending to some distance within the column, must be in a state of compression, while those beyond that distance, towards the side which is convex outwards, must be in a state of tension. Let AB be a vertical line passing through A in the centre of the upper extremity of a column bent by a weight, and imagine ad, in any transverse section (suppose in the middle of the column) to be a line cutting the concave face in a; it is evident that, if the column were incompressible, the particles immediately above ac, which, by the weight at A acting at d, the extremity of the lever ad, is separated from a particle in ac, resists the weight of that particle. By treating the particles of the end of a lever whose length is the distance of the particle from a, and the whole resistance depends on the momenta of cohesion in all the particles between a and c, whereas, the column is compressible, and the momenta of cohesion in the particles between c and b. Hence it is evident that the compressibility of a column must increase the tendency of the column to be broken in consequence of the flexure produced by the weight placed upon it.

In MAXIMILIAN STEINER of P.C., it is stated, a priori, to the mathematical theory of elastic bodies compressed in the direction of their lengths, that the weights which solid columns will bear at the instant of beginning to bend varies with $\frac{ad^3}{E}$, in which $a$ is the area of a transverse section, $d$ its depth and $l$ its length; and, when the pillar is a solid cylinder, this expression may be transformed into $\frac{d^4}{E}$ (d representing the diameter). Also in Poisson's Traité de Mécanique, No. 315 (ed. 1833) it is shown that the force by which an elastic hollow cylinder resists the tendency to flexure by a weight acting in the direction of its length is expressed by a formula which denotes that the force, or weight, varies with $\frac{d^2}{E}$, in which $d$ and $d'$ are, respectively, the exterior and interior diameters of the cylinder, and $l$ its length. These formulæ must be understood however as holding good only for columns which are incomparably thicker than the particles and thus, till lately, good experiments for the determination of the actual strength of columns were entirely wanting.

This desideratum is now supplied by the valuable series of experiments carried on by Mr. Hodgkinson, and which a full account is given in the 'Philosophical Transactions' for 1840 (Part II.). The columns, which were placed in vertical positions, were of various length, from a few inches to seven feet six inches, and all were subject to pressures acting vertically; some were cylinders, and others were rectangular prisms, and the former were either solid or hollow: in some cases the ends of the columns were planes perpendicular to the lengths, in order that the pressure might be diffused uniformly over those ends; and, in the others, the ends were hemispherical, in order that the pressure might be transmitted almost wholly in the direction of the axis. Of the experiments alluded to, a few only can be stated here; but these, which are contained in the following table, may serve to give an indication of the relative strength of different columns when supporting weights, and of the indications the columns experience.
From his experiments Mr. Hodgkinson has obtained the following conclusions:

All the pillars whose lengths exceeded four times their diameters became bent before they broke; and when the pillars were of uniform dimensions, both ends being plane or both hemispherical, the greatest flexure was near the middle of the length, and the fracture took place in such a manner that the place between one end was plane and the other hemispherical, the fracture was at a distance from the rounded end equal to about one-third of the whole length.

Pillars, made with plane ends, and having their lengths about thirty times their diameters, were broken by weights equal to one-third or one-fourth of those which would crush them if they had been made short enough to be crushed without bending; and when the lengths of pillars, whether made of cast-iron, wrought-iron, steel, or timber, were from 30 to 121 times their diameters, the ratio between the weights supported on those with flat and those with rounded ends was nearly as 3 to 1; the weight, in the latter case, falling almost entirely on the axis.

The strength of iron columns with flat ends appeared, however, to suffer a diminution of relative strength as they became shorter; and this was found to be owing to the tendency of those columns to be crushed by the greater weight which, in order to produce flexure, it became necessary to place on them. The ratio between the strengths of pillars having both ends flat and both rounded, within the lengths above mentioned, was nearly constant; and when one end of a column was rounded and another flat, the strength was found to be nearly an arithmetical mean between those of the other pillars.

In some of the experiments the cast-iron columns were formed with disks at their ends, the diameters of the disks being about twice as great as those of the columns; and it was found that these columns yielded a greater pressure before breaking than the simple columns: the strengths of such columns were about equal to those of columns of equal diameters and half their lengths, the ends of the latter being hemispherical. The columns were thicker in the middle than at either end, their strength was thereby increased, if compared with cylindrical columns, by one-ninth or one-seventh.

Mr. Hodgkinson succeeded, in many of his experiments, in determining the position of the neutral point; and, among the experiments stated in the above table, the fifth and sixth are those in which the situation of the point appears to have been correctly ascertained. In the former it was a distance from the compressed side of the column equal to 0.23 inch; and, in the latter, at a distance from the side equal to 0.11, being measured, in both cases, at the place of fracture, in the direction of a diameter. In the prismatic pillars, the flexure always took place in the direction of a diagonal. The hollow columns used in the experiments were often thicker on one side than on the opposite, yet the strength of such columns differed little from those of columns of uniform thickness: the reason for this seems to be that the thin side was almost always that which was compressed; and as iron resists compression with about six times the force with which it resists tension, it must follow that such a column would seldom give way on the compressed side.

In solid cast-iron pillars whose lengths were from 30 to 121 times their diameters, the ends being hemispherical, the yielding weight, with flexure, varied nearly as a power of the diameter whose exponent was 3.76; when the ends were plane, that exponent was 3.55. When the diameter was so small that very little compression took place before the pillars broke, the exponent was nearly equal to 4, agreeably to the mathematical formula above stated. In the like pillars, whether the ends were rounded or flat, the breaking weights varied inversely as a power of the length whose exponent was 1.7.

The experiments on hollow cast-iron cylinders of those lengths were not less than 30 times their external diameters, showed that the above exponents of the powers of the external and internal diameters, and also of the lengths, hold good for the breaking weights. Computing therefore those exponents, on the supposition that the columns were expressed in inches and the lengths in feet; the expressions for the breaking weights (W) in pounds were:

For hollow cylindrical columns with hemispherical ends,

\[ W = 33379 \frac{d^{1.7}}{l^{0.7}} \]

and for such columns with flat ends,

\[ W = 98922 \frac{d^{1.7}}{l^{0.7}} \]

the same formula serving for solid cylinders by making, in both, \( d^2 = 0 \).

FLINDERSIA. [Cedrela.] P. C. B. FLINK, GOVERT, a very able Dutch painter, born at Cleves in 1616. His parents were wealthy, and designed Govert for a merchant, an occupation to which he showed every disinclination; but his parents steadfastly opposed his own inclination to become a painter, until they happened to hear a sermon by Lambert Jakobsen, a Minorite of Louwerden, who was himself a painter. They in consequence changed their notions as to the eligibility of Govert's choice and placed him with Jakobsen to learn to paint. He studied afterwards under Rembrandt at Amsterdam, and completely mastered his style of execution and colour, and adhered to it for some years until after the death of Rembrandt, when the Italian taste prevailed, and he had seen the works of Rubens and Van Dyck. Flink took as much pains to get out of Rembrandt's manner as he had before taken to acquire it. He was however as successful in the one as in the other, and produced several historical pictures and many portraits, all of which rank among the best productions of the Dutch school. He died in 1660, aged only forty-four. If he had not died so early an age, he would probably have produced many noble works, as his last picture is his best, his Solomon praying for Wisdom, in the Council Hall at Amsterdam. He has also painted admirable portraits: he has had few superiors as a portrait-painter.

Flink formed a good collection of prints and Italian drawings, which was sold after his death for 12,000 florins.

(Hooboken. Grote Schouwburg, etc.) FLINT. The true origin of this mineral substance—as it occurs in the chalk of Europe especially—has been, and still is, the subject of much discussion among microscopists and geologists. Mr. Bowerbank believes generally in the origin of some flints (and some other minerals) from sponges. In confirmation of this view apecula, such as characterize the silicious sponges (Halispongia), are found in flint, and on the surfaces of flints peculiar marks of organization referable to spongeous texture. Ehrenberg, finding in some flints abundant animalcula, supposed the origin of flint from aggregations of these silicious-shelled microzoaria. Mr. Charlesworth has recently found flint occupying the closed...
pulp cavity of a tooth of moosaurus, and regards this fact as opposed to both speculations.

It appears desirable to prosecute still further the microsco-
pic researches on this subject, and the inquiry may be delin-
eted into three main classes, especially of the cherts which lie in the oolite of Yorkshire, the lias of Mendip and Glamorgan, and the mountain-limestone of Britain generally.

FLOOR. (Hooke, F. C. S.)

The use of a covering for floors, though partly dependent on other circumstances, is mainly determined by the kind of material of which the floor is made; since, so far as decoration is concerned, certain kinds of flooring are in themselves more elegant than any covering that could be fitted to them.

Chequers of black and white, or various-colored marble, form a kind of flooring well adapted for large buildings; be-
cause there is space at command for producing a pattern both large and varied in details. Two such examples in private houses, commonly used, are either of a series of ornamental borders enclosing one or more compartments containing a device or group, or of a uniform pattern in two or three colours. [MOSAIC, F. C.]

Another kind of flooring, technically named by the French parquet or parquet floor, is made of small pieces of wood in an ornamental form: it is, in fact, a species of mosaic in wood. About two centuries ago this sort of workmanship was in high favour, especially in France, where a workman named Bourc carried the inlaying process to a high degree of delicacy. In some examples the pieces of wood employed were so small and the colours so selected, as to admit of the formation of pictures, or of small articles for furniture or ornament: in such cases the term marquetry was applied. The marquetry was produced, not by the machine, but by the hand of the workman employed when the floors were the object of the workmanship. Since the use of sawing and planing machines the production of parquet flooring has been rendered more easy than formerly.

The simpler kinds are said to have had their origin in a desire to avoid the warping of long narrow boards, by employing boards only three or four feet long by as many inches in width, and arranging them in various patterns. In a recent periodical work ("Art-Union," 1845) it is stated that a foreign painter, has actually extended the use of parquetry in this as well as in England; he has floored two small rooms in Windsor Castle, and a portion of one of the staircases in the new Royal Exchange. He is said to proceed thus:—

The irregularities of grains in two pieces of oak, obtained from stont oak frames formed into compartments, comprising squares, diamonds, polygons, or any other desired shape; the oak frames are rather more than an inch in thickness, and the rich or colored wood laid on them is from a quarter to three-eighths of an inch in thickness. All beautifully grained wood, capable of being cut up into veneers, such as maple, cedar, mahogany, satinwood, rosewood, and ebony, are available for this purpose.

Floor-poising of an ornamental character are, however, decidedly an exception to the general rule; and it has be-
come customary, in this country at least, to lay down some sort of covering on the wooden boards of which the floor is formed, in most rooms a little removed from the humbler class of dwellings. The covering have been largely made, and by degrees established for this purpose—that of Carpets (for which see Carpets, F. C.), and that of Floor-cloth or Oil-
cloth, more modern and less important than the other. As both of these kinds of covering are formed of cloth, and as velvets is a sort of medium between the two, it is not diffi-
cult to see how motives of economy may have led from the use of a carpet to a plain drugget, and from this to a painted drugget or cloth, more or less diversified in the arrangement of the material, and of the greatest width likely to be required. As brought to the floor-cloth factories, the pieces of canvas have generally one of these scales of dimensions: a hundred yards long by six wide, a hundred and eight yards by seven, a hundred and twenty-six yards by six, and hundred and thirty-five yards by five and hemp are spun, and the canvas woven, almost entirely in twenty-four looms, in Dundee; and the degree of fineness is generally such as to present about sixteen or eighteen threads to the linear inch.

The canvas, throughout the subsequent operations, retains the network; this was given to it when it is cut into pieces varying from sixty to a hundred feet long, though these pieces has to be stretched over a frame in a vertical position; and in most of the factories there is a large number of these frames, some a hundred feet long by eighteen or twenty high, others sixty feet long by sixty feet wide. A means of transferring the canvas to those frames, if it, when the bales are opened, cut to the proper length, laid down on the floor of a large room, and coiled round a long process of preparation, or the covering, the floor is then lifted up vertically and removed close to the front edge of the canvas is nailed or hooked to one edge of the frame, and the roller is made to travel onwards and to revolve in such a manner as to give off the canvas as fast as the latter can be hooked to the upper horizontal bar of the frame; when all is uncouled and the canvas hooked on all four of its edges, the sides of the frame are so drawn by winches and levers as to stretch the canvas to a degree of tightness nearly equal to that of a tent, and is then coiled, and its length measured (from fifteen to eighteen hundred square feet). Here the canvas remains many weeks, during most of the processes.

Before the imprinting of the pattern which forms the most conspicuous feature in floor-cloth, the surface of the canvas is adapted to receive a design of any object or subject, but not in durable. The pattern is applied on one surface only; but both surfaces are painted and prepared, the back before the front. A wash of melted size is applied by means of a brush to each surface; and, while this is yet wet, the surface is well rubbed with a flat piece of pumice-stone, whereby the little irregularities of the canvas are worn down, and a foundation is laid for the oil and colour afterwards to be applied. To work over so large an extent of surface, the workmen are employed in two processes: they are either placed about the room, not in contact with, the surface of the canvas: one scaffold being in front and another behind the canvas.

When the size-preparation is dried, the painting begins. The paint employed consists of the same mineral colours as those used in house-painting, and, like them, mixed with linseed oil; but it is much thicker or stifler in consistence, and has very little turpentine added to it. The first layer of paint is applied with a trowel: or rather, the paint is dabbed on in places to the height of a quarter of an inch, and then levelled and spread by means of a kind of trowel twelve or fourteen inches in length. Ten or twelve days are required for this thick coating to dry; and at the expiration of this time a second coat of the same thickness is applied with a brush instead of a trowel. These twain layers of paint are all which the back or hinder surface of the can-
vases receives; but the front or face receives a greater thick-
ness and a greater number of processes. For instance, after the sizing, the surface is rubbed down with a brush, and then comes the 'trowel-colour;' followed by a second rubbing with pumicestone; and then two, three, or more layers of colour, applied with a brush, each coating being followed by a rubbing with pumice stone before the next one is applied. The surface has by this time acquired smoothness, and the general substance a suppleness and pliability.

The prepared canvas is next removed from its vertical posi-
tion in the frame, and wrapped round a roller, which is so placed as to allow the canvas to be unrolled and spread out on a table to be printed. The printing of floor-cloth is con-
ducted much on the same principle as that of paper-hangings for rooms [Paper-Hangings, F. C.], and that of colour-
printing; via, the successive application of the various blocks or engraved surfaces, each giving a different part of the device from the others, and being supplied with paint of a different colour. In the infancy of this art the pattern was given by means of 'stencil-plates;' that is, thin plates of pasteboard, on which the pattern is engraved or cut, to form the pattern, and the paint was so applied as to fall through these holes upon the surface of the canvas spread out beneath. It was rather less than a century ago that the use of wood-blocks superseded that of stencil-plates. In the latter case the print was made was about fifteen inches square, and had a simple device of zig-zag lines.
cut upon its surface; when this was pressed face downwards on a cushion coated with wet paint, it took up a layer on all the raised parts of the device, and was then in a fit state to impress itself to the canvas. When the device was placed on the paper, the device is carefully drawn on the full scale on a stiff sheet of paper, and is coloured fully in every part according to the exact appearance which it is intended to present on the canvas. This second piece of paper is placed under this, with a pin or pricker a series of holes is made through both papers, following the outlines of the pattern so far as regards one colour, which we may suppose to be green; a second blank paper is placed under the pattern in lieu of the former, and the outlines or another coloured portion of the device are marked through both papers with the pricker; and so on as many times as there are colours, the outline of each being transferred to a paper distinct from the others.

An equal number of blocks of wood are then prepared; these consist of two thicknesses of white deal and one of pear-tree wood, ranged at right angles with respect to the grain, to prevent warping; they are about fifteen inches square, by two and a half in thickness, and the pear-tree surfaces are turned, in each case, to the same side. One of the pricked papers is laid down on a prepared block, and a little bag containing pounce or pounded charcoal is dashed all over it; the powder enters the pin-holes, and leaves upon the surface of the wood a series of dots sufficient to define the design. The device is then put in order, by cutting away all the surface except where the lines of device are marked. All the other blocks are treated in the same way; and it is easy to see that each one is left uncut at those parts which are cut away in all the others, so as to avoid confusion of colours.

The blocks (which we will suppose to be four for one pattern, red, yellow, blue, and green) being ready, and the prepared canvas spread out on a flat table, the printing commencements. Each block should be pressed either on the surface of a pad or cushion formed of flannel covered with floor-cloth; the block, held by a handle at the back, is placed face downwards on this cushion, and the layer of paint thus obtained is transferred to the surface of the canvas by pressing the block smartly down on the latter. A second impression is made in a similar way by the side of, and close to, the first; and so on throughout the length and breadth of the canvas; each impression being about fifteen inches square. The wood in the blocks is notched at regular intervals, and little triangular impressions are aided by pins at the corners of the blocks. When the whole surface is thus printed with one colour, all the other three are similarly applied in succession. Such is the process in the case of four colours; but the greater the number the more it would be the care necessary in adjusting the numerous partial impressions so as to secure a proper arrangement of the whole.

In printing floor-cloth for passages and stairs, where the width seldom exceeds a yard, the canvas is prepared in the frames as in other cases; but it is cut up into strips before being printed, and has usually a border given to it by means of a succession of blocks, much narrower than those employed in ordinary cases. Where there are large patches of one colour in the pattern of floor-cloth, these are not given by smooth surfaces on the block, but by means of little projecting squares technically called "teeth;" the reason for this is, that if a surface two or more inches square were laid on wet paint, it would not take up the paint equally, but would exhibit it in an unequal spatter; whereas, if the surface were broken up into a number of smaller surfaces by means of lines cut in various directions, these lines would act as air-vents, and the paint would be taken up pretty equally by the letter,
FLOWERS, ARTIFICIAL. The Egyptians, according to Dr. Ure (Dictionary of Arts, &c., art. "Flowers, Artificial"), appear to have been the first people in Europe who excelled in the art of making these elegant ornaments, though of late years the French have displayed most ingenuity and taste in the manufacture. Ribbons of various colours, folded into various shapes, were sometimes originally employed for illuminating flowers, by being attached to wire stems. This imitation, he says, soon gave way to that by feathers, which are more delicate in texture, and more nearly resemble the real flower-like figures; and it was found difficult to dye them with colours of the requisite vivacity. 'The savages of South America,' he adds, without quoting any authority, 'manufacture perfect feather-flowers, derived from the brilliant plumage of their birds, which closely resemble the products of v Doll's and leaves are admirable, while the colours never fade.' The cocoons of the silk-worm, which take a brilliant dye, preserve their colour, and have a transparent velvety appearance suitable for the imitation of petals, are sometimes used by the Italian flower-makers. The French, of late years, have used the finest cambric for petals, and the taffetas of Florence for the leaves; and M. de Bernardiencourt has introduced artificial flowers made of exceedingly thin leaves or laminae of whorlen, which may be bleached and dyed of various hues. Sometimes petals and leaves are made of velvet, coloured by the application of a finger dipped in the dye. Dr. Ure adds directions for dyeing various colours required in the artificial flowers.

The stems of artificial flowers are mostly formed of wires, (the largest being of two or more wires twisted together), wrapped round with paper, silk, or some other material of the required colour; and wires are also sometimes applied to the leaves and other parts which need a branch and dye. Petals are mostly cut, and, if needful, embossed, by stamping with dies with sharp cutting edges, and are united together by means of wires and paste or cement. The modes of colouring are of course exceedingly various, and it being in many cases necessary to apply colour only to one part of a petal, or to apply two or more colours to one petal. Seeds and similar objects, and small fruits, such as currants, are beautifully tinted by wax, glass, or other compositions; and by the judicious use of a variety of other materials, almost any object in the vegetable kingdom may be united with surprising accuracy and beauty. 'To such perfection is the manufacture carried, that artificial flowers are not only employed as decorations in ladies' head-dresses, but are also much used as elegant table or mantel-piece ornaments. When thus employed, as they are not liable to the same shaking and rubbing as those used in dress, more fragile and easily injured materials may be employed. Wax flowers are made of extreme delicacy, and are employed in the most delicate and beautiful imitations of them in paper coated with wax. Rice-paper is also occasionally used for the purpose. Artificial flowers formed of shells, by a judicious choice of forms and colours, are made of far more general appearance than would be supposed, are also used for such purposes, although, unless very small, they are too heavy for head-dresses. The manufacture of artificial flowers is conducted almost entirely by girls and women; and as it depends mainly upon taste and manual dexterity, it forms a very suitable as well as an important branch of female employment.

FLUIDS, ELASTIC. This name may be applied to all the fluids in nature, since all are in certain degrees elastic; or rather, more properly, to those substances possessing the property of elasticity in a very low degree. Among the aeriform fluids, however, those which are usually considered as permanently elastic are called gases; and the term elastic fluid is frequently confined to atmospheric air and the vapours which are produced from solids on liquids by the action of heat; these last are therefore such as may be rendered solid or liquid by reducing their temperature, or by increasing the pressure under which they exist. But between these two kinds is a third, while called permanently elastic is perhaps nominal, since many of the latter, by the discoveries of Dr. Faraday, are found capable of being exhibited in a liquid form. [Gas, F. C.] This philosopher, for example, obtained carbonate acid in a liquid state from the ashes of ammonium, by decomposing it in a sealed tube, one end of which was placed in a freezing mixture. The liquor was colourless. Many of the gases, moreover, on being combined with one another and with other substances, form solids or liquids: thus, oxygen

Almost all gases are invisible; but several which are so when they exist alone, become visible on being mixed with other, or when the temperature is raised. A mixture of atmospheric air with nitric acid, the combination becomes visible and of a red colour. Several gases also become visible when mixed with aqueous vapour. As sulphuric acid is usually heated, it produces an increased rarefaction, render it visible; and, on the other hand, a diminution of temperature will cause such a condensation as may render visible a vapour which before was imperceptible. These effects of heat and cold upon vapours have been rendered of explanations of the apparent dimensions of the mass of a comet when near the sun, and of its apparent enlargement in ascending from that luminary. All elastic fluids are transparent, but different quantities of light are absorbed in passing through those different kinds, and when the thickness of a stratum of fluid is considerable, the absorption is so great as to render an object beyond it invisible.

The elastic forces of a dry gas at a given temperature are inversely proportional to the volumes they occupy; and this law holds good also both for mixtures of elastic vapours with each other, and of vapours with gases, provided no chemical action takes place between them. Thus, different fluids of equal volume, pressure, and temperature, when mixed together in a close vessel whose capacity is equal to the sum of the volumes of the fluids separately, the fluids for a time remain separately in equilibrio; but experience shows, that gradually the fluids intermingle with one another, producing a homogeneous compound, part of the warming temperature, and the remainder continues to possess the elastic force due to the temperature. And again, if the volume of a quantity of vapour be increased, the vapour will expand, and, if not in contact with the liquid in contact with the liquid, the elastic force of the mixed fluid will be equal to the sum of the elastic forces of the separate fluids, and the temperature will remain constant. When a vapour at a given temperature is compressed by being confined within a smaller space than that which it previously occupied, part of the warming temperature, and the remainder continues to possess the elastic force due to the temperature. And again, if the volume of a quantity of vapour be increased, the vapour will expand, and, if not in contact with the liquid in contact with the liquid, the elastic force of the mixed fluid will be diminished; if in contact with the liquid, new vapour will rise to supply the void created by the dilution, and the elastic force will remain constant.

The temperature at which liquids become elastic fluids by the action of heat is called the critical or South wether's boil, under the usual pressure of the atmosphere, at about 70° (Fahr.); sulphuric ether boils at 98°, and acetic ether at 106°; water boils at 212°, while mercury can be made elastic by increasing the temperature.

The quantity of vapour produced by heat from a liquid increases with an increase of temperature, and while in contact with the liquid its elasticity varies with its specific gravity. The elastic force of vapour is increased by the mixture with air; for if the interior of a barometer tube be moistened at the upper end with water and air be introduced in it above the column of mercury, the tube being inserted as usual in a cistern of the latter fluid, the depression of the mercurial column in the tube by the expansion of the vapour and air, in consequence of an application of heat on the exterior, is greater than that which results from the expansion of air when dry.

The atmosphere which surrounds the earth is endowed with an elastic power; and partaking, moreover, of the earth's diurnal rotation, its particles should, by their elasticity and centrifugal force combined, recoil from the earth till the whole is dispersed in space. Such is not the fact; and hence it is evident that if the earth were a solid mass, while under the surface of the earth, the elasticity of the atmosphere is totally destroyed by the absence of calorics; or that beyond the stratum in which the centrifugal force of the particles is equal to their gravitation, there may exist, in a state of rest, the atmosphere, free from the disturbing effects of the earth's surface, and prevented from the atmosphere from being further expanded by its own elasticity.

Now, by Mechanics, it may be found, that the distance from the surface of the earth to the stratum of the atmosphere that
in which the centrifugal force of the particles is equal to their gravity is about five semidiameters of the earth, at which height the density must be inconceivably small; and since it is not necessary to suppose that the aetherial fluid beyond the atmosphere of the earth is more dense or more elastic than the atmosphere at that height, it may readily be admitted, that whatever may be the effect of such a fluid in restoring the motion of a comet, it can produce no sensible retardation of the movements of the planets.

The crepuscular light which has been observed at the cusps of Venus, and the changes which take place on the apparent disks of Mars and Jupiter, afford indications that those planets have atmospheres, though, with our instruments, such atmospheres may not be rendered sensible by their action on transmitted light. If, about a planet, an atmosphere were formed in consequence of the attraction exercised by the planet on the aetherial fluid supposed to fill all space, since that fluid may have no greater density and elastic power than the atmosphere of the earth at the height of five semidiameters of the latter above its surface, the attraction of the planet may be incapable of rendering it sufficiently dense to produce any sensible effect in refracting light to the earth. Again, the height and the law of the variations in the density of the strata in an atmosphere which may be formed about a planet by the vapours arising from waters existing on its surface, would depend on the temperature; and this we have no means of knowing: but assuming it to be equal to the mean temperature at the surface of the earth, the height of such atmosphere would be very small compared with that of the existing atmosphere about the earth. An atmosphere of either of the kinds here indicated would serve to account for the rare occurrence of remarkable refractions in the phenomena of the immersions and emersions of Jupiter's satellites, or the occultation of stars by them.

For the properties of elastic fluids, see also Elasticity, P. C.; Gas, P. C.; Vapours, P. C.; and Evaporation, P. C. S.

FLY. FLY-WHEEL. [Wheeler, R. C., p. 316.]

FLYING BRIDGE. This consists usually of a boat or other vessel which, being attached by a rope to a buoy moored in the middle of a river, is made, by the action of the current, to move across on an arc of a circle of which the buoy is the centre. On large rivers, at places where the communications across them are very frequent, such bridges will probably, in future, be superseded by steam-vessels; but, for temporary purposes, and particularly to facilitate military operations in countries where steam navigation is not in use, they may be of the highest importance.

Let A be a buoy securely anchored in the middle of a river, and B a boat to which, at a point about one-third of the vessel's length from the head, is attached one end of the cable or chain B A: then p b indicating the direction of the current, if the keel a b of the boat be inclined to that direction in any angle as p a b, the pressure of the water against one side of the boat being resolved in a direction q a perpendicular to p b, or across the river, will cause the boat to describe the arc C D E, whose centre is A. As far as the point D, in the middle of the river, the boat descends the latter; and, afterwards, it ascends obliquely against the current; but, while its keel is kept at such an angle as will make this force perpendicular to p b, the force parallel to q a continues to act and impel the boat towards E.

If r represents the direct force of the current, and θ the angle p a b, the force perpendicular to p b will be expressed by \( f = r \cos \theta \); and the force may be a maximum, when the arc C D E may not exceed a quarter of the circumference of the circle; and when, for this purpose, the length is very great, it must be supported as at g, h, and k, on moveable beams or small piles.

A flying bridge sometimes consists of a simple flat-bottomed vessel, having a mast fixed to one of its sides in the middle of its length. The cable passes through a block at the mast head, and is attached at one end to the opposite side of the vessel, the other end being made fast to the buoy. Two ropes connected with the cable lead one to the head and the other to the stern of the vessel; and, by pulling on one of these, the other being let go, the vessel is placed in a position opposite to the point of one end of the arc C D E. The force of a steering oar aided by a central-board which may be let down into the water at the head or stern as the case may require.

In a rapid current it may be impossible to make the boat B move up the ascending arc D E; in which case a boat at F, by means of a cable made fast at H on the opposite bank, may be allowed to describe the descending arc F G. On getting out from F, the boat takes with her a coil of rope, of which one end is attached to a fixed object near that place; then, when arriving at G, the boat is drawn up along the bank to H; and by the rope is hauled across the river to F, from whence it set out. Again, a rope being made fast to an object near F, a boat may be steered obliquely from some point as K, till it comes to a part, M, of the river at which a force makes strongly upon her; then letting go the rope and, by the rudder or steering oar, keeping the boat's keel at a proper inclination to the direction of the current, the resolved force of the water will impel the boat to some point, as G, on the opposite bank.

When the river is too wide for a boat to swing over in a single arc, two buoys may be moored in a direction across the river, at equal distances from the banks and from each other, and two boats connected with them by ropes may be impelled, in circular arcs, one extending over the first half of the breadth of the river, and the other over the second: a raft being moored in the middle of the first arc facilitates the transferance of the passengers, &c. from one to the other. If, on arriving at one boat, on arriving in the middle of the river, may transfer its passengers immediately to that which is to describe the other half of the breadth.

A triangular raft N P Q, having its front, as N F, parallel to the direction of the current, and being connected by a ring at N, with a rope S V stretched tightly across the river, may, by a resolved force of the current on N Q, be impelled directly to the opposite bank; and, on reversing its position so that P M is seen connected by rings with the rope. S V may be impelled across in a contrary direction. A boat running by a ring at one end, on S V, may, by being kept in a position corresponding to that of the line N Q, in like manner be steered across the river.

On broad rivers, even when objects of great bulk and weight, as horses, carriages, or artillery, are to be conveyed across, two boats or barges placed in parallel positions, and carrying a platform extending between their exterior gunwales, are employed: the boat or barge is impelled by a force, and the platform is consistent with the strength of the platform, in order that as much as possible of the current may act against a side of the lower vessel. The vessels are made narrow and deep, and each is provided with a mast, which may be from twenty to thirty feet in height; these are connected to a second piece, and the latter is placed contiguously to either mast, according to the direction in which the vessels are to move. A drawbridge is constructed on each side of the platform, and one of them is let down to form a passage when the vessels
arrive at the landing-place on either side of the river. Each vessel has a rudder, and the tillers are connected by a bar, in order that one man may be able to turn both.

For ample details concerning the subject of this article see "An Essay on the Construction of Military Bridges," &c., by Major-General Sir Howard Douglas.

FOG. [Merr. P. C.]

FOHR, CARL PHILIPP, a young landscape painter of veritable genius, was born at Helsingfors in 1796. In 1815, he visited Rome, and made the acquaintance of Cornelius, Veit, Overbeck, and Koch the landscape painter, and he shortly painted two large pictures there, which ranked him among the first painters of his class, and procured him the notice, patronage, and friendship of the great baron August Dufour, the present king of Bavaria, then crown-prince. This great patron of the arts, compared with whom Lorenzo de' Medici was but a shadow in magnificence, was strongly impressed with Fohr's ability; for taking leave of him at Rome, he presented his hand, saying, "Wir sehen uns wieder; wir Gehören uns naher an" (We shall see each other again, we belong near to each other). It was not so, however; Fohr was drowned in the Tiber while bathing, on June 29th, 1816, in the sight of three friends, who could afford him no assistance. Several of his early landscapes are in the museum at Darmstadt; a Life of him was published at that place in 1823; his portrait has been engraved by Amaler, one of the friends who witnessed his death.

(Fagler, Neues Allgemeines Künstler Lexicon.)

FONTANÀ, PROSPERO, a celebrated painter of Bologna, where he was born in 1612. He was the pupil of Innocenzo da Inola, the assistant of del Vaga and Vasari, and the master of the Caracci; and was of great authority in Bologna until the establishment of the school of his pupils. As a fresco painter Fontanà was a mere mechanist, but in portrait he was one of the first painters of his time. There are frescoes by him at Bologna, at Rome, and at Città di Castello, where in a few weeks he painted a great hall in the Palazzo Vitelli illustrating the deeds of that family. He was presented by Michelangelo as a good portrait painter to Giulio III., who took him into his service, as did also his three successors. He died at Rome. Levidia Fontana, called also Zappi, the name of her husband, was the daughter of Prospero, and likewise distinguished herself for her ability in painting, especially in portrait; but she executed works in various departments of painting, all finished with care and delicacy. Some of her portraits have passed for the works of Guido. She was a great favourite with the noble ladies of Rome from the time of Gregory XIII. to Paul V.; she painted Gregory's portrait. She died at Rome in 1614, aged sixty-two.

(Malvasia, Felice Pitrice; Lanzi, Storia Pitrice, &c.)

FONTENVAILL. [Maye & Lожe, P. C.]

FOOT. [Skelton, P. C.]

FOOT-PRINTS, impressions of the feet of reptiles (as of Crocodilus and Varanus, of Ophiomorphae), are now become recognised evidence of the existence of particular races of organic beings, in certain geological periods, though nothing of those tracts remain. From this evidence, the air-breathing vertebrata appear to be of higher antiquity than was formerly supposed, and to date from the upper part of the carboniferous system.

FORAMINIFERA, FOSSIL. The expectations of naturalists and microscopists from Lamsack to Ehrenberg, that in the common strata of the close, minute organized bodies have had a more important share than the bones of Vertebrata and the shells of Mollusca, appear to be fully justified by recent discoveries in the Cainozoic and some other strata. In the strata of the Cainozoic and many of those of the Cretaceous System the fossiliferous marls and slates which are associated with peat, are found to be full of the siliceous shells of Infusoria; some of the tertiary sands are loaded with the calcareous shells of Foraminifera, and this group has been distinctly traced downward; in the chalk, the marl, the limpet, the limestone, and probably even into the Silurian rocks. These Foraminifera diminish in number as we pass below the chalk: perhaps also they recede more from the forms of existing minute Polythalamaceae, but this is a point requiring much further investigation. The most abundant forms in the chalk belong to a few groups entitled Rotalia, Spiroolina, and Textilia. In the oolites and mountain limestone the forms generally resemble those of Textilia.

The following table exhibits a summary of the distribution of the genera:

In Cainozoic strata of Britain, according to Morris's Catalogue.

<table>
<thead>
<tr>
<th>Anomalina</th>
<th>Biboculina</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cristallaria</td>
<td>Dentalina</td>
</tr>
<tr>
<td>Glandulina</td>
<td>Globigerina</td>
</tr>
<tr>
<td>Marginulina</td>
<td>Nodosaria</td>
</tr>
<tr>
<td>Nodulina</td>
<td>Operculina</td>
</tr>
<tr>
<td>Planorbula</td>
<td>Polyomphila</td>
</tr>
<tr>
<td>Polysomelina</td>
<td>Quinqueloculina</td>
</tr>
<tr>
<td>Rotulina</td>
<td>Rosalina</td>
</tr>
<tr>
<td>Rotalia</td>
<td>Sperculina</td>
</tr>
<tr>
<td>Textilia</td>
<td>Triloculina</td>
</tr>
<tr>
<td>Trunculina</td>
<td></td>
</tr>
</tbody>
</table>

In the Cainozoic strata, taken generally, Bronn enumerates 60 genera, and Ehrenberg has augmented the number.

In Mesozoic strata.

Chalk of Meas-tricht, Meudon, &c., (Morris's Catalogue.)

<table>
<thead>
<tr>
<th>Buliminula</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cristallaria</td>
</tr>
<tr>
<td>Dentilina</td>
</tr>
<tr>
<td>Globigerina</td>
</tr>
<tr>
<td>Lithula</td>
</tr>
<tr>
<td>Marginulina</td>
</tr>
<tr>
<td>Nammulina</td>
</tr>
<tr>
<td>Rosalina</td>
</tr>
</tbody>
</table>
| Rotalia (7 species British).
| Siderolina      |
| Spiroolina      |
| Textilia        |
| Trunculina      |
| Tubulina        |

In Mesozoic strata.

Oolite of Cen.

(Oolite of Stones-field.)

| Cristallaria    |
| Planulina       |
| Textilia        |
| Rotalia         |
| Rotalia         |
| Textilia        |
| Textilia        |

In Palaeozoic strata.

Mountain Lime-stone of Bristol.

Limestone of South.

Genus ?

Concerning these numerous minute fossils, Ehrenberg has recently added to our knowledge on two material points, viz.—the organization of the analogous living races, and the degree of affinity between fossil and recent forms. From a fortunate capture at Cuxhaven in 1839, Ehrenberg was enabled to exhibit alive at Berlin two species of D'Orbigny's genus Polystomatella (classed by Ehrenberg as Ophiomorpha and Nodulina), and to study their organization.

The animal is soft, internal, covered by the discoidal spiral concentric shell, and without prehensile apparatus of tentacles at the mouth. Through perforations in all parts of the shell minute exfoliate filamentous tentaculata pass, and larger bundles of these appear about the umbilicus of the shell.

The last, sometimes the 2-4 following ones, contain transparent parts only. The others are filled with two differently coloured larger organs. One of these is the spiral alimentary canal expanded in each chamber, occasionally at each articulation (to an aperture in the septum); the other is granular, and is perhaps an ovarian mass.

By dissolving the shell in weak acid the shields of Infusoria swallowed as food become visible in all parts of the alimentary canal. There are no pulsating papillae or tentacles in this alimentary canal. Ehrenberg appears to regard one of these animals as a compound coral animal, the other as a single coral animal—the former communicating from chamber to chamber by many small apertures in the sepulchral, the other by one.

In a fossil state the shells of Rotalia show the minute perforations through which the pseudopodae tentaculata passed, and by a careful examination of the remains of those bodies enshrined in flint Dr. Mantell ('Medals of Geology', vol. 1, p. 159) has shown the general arrangement of the shell, and general form, if not the minute organization, of the
animal inhabitant. In a recent communication to the Geological Society of London, this author has more distinctly expressed his opinion that the soft body of Rotalia is actually silicified, and distinguishable by colour from the clearer flint which has replaced the shell.

The relation of the fossil Foraminifera to the recent types is perhaps closer than that of most other species. It appears not only that several tertiary forms are identical with living species, but further, according to Ehrenberg, that no less than nine or ten Foraminifera of the chalk are undistinguishable from existing species. The following is the list of those species, and the localities where they occur in real chalk:—

1. Globigerina bulloides
2. Globigerina helicina
3. Rosalina globularia
4. Rotalia ovata
5. Rotalia globulosa
6. Rotalia perforata
7. Rotalia turrida
8. Textularia aciculata
9. Textularia globulosa
10. Spiroliina cilindracea

Denmark.
Cattolica.
Graveynd.
Cattolica.
Cattolica.
Graveynd.
Brighton.

Even if some doubt must remain as to the exact identity of the specific forms thus declared to occur, both recent and in cretaceous beds, the analogies are too close and too numerous to allow of hesitation in admitting that the Foraminifera races of the Mesozoic and Cainozoic periods have more decided affinity than appears in any other group of organic life. As some of the Polyplacota of the Silurian series pass upwards into the Devonian era, some of the Foraminifera of the chalk, with Terebratula vitrea and T. Caput Serpentis, appear to reach our own day; and thus by feeble, but not to be neglected links, the systems of antient and modern life are united into one only partially discontinuous series, the seeming interruptions being in the higher grades of life, the less striking connections being formed by the simpler marine organic structures which might better survive great physical catastrophes and better endure successive variations in the condition of the sea.

POLITICAL WORKS, which were collectively published in Latin at Amsterdam, in 1646. A curious collection of funeral sermons on his memory, by many eminent survivors, was published soon after his death.

(Irving, Lives of Scottish Writers, ii., 43-47; Funeral of Bishop Forbes for the Spottiswoode Society.)

FORBES, WILLIAM, Bishop of Edinburgh, was born at Aberdeen in 1680. He studied at Marischal College in Aberdeen, which he entered when he was twelve years old. He held for some time a chair of logic in Aberdeen; and afterwards travelled in Germany and Poland, studying at Helmstaedt and Heidelberg. On his return to Britain he was offered a professorship of Hebrew in Oxford, but the state of his health induced him to return to his native country. In 1618 he was made professor of Marischal College. When he died in 1621 ceasing to hold this office, and soon afterwards becoming one of the ministers of Edinburgh. In that capacity he preached before Charles I. on his visit to Scotland in 1633, and the eloquence he there exhibited is said to have induced the king to resolve that he should be the first bishop of Edinburgh. That short-lived see was erected in the ensuing year, and Forbes was appointed bishop on 26th January, 1654. He died on the 11th of April of the same year. His fame is chiefly traditional. His only published work is posthumous:—Considerations modestae et pacífica Controversiarum do Justificatione, 'Purgatorio, Invocatione Sanctorum et Christi Mediatori, Enchastis,' published in 1658. It entered as a protest against the Protestant Episcopal churches and the Church of Rome likely to have made episcopacy more unpopular in Scotland than it was. Some other polemical works which had raised high expectations were lost. Burnet, characterizing the sequence, passed on the whole an account of his own cen- nence that made him forget all the measures of time—two or three hours was no extraordinary thing for him.'

(Irving, Lives of Scottish Writers, ii., 1-9.)

FORBES, JOHN, a divine and polemical writer, second son of Patrick Forbes, Bishop of Aberdeen, was born on the 2nd of May, 1693. He studied at Heidelberg and Sedan, and returned to Scotland in 1619. In that year he was appointed professor of divinity in King's College, Aberdeen. In this important post, says Dr. Irving, he laboured with great diligence, and speedily acquired the character of a most able and useful teacher. He was profoundly skilled in ecclesiastical antiquity; and not contented with delivering what is called a system of divinity, he exhibited a very elaborately deduced and the progress of Christian doctrine in various ages of the church. He lived during the period of the hottest struggles for supremacy between Episcopacy and Presbyterianism; and possessed with the views of toleration and ecclesiastic liberty, he first attempted the establishment of a toleration society, which, he published in 1629, at Aberdeen, 'Irenicum Amatorius Veritas et Paez in Ecclesia Scotiana.' Afterwards, in 1638, when the breach between the two parties, which was the commencement of the civil wars, had begun to spread, he published 'A peaceable Warning to the subjects in Scotland.' He was afterwards a leader in a polemical dispute as one of those generally styled 'the Edinburgh doctors,' who conducted, on the side of Episcopacy, a controversy with the Covenanters. Whichever party may have had the advantage in argument, the latter had the superiority in physical force; and after having seen his conductors deprived of their benefi- cies, Forbes was subjected to the same fate in 1640. His case was one of peculiar hardship, for he had made over part of his own private property to be attached to the professorship which he held; he lost this property on being dismissed from his office. In 1644 he went to Holland, where he married a Dutch woman named Soete Roseboom, or Sweet Rosebume. He returned to Aberdeen in 1646, and died on the 29th of April, 1648. Besides the works already mentioned, he published others on kindred subjects, some of which passed through more than one separate edition; and the whole, along with some posthumous works, were collectively published in his 'Opus Omnia,' at Amsterdam, 2 vols. folio, 1702-3.

(Irving Lives of Scottish Writers, ii. 46-54; Funerals of Bishop Forbes for the Spottiswoode Society.)

FORCING-ENGINE. See ENGINE, P. C.

FOREST MARBLE, one of the upper beds of the Bath oolite series.

FORLI, MELOZZO DA, a celebrated painter of Forli, where he was born about 1469. His father was a professor of art, he ventured to foreshorten figures upon ceilings, to attempt the
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sotto in su as it is termed by the Italians, and in which Correggio has obtained so great a name; Melozzo however was scarcely inferior in this respect to that great painter. He excelled generally in perspective; in a work published in 1494, by Fra Luca Pacioli, entitled 'Summa d' Arithmetica & Geometria,' was given an example of the living painters who were famosi e supremi in perspective.

Scarcely anything is known of Melozzo, though his contemporaries termed him the incomparable painter, and the splen- dor of all Italy.' (Morelli, 'Vita d' Opera di Diresi,' &c., p. 109.) He was buried, so some have been the follow-pupil of Mantegna with Squarcione at Padua, and by others to have been the scholar of Piero della Francesca, one of the earliest masters of perspective. He was early in Rome: he had been at Padua as the companion of Benozzo, who painted there, in 1472, for Cardinal Riario, the nephew of Sixtus IV., an Ascension of Christ, on the altar vault of a chapel of the church of the Apostles, Santi Apostoli, which was sawed out and removed in 1711, the principal part to the Quirinal Palace, and part to the Vatican, which is now in the sacristy of St. Peter's. The part in the Quirinal, the Asci- nion, has the following inscription — 'Opus Melotii Foro- liensis, qui summos famosus pingere artem vel primus invent vel illustravit, ex aside veteris templi SS. XII. Apostolorum hoc translatum anno Sal. MDCCX.' All the fragments are engraved in D'Agincourt's 'Histoire de l'Art par les Monnens.' There is also a large fresco, now mounted on canvas, in the gallery of the Vatican, which was formerly in the St. Peter's Library. It is a Crucifixion, Sixtus IV. installing (Bartolomeo Sacchi, or) Platina in 1475, as prefect of the said library. The fresco was removed from the wall and fixed to the canvas by Domenico Suci of Italy in 1744. The heads, mostly portraits of distinguished persons, is good and individual, and the general arrangement and colouring are of great merit, but in the severe style of Mantegna and other eminent quattrocentisti.

FORTESBRACCI. [BRAZIO FORTESBRACCI. P. C. S.] FOSBROKE, REV. THOMAS DUDLEY, has given a sketch of part of his life in a notice prefixed to the original quarto edition of his 'Encyclopaedia of Antiquities,' published in 1824; and he has entered into some details about his ar- ticles in the Encyclopaedia, in his Abstracts of Records respecting the County of Gloucester, 4to. (vol. i. p. 24), in the same year, 1824. In his work entitled 'Archeologia,' 1821, p. 158, and in an account published in the said library; 'Lanzi, Storia Pittorica, &c.; Galeria di Quadri al Vaticano, Rome, 1835.' He is a man of a strong mind, a geological term subordinate to 'system,' and including special 'groups,' or assemblages of strata; in a loose sense it applies also to pyrogenous rocks, and mineral veins.

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In the 'Biographical Dictionary of Living Authors,' published by the London, 1813, we are told that in 1809 Mr. Fosbroke published, in 8vo., a 'Letter to Mr. Cannning on his unaccountable Abuse of the Duke of York'; but afterwards, at p. 481, the letter is stated to have been a censure of Mr. Elphinstone, upon Dr. Canning (who indeed never abused the Duke of York): but the incorrectness of this pamphlet there were only fifty copies printed; it is not mentioned in the memoir published by Fosbroke's family.

That memoir (which is loosely drawn up) states that soon after he had been elected a member of the House of Commons, he painted there, in 1742, for Cardinal Riario, the nephew of Sixtus IV., an Ascension of Christ, on the altar vault of a chapel of the church of the Apostles, Santi Apostoli, which was sawed out and removed in 1711, the principal part to the Quirinal Palace, and part to the Vatican, which is now in the sacristy of St. Peter's. The part in the Quirinal, the Asci- nion, has the following inscription — 'Opus Melotii Foro- liensis, qui summos famosus pingere artem vel primus invent vel illustravit, ex aside veteris templi SS. XII. Apostolorum hoc translatum anno Sal. MDCCX.' All the fragments are engraved in D'Agincourt's 'Histoire de l'Art par les Monnens.' There is also a large fresco, now mounted on canvas, in the gallery of the Vatican, which was formerly in the St. Peter's Library. It is a Crucifixion, Sixtus IV. installing (Bartolomeo Sacchi, or) Platina in 1475, as prefect of the said library. The fresco was removed from the wall and fixed to the canvas by Domenico Suci of Italy in 1744. The heads, mostly portraits of distinguished persons, is good and individual, and the general arrangement and colouring are of great merit, but in the severe style of Mantegna and other eminent quattrocentisti.

Mr. Fosbroke possessed a considerable knowledge of England, and also of general archaeology, in the study of which departments of inquiry he had spent his life; and his 'Encyclopaedia of Antiquities' and 'British Mon- archies' are convenient books, though rather of reference than of authority. He had no accurate learning; and his judgment and acuteness were about on a level with his scholarship. All his books are rather popular compilations than any thing higher.

He married, in 1796, Miss Howel of Horsey, by whom he had four sons and six daughters. Seven of his ten children survived him.

FOSCARINI, MARCO, born in 1688, of an old patrician family of Venice, which has produced many distinguished men, such as Giano, who was ambassador in England, and in official situations in the service of his country. In 1733 he was sent Ambassador to the emperor Charles VI. He re- mained at Vienna for several years, and he had the arduous task of maintaining the neutrality of Venice during the war of the Austrian Succession, 1740-1748. This was the period of the Polish succession. He there wrote an interesting ac- count of the court of Vienna, its politics, and its administration, especially of its Italian dominions, in which he pointed out the latent causes of the sudden revolution in that campaign, and by which they lost the kingdoms of Naples and Sicily. This work has remained inedited until lately, when it was published by J. P. Vien- eaux, at Florence, in 1843; 'Storia Arcana ed altri Scritti inediti di Marco Foscarini,' 1 vol. 8vo., forming part of a
FOSCHINI, ANTONIO, was born June 16th, 1741, at Corfo. This architect—who, we may observe, is mentioned in Nagler's "Künstler Lexicon" as Ferarrese parents, and always called himself a native of Ferrara, because he had been brought up from his infancy in that city. His first professional studies were directed by his father, an engineer and architect, who had given his own taste out architecture as a more congenial pursuit, and to that he applied himself not only with diligence, but with the warmest desire of reforming the various abuses and correcting the bad taste which for nearly two centuries had been propagated by the University of Ferrara, and corrupted the art of building. In 1748, Clement XIV. endeavoured to restore the University of Ferrara to its former splendour, he laboured to impress upon the students the importance of attending to those fundamental principles which had been more or less disregarded or lost sight of, through aiming at superficial novelty without any freshness of invention for its basis. Yet greatly as his reputation increased, it did not shield him from the censures and intrigues of enemies, who succeeded in at length dispossessing him of his office. He was afterwards nominated, in 1804, to a similar professorship in the university of Pavia, not only without solicitation, but so contrary to his own wishes, that, flattering as the offer was, he rejected it.

On his return from his Turin embassy he was appointed Riformatore della Studi di Padova, or superintendent of that university, in which he effected useful reforms and improvements. About this time he delivered in the Great Council of Venice an oration, in recommendation of the revival of the Venetian academies, and the establishment of ordinary inspectors into the province of Dalmatia for the purpose of discovering and correcting the abuses that had crept into the administration of that important but long neglected country. And this motion was carried. His oration was published, and in its applause was mixed with illustrations by Cigna: 'Della Necessità di spedire Inquisitori di Stato in Dalmazia, Orazione inedita di Marco Foscarini.' In 1752 he published the first volume of his history of Venetian literature: 'Della antica e moderna letteratura Veneziana in libri, di Marco Foscarini, Cavaliere e Procuratore, volume primo,' fol. Padova, 1752. This work, which was considered to be a model of literary history, established the reputation of Foscarini as an author. The first four books treat of the Venetian writers of the Renaissance, the last four deal with those of Venice, and the Venetian writers on the history of other countries, including travellers. The remaining four books were to treat of the writers on mathematics, geography, and hydrostatics, those on the art of war, navigation, and lastly the rhetoricians and orators. This second part of the work however has remained unfinished and unpublished. The style of the work is concise and dignified, and the authorities are carefully quoted and discussed in copious notes. Morelli, in his "Storia della letteratura italiana," has made a work in his 'Della Letteratura Veneziana del Secolo XVIII.'

In May, 1762, Foscarini was elected doge, but his tenure of that dignity was short, for he died in the following March, 1763, and was succeeded by his eldest son, elected doge in 1765, and the second in the following year. This young man was elected doge in 1765, and the second in the following year.

The list of buildings executed by him, which claim notice as works of architecture, is by no means a long one: the greatest and most admired of them was the theatre at Ferrara, which was completed in 1766, and was one of the most spacious, well-arranged, and tasteful structures of its kind in all Italy. It should be observed, however, that it is said to have been originally begun by the celebrated Costo Morelli [Morelli, P. C. S.], Foscarini afterwards improving upon his designs. Foscarini had given his design for the great tower of the Duomo, which, had it been realized, would have rendered it one of the loftiest in Europe, but the want of adequate funds caused this project to be laid aside. Unfortunately, too, neither nor any other of the numerous designs and manuscript treaties on architecture which he left at his death, have ever been published—a circumstance by far too common with those of his profession to occasion any surprise, however much it may cause regret. The defenders of the theatre at Ferrara have never had commissions for designs or others from Venice, Verona, and Ancona; but, rather strange to say, he appears to have declined them: at any rate the only other theatre known to be indebted to him, from which he derived his income, was at Lendinara. The great Hospital at Camucchio is another edifice by him; and shortly before his death he was engaged in preparing designs for a basilica or large church at Bandeno, in the territory of Fossatti, Domenico, born at Venice in 1743, was the son of Giorgio Fossati, who, besides practising as an architect, was also a painter and engraver. The elder Fossati may also claim to be considered an author, having published in 1747 an Italian translation of Palladio's 'Lives of Architects,' a second edition of which appeared in 1755. Gifted with a fertile imagination, and delighting in the poetic effects which architecture is capable of producing, Domenico chose for himself a walk of art which, although generally looked upon as a secondary one, enabled him to improve at will the most splendid conceptions, quite unchecked by either utilitarian or necessitarian considerations. Having finished his studies, he commenced scene-painter, and was abundantly employed not only as such, but also in decorating various public edifices, and in various other ornamental and decorative painting. On the Teatro di San Benedetto in Venice being burnt down in 1776, he made a model for a new edifice; yet greatly as it was admired, it was not adopted, on account of its being too expensive. He, however, did paint a great number of historical canvases for the churches of Vienna and Munich. A number of Fossati's writings remain in the library at Venice, in the Library of St. Mark, and in his own collection now at Vienna. Ludovico Arnaldi and his father had the care of the doge's body after his death; and Professor Sibulato, of Padua, wrote an oration.

Istorio all' Eloquenza del Foscarini.'

P. C. S., No. 76.
Odine, where, besides painting for the theatre, he was employed in decorating several palaces; after which he was employed successively at Padua, Vicenza, and Verona, one of his most important performances being the ceiling of the church of Marcellago. Those labours terminated, he went to Milan, and assisted Piermarini [Piermarini, P. C. S.], in the internal decorations of the theatre of La Scala, then just established. He was painted for a picture which he did at Gratz, and while at the latter place received invitations from both Rome and St. Petersburg. He was however induced by his friends to decline them, and to return to Vienna. His master at Vienna, however, neither knew of it nor he could foresee. He had just finished painting a ceiling in the Palazzo Contarini, and was standing upon the scaffold with some of his assistants, when a workman incautiously removed one of the props, and all were precipitated to the ground. The only one who received any serious injury was Fossati, who broke his leg, and died in consequence, within less than a month afterwards, August 15, 1784. He left a great number of drawings, consisting of original designs, studies and sketches, which came into the possession of his nephew Pierangelo, son of his brother Giuseppe, which brother was an architect and engineer in the service of the King of Naples.

FOSSEMBSITE, Vittorio, born in 1764, at Arezzo in Tuscany, of a noble family, studied at Pisa, and applied himself especially to the mathematical sciences, for which he showed a particular aptitude. In 1782 he was appointed, by the Grand-Duke Leopold I, inspector of the property of the native state, and in that capacity was made ministerial of that order. In 1792 he was consulted by the Grand-Duke Ferdinand III. on the subject of the corn-trade and corn-laws, upon which he wrote a treatise, which has not been published. In 1794 he was appointed hydraulic super-intendendt of the Val di Chiana. Fosforoni had previously studied the ground attentively, and had written a learned treatise on the causes which had led to the encroachment of the waters over that low but fertile district, and had pointed out the means of draining the country; 'Memorie Idraulico-storiche sopra la Val di Chiana,' 1789. He promoted the works for that object, which having been continued through a succession of years, have at last restored the valley of the Chiana to fertility and salubrity. In 1796 Fosforoni was appointed auditor for Foreign Affairs of the Grand-Duke of Tuscany. When the French took possession of the country in 1799, Fosforoni accompanied his master to Vienna, where the grand-duke gave him leave to return home to attend to his own affairs. After Tuscany was transformed into a kingdom, the new queen of Etruria appointed Fosforoni in 1804 member of the Commission of Finance. In April, 1805, he was sent, jointly with the Prince Corsini, to Milan, to compliment Napoleon on his assumption of the sovereignty of Italy. When France and the French empire, Napoleon made Fosforoni a member of the Legion of Honour, and appointed him president of the commission for the improvement of the Campagna of Rome and the surrounding district. A helping hand, he gave to Napoleon Murat, in the report for the emperor. On the restoration of the Grand-Duke Ferdinand to his paternal dominions, Fosforoni was one of the first persons employed in the new ministry. He was made president of the legislative commission, councillor of state, minister for foreign affairs, and in that capacity the presidency of the other departments of the government. These offices he retained till his death, which took place in 1844, when he was ninety years of age, having retained all his mental faculties to the last degree, when he was seventy-eight years of age, he married a lady of the family of the name of Arezzo.

Besides the works already mentioned, Fosforoni published the following works on hydraulics: 1. 'Memoria sopra la Delineazione delle Alluvioni;' 2. 'Metodo della Resistenza ed Urti dei Fluidi;' 3. 'Illustrazione di un Antico Documento relativo all' originario Rapporto tra le Acque dell'Arno e della Chiana,' 1828; 4. 'Memoria sulla Relazione tra le Acque del Fiume Arno e della Chiana,' in which papers he explained the remarkable change that has taken place in the course of ages in the delevely of the bed of the Chiana, which in ancient times afforded a water communication between the Arno and the Tiber. [ARNO, P. C.] He has observed that the Arno has been breaking in continually, and the surrounding country were exposed, in consequence of the alluvial deposits which are carried by the Chiana and numerous other streams into the Arno, and which tend to raise the bed of the Arno; 5. 'Saggio sulla Benificenza delle Paludi Pontine;' 6. 'Memoria sul Lago di Fucecchio,' another 'Memoria sopra le Alluvioni del Fiume Arno;' 7. 'Relazione sopra l'Incanalamento di un Tronco del Fiume Arno;' 8. 'Memoria sulle Maremme Toscani;' 9. 'Memoria sopra la Ineleminazione Artificiale.' Fosforoni wrote numerous other memoirs on hydraulic subjects, which are important for the advancement of science, and have been published under the auspices of the Emperor of Austria, which has been used for the works which are now in progress in that quarter, and another memoir for Mehmet Ali, Pasha of Egypt, concerning the hydraulic improvements of his country, which he has been engaged in advising. He wrote several treatises on mathematics and mechanics, among others a 'Saggio sopra il Moto degli Animali e sopra i Trasporti;' a treatise 'Sopra la Misura delle Forze Muscolari;' another, 'Sopra la Valutazione della Forza, e degli Attriti;' and a 'Memoria sopra il II.' in 1841, which was published in 1796, and which was highly praised by Lagrange, Laplace, and other eminent mathematicians.

As a statesman, Fosforoni was enlightened and unprejudiced. Jealous of the independence of his native country, he asserted its rights upon every occasion during the long and occasionally critical period of his administration; he maintained the freedom of commerce, which has greatly contributed to the prosperity of the country; he advocated toleration, and had the leads of making a paternal but enlightened government. His system appears to have been to govern without hustle and noise, to let society move on with a little apparent interference as possible on the part of government. The administration of his country was made, not by the disposition of the people, the smallness of the state, and by his own temperament. He may have been consoled by some for being too tolerant, and by others for not being bold or active enough; but in these matters our judgment may not be taken to consider the condition of the times and the circumstances of the country. One thing generally admitted is, that under Fosforoni's administration Tuscany has been the happiest country in Italy.  

Rev. JOHN FOSTER, born in the year 1770, in Yorkshire. At an early age he attracted the notice of the late Dr. Fawcett, baptist minister, of Hebden Bridge, near Halifax, in Yorkshire, by whose interest he was entered a student of the Baptist college, Bristol, where he studied first under Dr. Evans and afterwards under Dr. Ryland. After he had completed his studies he became a preacher, and during a course of several years was successively settled as such at various places, the last of which was Downend, near Bristol. He then relinquished the active duties of a minister, and for the last eighteen or twenty years of his life resided at Stapleford, near Nottingham, and there preached occasionally. He was for many years a frequent contributor to the Eclectic Review, in which his first article appeared in November, 1806, and his last in October, 1819.

Foster's reputation as an author is chiefly founded on his Essays, which were first published in 1806, in the form of a series of letters, which, though intended for publication, were really addressed to the lady who soon afterwards became his wife. The Essays are on the following subjects:—1. 'On a Man's writing Memoirs of himself;' 2. 'On Decision of Character;' 3. 'On the application of the epithet Rambler.' 4. 'On some of the Caesars by which Evangelical Religion was never contaminated—account on it in an Essay on Taste.' The only other work which he published in a separate form, was 'An Essay on the Evil of Popular Ignorance,' which grew out of the topics of a discourse delivered at a public anniversary meeting in aid of the British and Foreign School Society, and which was afterwards incorporated into a volume of moderate size. To the Eclectic Review he contributed altogether 185 articles, of which 50 were selected and published in a separate form in 1844. A volume of poems was also published from these last, to which Mr. Johnathan Ryland, is said to be the cause of preparation.

John Foster's writings occupy only a small space, but they are of great merit. The Essays have now (1845) gone through eighteen editions, and their popularity seems to be increasing. The title of Fostery is that of a high order, clear, comprehensive, and of strong grasp. He displays an intimate knowledge of the various forms of human character, draws his remarks from a wide extent of personal
observation as well as a large acquaintance with books, and is entirely free from party views or sectarian feelings. His thoughts are unburdened, his morality high and pure, and his views, whether relating to public or private conduct, are independent, lofty, and liberal. His composition is very elaborate, yet natural and graceful; it has no appearance of having been modelled on the style of any other writer, but always seems to flow with the unrestrained current of his own thoughts, and is the spontaneous result of that strong and powerful mind, almost powerfully without, yet often concise, nervous, and impressive.

The "Essay on the Evils of Popular Ignorance" consists of a series of arguments on the necessity of a comprehensive theoretical education. However, it is not only a work of learning, but also of feeling. To some of the editions is annexed his sermon in defence of Christian missions, which is much admired.

Foster was eminently qualified for a reviewer, as well as an essayist. His strong good sense, his wide range of knowledge, his happy faculty of seeing the beauty in all things, his deep feeling for the human heart, his power of sarcasm as well as of eulogy, pure taste, and attractive style, all contributed to fit him for sitting in judgment on works of general literature.

In person Foster was rather above the middle size. His countenance was handsome and striking. His social character is described as having been very attractive. His range of topics in conversation was extensive, embracing not only such subjects as those treated of in his writings, but including the finest details of every department of art and almost every department of antient and modern literature.

(Gentleman's Magazine, Jan. 1844; Eclectic Review, Feb. and May, 1844.)

JOHN. The name of this architect, who died at Plymouth, January 13th, 1842, aged sixty-nine, is especially connected with the history of that town and its neighbourhood, where, during the last thirty years of his life, he enjoyed a very extensive practice, and executed nearly all the public buildings then erected at Plymouth and Devonport (formerly Plymouth Dock), besides various general improvements, such as streets, and lines of uniformly built houses, distinguished by the name of "Terraces." Hence he earned the highest respect of all who have been complimented by the title of the "Wren of Plymouth," though that of its "Wood" [Woon, P. C.] would have been compliment sufficient. That he did much for the general appearance of Plymouth and the places in its vicinity, is not to be disputed; he introduced an improved style of building; but those of his buildings which challenge notice as distinct works of architecture exhibit little more than a smattering of style—those superficial and obvious rudiments of style, which not the best architects would readily dissociate from the critical meaning of the term, he himself possessed no style, for, applied to the works of an artist, style presumes both individuality and generality of expression in that particular language of his art which is employed by him; whereas Foster's language is not only applicable to Greek, but equally to Gothic, and Roman, as well as to Greek, followed in literal transcripts from it with respect to columnation, columns, and a few details, but essentially un-Greek, or pseudo-Greek, in regard to general character. His works in that style are however characteristic of their time, and serve to show what was admired in this country as genuine and pure classical architecture during the early part of the present century, when four-columned Parthenons without sculpture and with sash-windows were hailed as marvels worthy of Athens itself. When compared with many things of the same date, even in the metropolis, Foulston's Greek ought to satisfy us as being very good; indeed, the criticism which exterds the Post-Office in London as a classical and chaste piece in ornamentation is unjustified. On the contrary, we give it much admiration for the façade of the Royal Hotel at Plymouth, more especially as the latter has an octostyle portico, while the other is only hexastyle. The general resemblance of the two buildings is remarkable, for not only might they pass for being the work of the same architect, but for slight imperfections, it might even be said they were the work of different hands. The style of the Royal Hotel at Plymouth generally passes for Foulston's chef d'œuvre, it being his largest building—one rivalling the post-office in London in size, as well as resembling it in design; for the Plymouth structure measures 268 by 218 feet, and 92 by 220 feet, and therefore it is even somewhat larger in the plan, the respective areas being 58,424 and 50,700 square feet. It is also, like the London one, an insalubrious edifice; but unfortunately the principal front, with its Ionic portico, is a copy of the Genoa Pedestal. The latter is not only a simple monoprostyle not even recessed, it produces comparatively little effect, the sun very seldom striking upon it. There are two other porticoes to the same building, both of them Ionic porticoes, and placed in the side-walls; but as it happens to be the case that they have not the same appearance of much sum; besides which that façade makes no composition, there being no central feature between the two porticoes, 4 G 2
nor are they so placed as to form the extremities of the gene-
ral mass.

There is a portrait of Foulon, apparently a strong like-
ness, prefixed to the above-mentioned collection of his de-
signs.

FOUIERIACEE, a natural order of plants belonging to
Lindley's synarpous group of polyystemous Exogonia.
The stems are light green, round, with slender stems;
terated leaves seated in the axil of a spine or a cushion,
with scarlet flowers arranged in a terminal spike or panicle.
The sepals are five, imbricated, ovate, or roundish; the petals 5,
regular, combined in a long tube, arising from the bottom of
the tube or calyx; and in some species the tube is united to
the same line as the petals, but distinct from them, exserted;
the stamens 2-celled; the ovary superior, sessile; the style filiform,
trid; the ovules numerous; the capsule 5-cornered, 3-valved,
the tubes bearing the disciplets in the middle, the seeds in part abortive, compressed, winged, affixed to the axis;
the embryo strait, in the centre of thin fleshly albumen;
the cotyledons flat. This order was separated by De Can-
dolfi from Portulacaceae for the following reasons:—1. be-
cause the petals were in a long tube of the same nature as
that of gymnopalustus Crucisalae; 2. because the capsule
consists of three loculical cells, that is to say, which separ-
ate through the middle, forming three septiforous valves; and
the tube of this order is distinct, united, and stationed in the centre of fleshly albumen.' (Lindley, Nat. System.)

There are only two genera comprehended in this order:
Fouquieria, named after Dr. Peter Edward Fouquier, a pro-
Fouquier, named after Dr. Peter Edward Fouquier, a pro-

FOURIER, CHARLES, was born at Besancon in
Franche-Comté, on the 7th of April, 1779; he died at Paris
on the 10th of October, 1837, in his sixty-sixth year. He
lived and died a bachelor.

He was the son of Charles Fourier, a merchant and magis-
trate (juge consulaire) of the city of Besancon, who died
when Fourier was in his ninth year, leaving a widow with a
family of four children, and a property of about eight thou-
sand pounds. Fourier was the youngest child and the only
son. The property was divided into five parts; two-fifths being
left to his mother, and three parts, one of which of his father.
Fourier's sisters married well, and have left large families.

After completing his studies at Besancon and Dijon, Fou-

This Prospectus was a small octavo volume, published in 1808,

FOURIER'S portion of the property which she left was an in-
come of 900 franes-a-year, and that was nearly all he had to
live upon besides his earnings as an agent for commercial houses.
He still continued therefore in his mercantile position in Lyon.
Little is known of his habits or his movements from 1808 to 1815, except a few incidents mentioned by himself, which lead us to suppose that he was in a state of retirement. In one of his unpublished MSS. he says, in reference to the long interval which elapsed between his first and second publications, 'It was well that I deferred the publication of my theory, for it was not until 1814 that I discovered the principle of an ideal science, the basis of which is the eye of the inquiring mind the laws of God, which it reveals in its stupendous harmony. The mind of man itself, which is of divine origin also, is the power which refracts or divides the rays of mental light into their magick beauty of variety and conjunction. Alteration of action between refraction and reflection; and prophetic inspiration is a mixed mode of mental revelation, written in words similar to human verbalism, and reflecting divine wisdom just like the sacred grandeur of celestial; he characteristic peculiarities of both; inasmuch, as it is partly reflexive without explanation, like Nature; and partly refractive and explanatory, like the word of man. It is that mental or prophetic discourse which Fourier could not find until he came to look for it in secret, the work of God, before he published his _New Industrial World_ in 1822.

In the following letter to Muiron, we shall find his reason for not coming to it earlier. Up to that period it is evident that he had consulted only two sources of divine authority and revelation, the human affections and universal nature.

The views of Fourier's theory announced in that volume made a deep impression on Muiron, who wrote immediately to the author to obtain more information on the subject. This led to a long correspondence and an interview, which tended to confirm Muiron in the high opinion he had conceived of both the author and his theory. After a due consideration of the principles and an intimate acquaintance with Fourier, from whom he gained ample information on all points of doctrine, moral, and political, the veteran disciple of the devoted disciple of Fourier. He became more anxious than Fourier himself to have the theory completely published, and undertook to furnish a part of the funds for the expense of printing, as soon as the manuscripts could be made ready for the press. Fourier immediately returned the rest of the expense of printing. The correspondence between Muiron and Fourier became frequent. It is an interesting history of Fourier's opinions and pursuits during the period of his studio residences from 1816 to 1821. The whole of Fourier's theory was written during this period, though not more than one-fourth of it has ever been published: the rest remains in MSS. unpublished at the present day. The MSS. are numbered after Fourier to his first disciple Muiron, and are now deposited in the private library of the Phalanstarian School of Science, at Paris. The writer was permitted to peruse them during the summer months of 1843. These interesting documents treat however chiefly on cosmic philosophy or prophecy, and other topics, on nature subjects, which are not attractive to the general reader.

In one of his letters to Muiron he says, 'I have positively failed, after fourteen years' repeated application, to solve the problem.' The title of this work is _General and _Prophetic Inspiration of Fourier, is the principle of prophetic inspiration. It is an abstract question, but we may give it one short paragraph of explanation.

'To preserve the light of Revelation from the spiritual Sun of the universe on the eye of the mind, with the light of the natural sun on the eye of the body, we shall have the exact analogy between the two, in harmony with the language of Fourier. There are three modes of action in the transmission of natural light: _Refraction, Reflection, and Diffraction_. In the sphere of Revelation, or the transmission of spiritual light to the mind of man, Nature is the great, real, and efficient cause. Its origin is the eye of the inquiring mind the laws of God, which it reveals in its stupendous harmony. The mind of man itself, which is of divine origin also, is the power which refracts or divides the rays of mental light into their magick beauty of variety and conjunction. Alteration of action between refraction and reflection; and prophetic inspiration is a mixed mode of mental revelation, written in words similar to human verbalism, and reflecting divine wisdom just like the sacred grandeur of celestial; he characteristic peculiarities of both; inasmuch, as it is partly reflexive without explanation, like Nature; and partly refractive and explanatory, like the word of man. It is that mental or prophetic discourse which Fourier could not find until he came to look for it in secret, the work of God, before he published his _New Industrial World_ in 1822.

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associative unity, by which the produce of social industry may be increased from three to seven fold, and the economy of general and individual expenditure improved ten-fold; so that the general and advantageous of associating to all others. This society would be a Thirty to one more in instances, compared with the present state of things. Many of his statements are exceedingly simple and convincing; but to master his whole theory of universal science would require mental application than the study of all the branches of mathematics. This is probably the reason why his writings are so little known and understood by general readers.

In November, 1822, Fourier's two large volumes were completed, and he went to Paris to have them advertised, reviewed, and sold if possible. Here he was disappointed. Few of the reviewers noticed his work, because he had no influence with the literary cliques of that city, and those who mentioned it said little more than that it was a voluminous and abstruse production.

After waiting twelve months to have his book reviewed, without obtaining any notice from the press beyond the mere mention of "voluminous abstruseness," Fourier published a summary of some one hundred and fifty pages, in the hope of obtaining a more favourable and detailed review. Here again he was disappointed. He was a stranger in Paris, and without friends of influence. He sent his work to many of the leading philosophers and intellectuals, including Constant and others, but those who were polite enough to acknowledge the present, alleged their multifarious occupations as a reason for not having time to read the book.

Unable to continue the expensive residence of Paris, and persuaded that no more influence he could not succeed with the reviewers to obtain a proper notice of his works, Fourier returned to Lyon in the month of March, 1823, where his necessities compelled him to accept the office of cashier in a commercial house, at a salary of twelve hundred francs a year. In the meantime his book had been read by some inquiring minds in various parts of the country, and a few influential persons became professed disciples. In the summer of 1824, M. Greau, a gentleman of large property, in his country, offered to contribute to the establishment of the Château de Belmont, near Lyons, where he was anxious that Fourier should remain and write a more elementary work for general readers. Fourier complied with the request, and commenced his compendium, but did not then complete it. He returned to Lyon for a short time, and in January, 1826, to Paris, where he remained nearly two years. In July, 1828 he went again to Besançon to print the compendium to his theory, which was published early in 1829, under the title, "New Industrial World, or Companion to the Sacred Scriptures with devout attention, and to have altered his mind with regard to the influence of their authority in corroboration of his science.

During the time of his last visit to Besançon, his native city, to superintend the printing of his "New Industrial World," he resided in the house of a lady, Madame Clarissa Vigoureux, who had recently become a convert to his views, and who has since then devoted her whole fortune to the propagation of his theory.

In March, 1829, Fourier returned to Paris, where he continued to reside permanently. His compendium was treated by the press with the same indifference and silence as the larger work of 1822, and his name remained unknown to the public until the year of the Revolution, 1830, when the St. Simonians in Paris began to attract general attention by their eloquence and eccentricity. As this new sect professed to take an interest in social industry and combinative unity, Fourier, being desirous of getting his works before their leaders, offering to assist them in organizing practical associations, if they were willing to avail themselves of his theory. He had made the same offer to the English Socialists some years before; but his offer of assistance was treated with polite indifference. The English and the French sects of the innovators. They believed their own theories superior to his, and declined the aid of his proffered instruction. This treat- ment soured Fourier's mind against both parties, and he rec- ommenced his geographical definitions with renewed per- sistence, which he had hitherto regarded with complacency as indications of a desire to better the condition of the people, rather than with critical severity in analyzing their numerous omissions and defective principles. In 1831 he published a pamphlet of seventy-two pages, entitled "The Fallacy and the Prevalence of False Industry," and the same year, and in the same month, St. Simon, at the instigation of the Oventir, and the Öventir. This pamphlet contains a very severe criticism of the two systems, and was probably a powerful agent in neutralizing the influence of the St. Simonians in France. Its tone is exceedingly bitter, but the arguments are irresistible. Whether his influence is greater in his own country, where his name and the names of Owen and St. Simon are very far from possessing anything like a practical and scientific knowledge of associative principles. Most of Fourier's writings display an irritable temper, and while his language is strong, he shows very little originality in his arguments. It produced however a very great sensation amongst the St. Simonians, and several of their conscientious leaders openly embraced Fourier's views, and left the St. Simonian sect.

This was the beginning of Fourier's notoriety and influence in Paris. Men of talent and of property began to group themselves around him in numbers, and in 1832 they were able to afford him the means of publishing a weekly journal, the first number of which appeared on the 1st of June, 1832, under the name of "The Phalansterie," a journal of industrial reform. Fourier edited this journal with the aid of several of his new adepts, who had left the St. Simonians. Many of his articles are deeply interesting, inasmuch as they are less exaggerated than his most enthusiastic followers.

Being surrounded by new disciples, who were not thoroughly acquainted with his theory, and who were therefore partly induced with preconceived ideas on many subjects, Fourier signed all his own articles, and demanded responsibility for them. Thus, he bore the signature of his chief editors. The journal was very shly conducted and extensively circulated, but it was too exclusively serious and scientific to meet with a sufficient sale to clear expenses. It was continued however two years, and travelled the whole of the Phalansterian Propaganda, which has since spread over all parts of the globe.

The gentlemen who enabled Fourier to commence his journal, enabled him also to form a large number of adherents to his theory. Fourier was elected president, and his first disciple, M. Just Miron, and M. Paul Vigoureux, vice-president and treasurer; M. Baudet Dulary and M. Greau, members of the Chamber of Deputies, were elected governors of the society and controllers of accounts. Shares were taken to the amount of twenty thousand pounds, and an estate of twelve or thirteen hundred acres of waste land was purchased at Conde-sur-Vergy, near Rambouillet. Buildings were commenced and other operations, almost immediately, were commenced. In the spring of 1831, before his disciples, although they had been sold to warrant such precipitancy; but his friends were so anxious to proceed rapidly, and so sanguine in their hopes of selling shares as fast as they could spend the capital in connection with his project, that he was forced to have them act strictly in accordance with the means in hand. The result was, that they were stopped short for want of sufficient capital. But M. Dulary, who was the principal shareholder, paid up all the other shares, and took the estate into his own hands until the means for continuing the experiment could be found.

In the spring of 1834 the weekly journal was also discontinued, and Fourier's theory was without an organ of publicity. The number of convert had however been increasing gradually, and Fourier's books were beginning to sell rapidly. His first volume was out of print in 1834, and the others were selling steadily. The public journals and reviews began to notice him and his system, superficially and superficially, but very insufficiently to advance the sale of his works. In 1835 he published another 8vo. volume, entitled "Foul Industry;" but it was chiefly filled with criticisms of the present state of things, and contained nothing new in regard to his theory. In 1836 a movable journal was commenced by his friends, under the name of "La Phalange;" and this journal has been steadily increasing in influence ever since. In 1837 it was published twice a month: in 1840, three times a week, and it is now a daily paper, under the name of "La Démo-
was slight, and of a nervous, irritability temperament: his stature about five feet seven inches. His physiognomy was expressive, but a faintly high brow and aquiline nose, blue and of a mild expression. His nose was aquiline and chin large, his lips thin and much compressed. His head was of the 'Gaulois' form, less oval than the Celtie, prominent in front, compressed behind, and very full on each side, and yet rather small than large. In early youth his favourite study was geography; his favourite amusements were music and the cultivation of flowers. In one of his unpublished MSS. we observed an incidental comment on an author who asserts that no man enjoys more complete satisfaction for his errors. Fourier's note is 'non ego.' My delight would be to travel, and publish maps of a superior kind. This I cannot do with my small income.' He acquired a perfect knowledge of modern languages, and French, Italian, and English; he lost all interest in improvements in it which may ultimately be of considerable importance.

In 1837 Fourier's health began to decline rapidly, and on the 10th of October he died, leaving a second volume of his 'False Industry,' partly printed, but not published. The whole of his published works consist of—Théorie des Quatres Mouvements et des Destinées génériques, 1 vol. 8vo., 420 pages, published in 1808; 'Traité de l'Association Dom- mondroïde.' Second edition, 1822, and a summary of the same, published in 1828, making altogether a work of 1448 closely printed pages: 'Le Nouveau Monde, Industriel et Sociétai're,' 1 vol. 8vo., published in 1829, with a livret d'annonce of the same, published in 1830, 664 pages: 'Livingston,' ou 'la Différence des races,' by the present author, an 8vo. pamphlet of 72 pages, published in 1831: La Fausse Industrie, morcelée, repugnante, mensongère; et l'Antidote, l'Industrie naturelle, combinée, attrayante, vaste, donc撁utique. Prod. 1 vol. 8vo., published in two parts, the first in 1835, the second in 1837, 840 pages.

Besides these books he published a long series of interesting articles in his weekly journal, the 'Phalanstère.'

A second edition of his two first works has been published at Paris by the Phalanstérien School of Science. The first edition of the others is not quite sold off, or was not some few months ago, though few copies then remained on hand.

Fourier, a theorist based on one universal principle—that of attraction and repulsion, in all spheres of life and movement. The cardinal division of this One principle or law of movement, pivots on, or terminates in, what be terms Pasa- sional or Social harmony. When stated mathematically his science resolves itself into three theorems—three aspects of universality—which are these:

Les attractions sont proportionnelles aux destinations. La Série distribue les harmonies. And so on.

These are fundamental axioms of science, and susceptible of demonstration. These axioms of science are accepted by the Phalanstérien school, and all that Fourier has been able to demonstrate with them is admitted, but when he only con- junctions and consequences, it was correspond to another in some degree of does to a very great extent, his school of science rests on his axioms, leaving him to roam alone in the romantic regions of imagination. They do not teach his speculative doctrines, but conduct themselves to practical economy. All their writings are directed to that object chiefly, and exceptionally only to mere speculative controversy.

There can be no doubt that one principle of unity governs all the infinite varieties of nature, and that these varieties may not, correspond to one another in some degree of close or of remote analogy, as well as to the One great prin- ciple in which they all unite; and hence the evident neces- sity of Universal analogy as a connecting link in nature, and a connector of the parts, it being the cause, to the infinitely great, or in descending to the infinitely small in creation.

That order is heaven's first law, the law of universal harmony. In fact, order is not a doctrine in holy minds; and that order is harmony is a unitary order, by the law of series or gradation, is self-evident, and hence the truth of Fourier's second theorem. The application of this law, how- ever, is inadmissible in superhuman wisdom only, not in fallible humanity; and hence it is that Fourier's school accept the law of order or series, as he explains it scientifically, but re- serve their free assent in cases where a special application of this law is not sufficiently supported by experience or scienti- fic demonstration. They never doubt the truth of this great law, but sometimes the correctness of Fourier's startling and prospective applications to the moral order of society.

The law of the general interest is therefore, adapted to the ends for which they are created, is a theorem which cannot be denied without imputing imperfection to the au- thor of our being, and hence the first theorem of Fourier, that order is harmony.

From this they argue that the affections and desires of human nature for individual and social happiness, are permanent impulses destined to seek, and ultimately to find, the laws of their harmonious satisfaction. He also argues that these impulses are of a social and national kind, that they cannot be eradicated from the soul, but that they may be, and too often are, corrupted by temptation, instead of being developed in har- monious discipline. Whence he concludes that the disciplines of social improvement and happiness are a new law for every people and nation, the institutions of society in moral and religious and industrial education, government and progress, are alone within the power of man to alter and improve, as a medium of due development for those impulses which God has implanted in human nature, and over which man has no control but that of his own soul, which may be good or bad, general or partial, and which may influ- ence the destiny of human souls for good or evil, though it cannot alter human nature.

Fourier's work is devoted to this problem of social disciplines in every sphere of life, but particularly in the sphere of social industry. Whether his solution of the problem be complete or not, it cannot be denied that he has thrown considerable light on many questions of the highest moment to society in general and to the State in particular.

The great sense of his mind may be gathered from his an- swer to an allegation of scepticism from the 'Gazette of France,' two years before his death. He states that there are two principles of truth which he could not deny without doing injustice to the doctrine of Christ in religion; that of Newton in science. Religious and political discussions are carefully avoided in all Fourier's writings. He professes not to meddle either with the throne or the altar. He establishes a 'School of Science,' but denies that he has any wish to form a new religion. He proclaims himself a Christian. Theology as well as politics he deems a proper subject for discussion, but not Revelation. He differs from philosophers and divines on many points of natural and Scriptural interpretation, but he is entirely in support of Revelation in the Word and in the works of God. If we have understood him rightly in his views of future unity in Christian faith, he believes the Roman Catholic religion will be universally adopted, when its ecclesiastical councils have been re-established, and the principles of love and charity reign as much ascendancy as will admit of private liberty and toleration of opinion in the Church. The unity of Roman Catholic devotion will then harmonise the liberty of Protestant opinion, and the solar light of truth will have driven all the various repugnances or destroy them in one regently impartial colour, White. Doctrinal variety and pure devotional unity appear to be the Phalanstérien view of Christian harmony.

Since Fourier's death, the progress of his theory has been rapid, in almost all the civilised countries of the world, but more especially in France and North America.

In 1840, Mr. Arthur Young purchased the estate of Citeaux, near Dijon, in France, for the purpose of commencing a joint-stock society, to try out Fourier's theory of domestic and agricultural association. The estate contains more than thirteen hundred acres of excellent land, and a splendid chateau in the centre. Sixty thousand pounds have been invested in this estate, and it is now in active prepara- tion. There exist at present ten persons residing in the estate, and two hundred farming labourers are employed in busy seasons. The Phalanstériens in France are numerous and active. In 1843 an appeal was made to his friends, who contributed to establish a 'Phalanstère' in New York, and other cities, the Phalanstériens have commenced a dozen or more practical experiments in the United States.

In England the Phalanstérien School has also its repre- sentatives. In 1840, Mr. Hugh Doherty commenced a peri-
edical in London, called the 'Morning Star,' and in 1841 this journal became a weekly stamped newspaper, under the name of the 'London Phalanx.' It was not however able to illustrate, with the help of fifteen months, a weekly paper, and in June, 1842, it was continued in the form of a small monthly magazine, published in Catherine Street, Strand, which completed one yearly volume.

They have made heart-rending progress in England, owing perhaps to the abstruseness of their writings. They have not appealed to the popular feelings and interests in this country, as in America, probably from a fear of being misunderstood and misrepresented as political agitators and sCEPTical Sociologists.

In Germany, and Italy, and Spain, books, and journals, and reviews, have been published by converts to the Phalansterian theory. In South America they have also published books and journals, and commenced two practical experiments in the Brazils. In Belgium and in Holland they are also gaining ground.

They call themselves a 'School of Science,' and object to being termed a religious or a political sect, on the ground that they meddle not with the interests of the throne or of the altar, though they claim the right of private judgment in matters of civil and religious liberty. They discuss freely also the doctrines of theology and politics, but not with a view to the subversion of established religions in Church and State. Their object in discussing principles is to enlighten the authorities, and not subvert them. They conform to the established laws and government wherever they are, and proceed to improve the industries, and to promote a harmonious intercourse with established institutions of society. They do not argue that the improvements which they contemplate in the sphere of social industry, would not ultimately modify the higher institutions of the State, but they maintain that such reforms would not be sudden or injurious to any class of vested interests, inasmuch as they would come into existence gradually.

As a school of science, the Phalansterians accept without reservation that part only of Fourier's theory which is susceptible of scientific demonstration, reserving all his speculative and conjectural assertions for the judgment of posterity; particularly with regard to marriage. They accept the principle of his discovery, the 'law of series,' as the law of universal harmony, but not the infallibility of his novel applications of that law in the sphere of moral and domestic life.

They have published many elementary works on social science and general principles. The following is a list of their most important books, but their minor tracts and pamphlets are too numerous to be named here.


English Works published in America:— 'Social Destiny,' 1 vol. 8vo., 500 pages, Albert Brisbane; 'Doctrine of Association,' 1 vol. 8vo., 100 pages, double column, small type, id.; 'Social Destiny, as published in London, by Fourier, and his System,' translated from the French of Madame Gatti de Gandon, 1 vol. 8vo., 100 pages, T. Wood; 'A Journey to the Phalanx, and Hints for Railway Travellers,' 3 vol. 8vo., 700 pages, by H. Crewe. 'The results, based upon a critical introduction to Fourier's Social Science,' 1 vol. 8vo., 170 pages, Hugh Doherty; 'The London Phalanx, weekly series, one large volume in folio, id.; 'The Monthly Phalanx,' 1 vol. 8vo., 410 pages, id.; 'Phalanstery, High Rents and Low Wages;' 'Social Maladies and Social Doctors;' 'Hints on Poor Law Legislation;' 'Position of Woman in Harmony.'

FRA, FRA, FRA, FRA, FRA, FRA

much use in the integral calculus for reducing products of
the form $X(x-a)=^m(x-b)$... in which $X$ is radical
and integral to the sum of terms of the form $K(x-a)^n$, in
which $K$ is independent of $x$. But if $X$ be of a higher
dimension than $m-1+n$, the missing term
This quotient may be easily found by the short rule for
division by $x-a$. To divide $x^n+a^n-1$... by $x-a$,
take the first coefficient, multiply it by $a$ and add the next;
repeat this process to the end, taking care to use 0 for the
coefficient of the missing term, beginning with the
first coefficient, are the coefficients of the quotient,
except the last, which is the remainder. Thus in dividing
$2x^2-2x^2+1-1$, by $x-3$, the coefficients are

$$2 - 2 0 0 1 0 1 - 1$$

The results of the rule are

$$1 0 0$$

Hence the quotient is $2x^4+4x^3-4x+4$.x-1), the process is as follows, it being seen before hand that the answer is of the second degree. We omit all the work which is of no use in the final result.

$$1 0 0 1 1$$

$1 1 1 1 1 1 2 3 6

$1 1 3 1 1 6 3 3$

When we divide $x^2-2x^2+4$ by $x-1$ the three first terms of the quotient are $x^2+2x^2-4$: two divisions more by $x-1$ give $x^2+2x^2-4x$, and then divide twice following by $x-1$, still preserving only three terms, and the result is $x^2-2x^2+3x$, and the final division by $x-1$ brings out $x^2-2x^2-33$ for the three first terms of the final quotient, that is, for the whole quotient. For verification the order of the divisions may be vary.

When all the roots of the denominator are unequal, that is, when the quantity to be reduced is of the form $X(x-a)^{-1}(x-b)^{-1}$... where $a, b, c, &c.$ are all unequal, the process for finding the reduced form of the remainder is very easy. Strike out $(x-a)^{-1}$ and make $x=a$ in the form thus mutilated; let this result be $A$. Next strike out $(x-b)^{-1}$, and make $x=b$; let this result be $B$, and so on. Then the fraction $X(x-a)(x-b)$... is the quotient, if $A X(x-a)^{-1}+B(x-b)^{-1}$... is the expression $x^2-2x^2-1$, we set down all the work as follows, the quotient being the third degree of

$$1 0 0 0$$

$$1 1 1 1$$

$$2x^2(1-x^2)=3$$

$$1 3 7 15$$

$$1 2 5 10$$

$$6x+1$$

When the roots of the denominator are not all equal, the way of proceeding which is most easy in the simple cases which generally occur in practice, will be best found from an example. Suppose $X(x+1)(x-1)$ is the fraction to be reduced. Begin with the denominator $(x-1)(x+1)$, and by the preceding rule, obtain the result,

$$x^2+1$$

$$1 3 7 15$$

$$1 2 5 10$$

When the roots of the denominator are not all equal.
and the result is
given on page 78.

More complicated examples may be seen in the 'Differentia
Calculationis' of Giordani and years later in Francesco di Carlo's work, p. 578. The
above will be sufficient for ordinary purposes.

FRAMBESIA. [SKIN, DISEASES OF, F. C. S.]

FRANCESCA, PIERO DELLA, called also Piero Borghese, from his native place, Borgo San Sepolcro, where he was born in 1408, was the chief servitor of the goldsmith, and proceeding thence to the Spanish possessions in the Interior, had finally settled in Paraguay, where he married a Creole, and had this José and other sons and daughters. He was a goldsmith, and, according to Vasari, who published the account of his work at the beginning of the century, was the first to fully develop the technique of the goldsmith, in which he was a perfect master. His works in the workshop of the goldsmith, in the city of Bologna, and in the magnificent suit of armor which was designed for him by Bolognese goldsmith. In 1517, he died in Bologna, where he had been active in directing this workshop which had been very successful in reviving the ancient art of goldsmithing, and in the year 1533, also, he died after a long illness in Bologna. He was a master of Bologna in the fifteenth century, and was a member of the noble family of the Medici.

The story told by Vasari is incorrect, as is also Calvi's account, that he died in 1517, though the latter is adopted by Giordani and Vignani in their catalogues of the works of Raphael, and character of the works of Raphael and his contemporaries. The exact period of his life is not known, but the story of his having been a pupil of the famous Italian painters, and the most perfect in his style, the antico-moderno, or a transition style between the two, is the work of Raphael, and it is said to have been very successful. Vasari, in his life of Raphael, says he was a good painter. He was a member of the Medici family, and was employed on extensive works in the Palazzo Bentivoglio in Bologna. He was an admiral colourist, and was a member of the National Gallery, where a number of his paintings are on view. The National Gallery is a museum of fine art, and is open to the public.

FRANCESCA, PIERO, son of Francesco, was a painter in his father's style, and, though far from equalling his father, was a good painter; he died in 1567. A Life of Francesco was published in 1592, and the paintings in the National Gallery are admirable specimens of his style, and the most perfect individual specimens than the other foreign pictures in the collection: they are definitely for the benefit of the public, and were purchased for the nation in 1843 for 3500.

In 1575 or 1578. His father, who was a prosperous, and a small proprietor cultivating his own land, is admitted on all hands to have been a European; but it is doubtful whether he was French or Portuguese. Francesco himself, who had a passion for everything which was exquisite, appears to have been a Frenchman; and had the name he bore may have been given him to mark his original country. Most probably however the name may have suggested this pretention to the dictator. Francesco, however, was not of this school in his life, He died in 1517, and, proceeding thence to the Spanish possessions in the Interior, had finally settled in Paraguay, where he married a Creole, and had this José and other sons and daughters. José was his eldest son.

In 1522, he purchased a house in Assunciation, and in the following year, 1523, he was in London, where he purchased a house in St. Paul's, and in the following year, 1524, he was in the city of Bologna, where he had been active in directing this workshop which had been very successful in reviving the ancient art of goldsmithing, and in the year 1533, also, he died after a long illness in Bologna. He was a master of Bologna in the fifteenth century, and was a member of the noble family of the Medici.

The story told by Vasari is incorrect, as is also Calvi's account, that he died in 1517, though the latter is adopted by Giordani and Vignani in their catalogues of the works of Raphael, and character of the works of Raphael and his contemporaries. The exact period of his life is not known, but the story of his having been a pupil of the famous Italian painters, and the most perfect in his style, the antico-moderno, or a transition style between the two, is the work of Raphael, and it is said to have been very successful. Vasari, in his life of Raphael, says he was a good painter. He was a member of the Medici family, and was employed on extensive works in the Palazzo Bentivoglio in Bologna. He was an admiral colourist, and was a member of the National Gallery, where a number of his paintings are on view. The National Gallery is a museum of fine art, and is open to the public.

FRANCIS, JOSEPH GASPAR RODRIGUEZ, Bishop of Paraguay, was born in the town of Assunciation, the capital of that country, in 1575 or 1578. His father, who was a prosperous, and a small proprietor cultivating his own land, is admitted on all hands to have been a European; but it is doubtful whether he was French or Portuguese. Francesco himself, who had a passion for everything which was exquisite, appears to have been a Frenchman; and had the name he bore may have been given him to mark his original country. Most probably however the name may have suggested this pretention to the dictator. Francesco, however, was not of this school in his life, He died in 1517, and, proceeding thence to the Spanish possessions in the Interior, had finally settled in Paraguay, where he married a Creole, and had this José and other sons and daughters. José was his eldest son.

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had the country any political relations, or almost any commercial communication, with any other part of the globe.

Before matters came to this, however, Francia's joint consulship had been terminated, in 1814, by a third pressure, into a dictatorship for three years, and then in 1817, into a dictatorship for life. Yegros, who had been all along a mercenary or useless incumberance, was of course got rid of. He afterwards, in 1819, involved himself in a diplomatic complication in a conspiracy of his former colleague: the detection and defeat of which at the same time consolidated and greatly strengthened Francia's power. It appears to have been principally during the entire first consulship of his life, that system was produced, in a period of two or three years, that the system of somewhat puny severity which has been called the reign of terror, was kept up by Francia. In that time he is said to have put to death about forty persons.

The supreme and absolute master of Paraguay till his death on the 20th of September, 1840, when he was succeeded by a Secretary, or governing junta, of three persons.

The instances of what is called Francia's tyranny as exercised on foreigners who have had the greatest noise made about them are those of his treatment of M. Bonpland, M. M. Regneger and Longchamp, and the Messrs. Robertson. Bonpland, the distinguished botanist, had set up an establishment at the confines of Paraguay and Brazil, in the district of Entre Rios, a sort of desolate land, and there was seized, in 1821, by order of Francia, and carried off into Paraguay, which he was not allowed to leave so long as the dictator had to consider himself as having any right to trespass upon the rights of the republic by his growing speculation. However, beyond his forcible detention he was never harshly treated, and he continued in the country of his own accord for some time after Francia's death, if he be not there still. Messrs. Regneger and Longchamp were two Swiss surgeons who had found their way into Paraguay in 1819, and were detained by the dictator, principally, it would appear, for the sake of their professional services. After their person were seized, Francia published an account of their adventures and of the country, under the title of "Essai Historique sur la Revolution de Paraguay, et le Gouvernement Dictatorial du Docteur Francia," which contains on the whole the best materials that have yet been given to the world for the history of Francia and his administration. As for the Messrs. Robertson, they were not detained in the country, but turned out of it. They have told their own story, rather than confusedly, in their "Letters on Paraguay," 2 vols. London, 1836, and "Spain's Reign of Terror," 2 vols. London, 1839. The most distinct and graphic sketch that has been drawn, at least in English, of Francia and his career, is in a very characteristic paper by Mr. John T. Lothrop, in the "Foreign Quarterly Review" (for July, 1843), pp. 644-659.

Mr. Carlyle has thought too much to soften some of the more startling points in the dictator's character and conduct, and to give him the benefit of a favourable doubt somewhat too liberally, it may be admitted, by comparison with the Messrs. Robertson's unmixed and unmeasured condemnation. Mr. Carlyle has derived some of his facts from a funeral discourse delivered at the celebration of the obsequies of Francia by the Rev. Manuel Antonio Perez, in which his government is lauded in the highest terms. He certainly appeared to have been the last looked up to both with respect and gratitude by the Paraguayans. Perez says that when he was dying the people crowded round the government house in tears.

FRANKALMOIGNE [Frankalmoigne] (§ 156): 'This tenure is thus described by Littleton (§ 138):' Tenant in frankalmoign is when an abbot or prior, or other man of religion, or of holy church, holdeth of this lord in Frankalmoigne; that is to say, in Latine, in liberam eademnusm, that is, in free alms. And such tenure beganne first in old time. When a man in old time was seised of certain lands or tenements in his demesne for the use and charge of the bishop, or of the abbey or priory, he retained the rents, and of the remainder he should have given the bishop or priory, or prior and his covent, to have and to hold them and their successors in pure and perpetual alms, or in frankalmoigne; or by such words, to hold of the grantor, or of the lessor and his heirs in free alms: in such case the tenant was held in frankalmoigne. From this it appears that lands which are held by religious bodies or by a man of religion, are held by tenure; but neither fealty nor any other temporal service is due. The spiritual service which was due before the Reform was thus described by Littleton: 'And they which hold in frankalmoigne are bound of right before God to make orisons, prayers, masses, and other divine services for the souls of their said grantor or feudal lord, and for the souls of their heirs, and to hold and maintain, in good and perfect condition, the land and heriot of their heirs which are alive. And therefore they should do no fealty to their lord; because that this divine service is better for them before God than any doing of fealty; and also because these words (frankalmoigne) exclude the lord to have any ecclesiastical or temporal service, but to have only divine and spiritual service to be done for him.'

On this section (§ 156) Coke has given the following remark, which explains how most lands are now held by the clergy of the church of England, and spiritual seignories in England:—"Since Littleton wrote, the liturgie or book of Common Prayer of celebrating divine service is altered. This alteration notwithstanding, yet the tenure in frankalmoigne is still continued; and such prayers and divine service shall be said and celebrated as now is authorised; yes, though the tenure be in particular, as Littleton hereafter (§ 157) saith, viz, to sing a mass, &c., or to sing a placeto et dirige, yea if the tenant be a bishop, a mass for the soul of the abbot or the bishop. Littleton hath said before (§ 119), in the case of Swayne, the changing of one kind of temporal services into other temporal services altereth neither the name nor the effect of the tenure; so the changing of spiritual services into others, altereth not the name or effect of the tenure. And albeit the tenure in frankalmoigne is now reduced to a certainie contained in the book of Common Prayer, yet seeing the original tenure was in frankalmoigne, and the same was not altered by the Act of Settlement (2 Ed. VI. c. 1; 6 & Ed. VI. c. 1; 1 Eliz. c. 3), whereunto every man is party, the tenure remains as it was before."
The statute 12 Charles II., which abolished military tenures, expressly excepts tenures in franklinigne.

Those who hold lands in franklinigne must do the service which these lands were given; these services are now determined, as Coke says, by the book of Common Prayer. The mode of compelling these tenants to do their duty is thus described by Littleton (§ 186)—"And if they which hold their tenements in franklinigne, will not do the service (as is said), the lord may not detain them for not doing this, &c., because it is not put to certainty what services they ought to do. But the lord may compel of this to their ordinary or visitour, praying him that he will lay some punishment and correction for this, and also provide that such negligence be no more done, &c. And the ordinary or visitour of right ought to do this, &c."

Since the statute of 16 Ed. I., called Quia Emptores, from the forcibly his skill in the art of printing, was established at Babington, near Munich, under which the annual can be no gift in franklinigne except by the crown. This tenure, however, as Blackstone observes, "is the tenure by which almost all the ancient monasteries and religious houses held their lands; and by which the parochial clergy and very many ecclesiastical and eleemosynary foundations hold them at this day, the nature of the service being upon the Reformation altered, and made conformable to the purer doctrine of the Church of England."

FRANKENIA, a genus of plants, the type of the natural order, is a native, for which the reason for the name is given in the genuineness, a professor of botany at Upsal, and the first enumerators of the Swedish plants in 'Speculum Botanicum.' It has a 5-leaved style, the lobes oblong, with the stigmas within. Capsules 1-celled, with three or four valves, and many-seeded. The first most remarkable instance of this is the flowers usually rise from the forks of the stem or are disposed in terminal corymba. P. pulverulenta, or the Powdery Sea-heath, has its leaves opposite in whorls, obtuse, glaucous, and the under surface powdery, with ciliated petals; a slender root, and axillary terminal flowers of a pale-red colour. This plant grows in the sand by the sea-shore in many parts of Europe and Asia; it is occasionally found on the coast of Sussex in England, but it is very rare. P. levis has clustered, linear, glabrous leaves, with revolute margins, ciliated at the base; prostrate downy stem, and terminal axillary solitary flowers. It is a native of the mucky salt-marshes by the sea-coast, in many parts of Europe and the Canary Isles. In England it is found principally on the eastern coast, and flowers in the months of July and August. The flowers are generally flesh-coloured, but sometimes white, with yellow claws.

The genus enumerates sixteen species of this genus, besides those already named as being found in Great Britain. Of those not British plants the majority occur in Africa and New Holland, and some are found in South America. P. hispida grows by the tide-line, with thin stems, which the author of the genus remarks, that the flowers usually rise from the forks of the stem or are disposed in terminal corymba.

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FRAUD, STATUTE OF. [Statute of Frauds, P. S.]

An accident, which nearly cost him his life, was the cause that the merit of Fraunhofer became known: an old house in which he lodged fell down one day and buried him in the ruins. The authorities were slow in sending help; he was exalted in a state of collapse, and the doctor said he would not be able to recover. The interest excited by the danger which the young man had escaped drew upon him the notice of several persons of rank and fortune; and these, being struck with his admiration for discovering the efforts he had made in the midst of many adversities, set about procuring for him an introduction to the celebrated Reichenbach, who received him, he being then about twenty years of age, into the great manufacture for the construction of mathematical instruments in which solar angular was beginning to be practised. When he was employed. Enabled now to study optics as a science, he used the means at his disposal to make many important experiments on light, and to construct instruments of superior kinds for celestial observations. By his discoveries and improvements he greatly increased his brightness, in which the means to which he belonged; and at length it became his own property.

Fraunhofer was a member of the University of Brabant, and the Royal Society of Sciences, and in 1822 this academy appointed him keeper of the Museum of Physics. The King of Bavaria conferred upon him the order of Civil Merit, and the King of Denmark that of Danebrog. He died in 1826, in the thirty-ninth year of his age.

His name was the first to give rise to the existence of a series of dark lines in the spectrum produced by the reflection of the sun's light in a prism of glass or other transparent medium. The prisms were formed of a material free from cements, and, in the experiments, they were so disposed on the screen, that the light entered and emerged at equal angles with the sides, by which means each of the coloured spaces in the solar spectrum on the screen were homogeneous: on examining these with a telescope, it was perceived that they contained many black lines parallel to one another and to the breadth of the spectrum; and Fraunhofer ascertained that they amounted in number to about 564; Sir David Brewster has since discovered many more. By means of a theodolite he measured the angular distances between the most strongly marked of these lines in every two of the differently coloured spaces in the spectrum produced by each of the prisms employed in the experiments; and thus he was enabled to determine with great accuracy the index of refraction for the mean rays of the prismatic colours in each of the prisms and to the breadth of these were formed, as well as the dispersive powers of those media. He observed similar black lines in the spectra of the Moon, Mars, Venus, and some of the fixed stars; also in the spectra produced by the pencils of light from the aurora borealis, and the aurora australis. An account of the observations on spectra was published in a pamphlet entitled 'Bestimmung des Brechungs- und Farbenzuer-Streuungs-Vermögens verschiedener Glieder der Erde in Bezug auf die Vervollkommnung schmuckkünstlerischer Fern-Bühne,' 4to., Munich, 1815.

Fraunhofer also made experiments on the phenomena arising from the interference of light in passing through small apertures of different forms, and through wire gratings. In these experiments the direction of a perpendicular line of light was fixed by means of a heliostat, and was examined through the telescope of a great theodolite: the apertures, which were circular, triangular, and rectangular, were formed in a metal plate which was placed before the telescope; and the gratings were, first consisted of a metal plate, which was grained in the frame. In another a frame, but Fraunhofer afterwards used glass plates covered with gold leaf or with a thin film of grease on which were ruled parallel lines at distances from one another equal to 1.4. In both light was allowed to fall on the gratings or plate of glass after having passed through a very narrow aperture: the image of the aperture appeared well defined as if the grating had not been there; on each side of the image was a broad black line. The lines were so arranged as to allow of the wires crossing one another at right angles: the aperture through which the light proceeded was circular, and the coloured spaces, which were seen on a dark ground, are de-
scribed as being very brilliant. An account of the experiments on the induction of light were published in 1840 at Munich, under the title of 'Neue Modifikation des Lichtes durch elektrische Einwirkung und Beugung der Strahlen und Ersatz derselben.'

Fraunhofer executed an equatorially mounted telescope for the observatory at Dorpat. The diameter of the object-glass is nearly 10 inches and its focus 4.5 feet and 26 feet; it contains, of 4 convex lenses of crown glass, and a concave lens of flint-glass, but the materials were compounded by himself, and the performance of the instrument is said to be superior to that of any which had been made before. A description of the telescope is given in the Astronomische Nachrichten, No. 74, 75, 76, with a memoir on the refractive and dispersive powers of different kinds of glass. In the same work is a memoir by Fraunhofer on halos, parhelia, and the like phenomena. It was this telescope that observed the formation of the small golden and lunar halos to the induction of light in the vapour of the atmosphere; and that of the larger kind, to the refraction in hexagonal prisms of ice.

(Biographie Universelle, and the works quoted.)

FRAXINELLA, the common name of a plant belonging to the genus Dictamnus, which is referred to the order Rutaceae. Dictamnus has a 5-parted, unequal, deciduous calyx; 5 unequal unigulate petals; 10 deciduate stamens with awl-shaped filaments, filiform, unequal filaments, and oblong-ovate, glandular; 2 filiform, sessile, roundish anthers; the style single, deciliate, striated lengthwise, terminated by a blunt papilliform stigma; the capsule stipitate, composed of 5 carpels, which are connected on the inside, compressed, 2-seeded.

The leaves, flowers, and stem of this plant, when gently rubbed, emit a strong lemon odour, and when bruised the scent is more powerful. The volatile oil which gives it its peculiar odour is secreted in the largest quantities in the petals of the flowers, which are covered with little glandular tubercles of a rusty red colour, which exude a viscous resinous juice.

The volatile oil from this plant is evolved in so large quantities that it will burn when a light is held near it, and, in a dark place, may be seen to take fire. It was formerly used in medicine under the name of Dictamnus olibus, and the root was considered stomachic, anthelmintic, and aperient. Stoekert, to whom we are indebted for the re-introduction of so many European plants into modern medicine, recommended it in epilepsy, intermittent fever, and anaemia. The plant used in medicine under the name of Dictamnuscreticus, the Dictany of Crete, is the Origanum dictamnus of Linnaeus.

(Fraxinum, P. C. S.)

It has 4-5 pairs of leaflets, alternate, ovate-lanceolate, acuminate, finely serrated, the racemes long, the calyx nearly equal. It is a native of the Alpaean Mountains.

There are several varieties of Fraxinella found in gardens, with white, red, and purple flowers. They will grow in any common garden soil, and may be grown from seeds, which ripen well in this country.

(Don, Gardener's Dictionary; Burnett, Outlines of Botany; Lewis, Handbook of Medicinal Plants; Rush, A New Medical; FRAKINN: [Chemistry, P. C. S.])

FRAZERA, a genus of plants belonging to the natural order Gentianaceae, named after John Frazer, a collector of North American plants. It has 4-cleft, deeply-parted calyx. The flowers are white, pale, or greenish, pure white, more or less circular glandular in the middle of each segment. The stamens 4, enclosed, filaments filiform; the capsule compressed, partly margined, 1-celled. The seeds few, imbricated, elliptical in section, with the face of the valves concave. F. carolinensis, F. Waltersi of Michaux, is the only species of this genus. It has a biennial root; stem from 3 to 5 feet high, erect, sub-quadangular, and smooth; leaves opposite and verticillate, oblong, lanceolate, from six to nine inches broad; flowers in several aggregate clusters. This plant is indigenous in the swamps of the Carolinas, and is found on the borders of lakes in Pennsylvania and New York. The whole plant has a very stately appearance, and is the most beautiful of the Gentianaceae. It grows on the banks of the Potomac, where, when examined the fruit, it might be mistaken for a species of that genus. The root yields a powerful bitter, nearly as pure as that of quassia, and wholly destitute of aroma. It is fully equal in its medicinal effects to gentian, and when fresh is said to be emetic and cathartic. The roots have been imported into Europe as a sort of Calumets, and hence have acquired the name of 'the American Cynanchum Calumbas.' F. carolinensis blooms and flourishes best in a peat soil. It should be protected the winter after being raised from seed, or that preceding its flowering.

(Fredric's Gardener's Dictionary; Lindley, Flora Medicinal; FREDERIC WILLIAM III., King of Prussia, was the eldest son of King Frederic William II., by his second wife, Friederike Louise, princess of Hesse-Darmstadt; he was born on the 3rd of August, 1770. Frederic William, the subject of this notice, Frederic of Prussia, was the Great, under whose superintendence he was prepared for the important functions which he was destined to discharge on the throne of Prussia. Frederic II. was extremely fond of the court in the young princess owed her grandeur to the genius of a warrior, the sword was the emblem of her future prosperity; and the hero of the Seven Year's War was much pleased whenever his youthful grand-nephew announced by some sprightly remark or spirited answer that courage and enterprise were principles of his mind. On one occasion the young prince was playing with a ball in the royal gardens in the presence of old King Frederic. The ball having rolled to the feet of the king, he picked it up and said, "That is a valuable ball for a prince!" On the young princely's face, and his hands on his sides, the boy called out, 'Will your majesty give me the ball or not?' The king laughed, and giving the ball up, 'Sure Fred,' he cried, 'they will not take Silisie from thee!' The prophecy proved true, for Silisie had been lost in the French war. Frederic William III., by Napoleon in 1807, Silisie remained with his lawful sovereign. The chief tutor of Prince Frederic William was Benish, one of the king's privy councillors; General von Backhoff introduced him in the military sciences: both are said to have been honest men, but unfit for training the mind of a youth; and well-informed writers of that period assert that the education of the prince was bad. Frederic William was sixteen when, through the death of his father, the king of Prussia made him the prince of Hesse-Darmstadt: this was the death of young Prince Frederic William II. having succeeded King Frederic. During the reign of Frederic William II. Prussia lost much in general opinion. The successor of the great Frederic was utterly unable to maintain the dignity of a kingdom exposed to so many chances as Prussia then was. Jealousy more than interest induced him to declare the equilibrium of Europe endangered through the combined war of Austria and Russia against Turkey; his unjustifiable interference in the domestic disturbances in Holland, this of 1795, as war-Prince, against the French republic, and, above all, his conduct towards Poland, in its two last partitions, placed him in the eyes of liberal Europe among the worst of tyrants; and the system of intestine Prussia, which he established, made him the medium of his minister Widler, into the administration of his kingdom, exposed him to both hatred and ridicule. The haughtiness which he showed in his conduct towards the French republic seemed to promise that he would prove a faithful ally of the powers that were united against his state if it were only through fear of disgracing himself by negotiating with the 'republican mob.' Great was therefore the surprise of Europe when he concluded with France the separate peace of Basel in 1795. That peace, however, would have been a wise act, but for the neutral position in which it placed Prussia at a time when all Europe was arming—a position which was more dangerous than a protracted war with France. Death saved Frederic William from repentance. He was assassinated, on the 16th of November, by a madman. The king of Prussia's son and successor. Frederic William III. succeeded his father on the 16th of November, 1787. He had already distinguished himself at the Congress of Vienna, and at the Congresses of Frankfort, wrenched from the hands of the allied powers a part of the Prussian province, Hesse-Cassel, and the Polish capital, Warsaw, was then a provincial town of Prussia; from this portion of the monarchy the king
derived more nominal than actual strength, and among its inhabitants there was not one in ten thousand whom he could trust. The character of Prussia had been squandered away by Frederic William II. in his campaigns in Holland, France, and Poland, and a considerable debt, contracted by the same king, now added to the difficulties of his kingdom. In 1804, the King of Prussia, taking advantage of events that had happened in Europe, now treated Frederic William as a traitor to the holy cause of kings. Their astonishment was still greater when, after Napoleon had crowned himself Emperor of France, on the 2nd of December, 1804, the King of Prussia started a war, as a war of self-defence, against the joint and immediate purpose of France, and the great states of Europe to recognise him, and to accept and bear the Grand Cross of the recently founded order of the Legion of Honour, in acknowledgment of which the king sent Napoleon the Grand Cross of the order of the Black Eagle. It seemed to be settled that the King of Prussia was to receive no more presents from the power that was the price of his neutrality and friendship, as soon as it could be occupied with safety. Napoleon used to speak of Frederic William in terms of the highest esteem, but these sentiments showed only a weakness of mind.

In 1805 Napoleon's designs against England were frustrated through a new coalition headed by Great Britain, Austria, and Russia. From Boulogne, where the French army had been concentrated for the intended invasion of England, it advanced by rapid marches to the confines of Austria. Berlin was the centre of the most important negotiations; for the king's aid seemed to promise victory to the side to which he should incline; and a large party in Prussia, tired of the useless and expensive war against his confederates, was treated with contempt by Napoleon, and that it was now time to fight against the usurper. Frederic William, however, still professed friendship for Napoleon; he assembled a strong army on the frontier of Prussia to assist his ally, and he opposed the one to the other. The Emperor Alexander now demanded a free passage through Silisia for a Russian army, which was either to join the Austrians in Bohemia, or more probably to occupy Hanover, and having met with a refusal, he declared war in an impetuous tempest. The King of Prussia answered that his generals had received orders to treat any Russian who should set his foot on the Prussian soil as an enemy. There was little doubt that in this struggle Frederic William would remain on the side of the French; one of the belligerent parties should have been weakened by defeats, and then join the victor and have his share in the spoil. But no sooner had the war broken out than the violation of the Prussian dominions in Saxonia, by Marshal Bernadotte, showed how little Napoleon cared for the Prussian king—or rather, how well he knew that Frederic William was a man of indecisive character, who would not avenge an insult unless he could do it with impunity and profit. However, he induced Frederic William to disband von Hardenberg, and to appoint in his stead Count Haugwitz, a nobleman of immense wealth, great talents, and distinguished as an able statesman, but whose political principles were too much like those of his master. Prussia with safety through the sea of dangers on which she was then embarked. Haugwitz hastened to the head-quarters of Napoleon in Morocco. A battle between the hostile armies was unavoidable, and the general opinion in Prussia was that Haugwitz was to present his master's ultimatum to Napoleon, and either to compel him to make peace with Austria on the status quo, or to have a new enemy in Prussia. One hundred and fifty thousand Prussians were on the Moroccan frontier, ready, as it seemed, to join the Austro-Russians, from whom they were separated only by a few days' march. No ultimatum was tendered to Napoleon. Haugwitz waited till the Austro-Russian army was annihilated by Napoleon in the battle of Austerlitz on the 2nd of December, 1805, before the after the battle impunity congratulated Napoleon in the words 'Dieu merci, nous avons vaincu.' If I had lost, said Napoleon to his ministers, after Haugwitz had left him, 'I would have said the same to the Emperors of Austria and Russia.'

Only thirty days after the battle of Austerlitz (15th of

* In a secret article of that Convention, Frederic William promised to join the coalition against Napoleon unless he withdrew from Germany before the 15th of December.
December, 1803, a treaty was concluded at Vienna, through Haugwitz, between France and Prussia, which astonished all Europe, caused deep indignation in England, and filled all Prussia with shame and disgrace. France her dominions in Francia, the violation of which had caused so much indignation in Germany, and received as the reward of her duplicity the electorate of Hanover, though of course with this general policy in France it would be a party should be made. Hanover had been occupied by the French in 1803, against the law of nations. In that year George III. renewed the war against France as King of Great Britain and Ireland, but not as Elector of Hanover; and found to establish that distinction, he sent a circular letter to the courts of Europe informing them that Hanover was out of the question, and was consequently a neutral territory. In this case however, as in so many others, Napoleon disregarded international law; and the consequence was that Hanover was first occupied by the French, and afterwards by the Prussians. According to the condition on which Prussia was put in possession of Hanover, she could only hold it as a trustee for the Elector King George III.; but a second convention, concluded at Paris on the 15th of February, 1806, showed that Frederic William intended to annex Hanover to his dominions, which he actually effected, declaring that he had received Hanover as a lawful conquest of Napoleon. Thus a new annexation was added to the called liberal and extravgant terms, committed an act of robbery through which he violated the law of nations no less than the rules of political decency. His policy in those transactions was most severely but most justly commented on by both Houses of Parliament, and the English historian, called loud and hissing of Prussia without a careful examination of those debates would fall far short of doing what truth and justice demand.

Prussia soon received the due punishment for the duplicity of her government. The first consequence of the first infringement of the treaty of Paris was a declaration of war by Great Britain; in a few months several hundred Prussian ships were seized by the English cruisers; and England's ally Gustavus Adolphus IV. of Sweden occupied the duchy of Lauenburg, an appendix to the electorate of Hanover for Germany, and threatened to invade Prussia. However, as neither Great Britain nor Sweden was able to injure Prussia much by land, King Frederic William hoped to settle his differences with those powers and to enjoy the profits of his neutrality, but he was roused from his dreams by the insolent conduct of Napoleon, and at last brought to see clearly his dangerous position. The history of those times shows plainly that in such a contest as was occasioned by the French revolution, there was no last nor nearest one. But what was in direct contact with French influence, and that there was no chance left but to fight either for or against France. In the struggle against French aggression, Great Britain, neutral France, and Austria, often experienced but had not differed—were foremost in showing that perseverance and consistency in political principles that should characterize great powers. There was less stability in the policy of Russia, it was governed by principles which, by selfish and ambitious plans; but Russia could waver, because political faults or want of character did not expose her unwieldy body to the danger of being overthrown by a single blow. But how could Prussia, the neighbour of France, stand untouched by that violent storm, when distant Portugal was summoned to surrender, and did surrender her position among the kingdoms of Europe at a day's notice? And even Turkey was so deeply engaged in the political issues of Europe that she too was under the dissolving spirit of the Revolution, although the elements of her political existence had no affinity with those on which the imperial throne of France was based. The king and statesmen of Prussia had ill understood the French revolution.

As to the personal character of Frederic William, he was considered to be a just man, of plain understanding, more admired by his subjects for the qualities of his heart than those of his head, and almost disposed to admire his genius. There is no doubt that Napoleon expressed his real opinion when he spoke of him with contempt, and his contempt changed into animosity in proportion as the Prussian cabinet damaged his plans without exactly thwarting them. On crossing the Rhine, he sent a messenger, who caught Frederic William in a trap from which he could not escape without becoming either his vassal or his enemy; and matters being once in this condition, the French emperor boldly proceeded towards pushing him to extremities. The foundation of the Rhenish confederation, which, as Napoleon openly said, would be as useful to him against Prussia as against Austria, was completed by the first cabinet after it was completely established, though it would seem that such a union of most of the members of the German empire would not even have been proposed to any of them if the Mediations of Prague had not been regarded by Napoleon with that respect and deference which he owed to the head of one of the great European kingdoms. Another provocation was the occupation by the Grand-Duke ofberg, Murat, who was the brother-in-law of Napoleon, of the island of Reichenau, Dietz-Orange, the brother-in-law of the King of Prussia; and perhaps a direct order of Napoleon only could induce Murat to take possession of three abbeys in Westphalia which had belonged to Prussia since 1803. In order to conciliate Frederic William's anger at the establishment of the Rhenish Confederation, Napoleon, with apparent friendship, proposed to him to form a similar union in northern Germany; but, with still more manifest disrespect towards him, he ordered the Hanover-Town not to adhere to this new confederation, because he would take them under his immediate protection, and he secretly enjoined several princes in northern Germany to refuse any closer alliance with Prussia. At the same time Napoleon, as it is said, had parliament of the grand minister of Prussia, was maliciously attacked in the French official newspapers; nor was there lack of articles in which Frederic William was ridiculed, or the pride of his queen provoked. The majority of the Prussian nation, however, quietly welcomed his comments. His language against France became the louder, and he listened to the prophecies of the southern Allerheiligen, who promised to assist him with a powerful army if he would wage war with France, and in order to make a strong impression upon the king and to show him that he was in earnest, he declined to ratify a treaty of peace with France, the result of those long negotiations which were carried on between that country and Russia ever since the peace of Pressburg between France and Austria in 1805. Under such circumstances hostilities between Prussia and Great Britain were threatened, and Frederic William sent his ultimatum to Napoleon, demanding that the French armies should immediately evacuate Germany and retire beyond the Rhine; that no German prince not belonging to the Rhenish Confederation should be employed to resist the principal powers of the Northern Confederation; and that the Prussian territories occupied by the Grand-Duke of Berg should be restored to Prussia. This ultimatum was rejected by Napoleon, who gave the king a written order to send his army on a campaign in Thuringia, and thus the war broke out on the 9th of October, 1806. The Prussian main army was in Thuringia; it was composed of troops who, down to the nearest drummer, thought themselves equal to those warriors with whom they had fought the war of 1806. It was invincible, and the numerous and well-disciplined contingents of the Elector and the Duke of Saxe, the Elector of Hesse-Cassel, the Duke of Brunswick, and several other princes, who had concluded an agreeable and advantageous arrangement of mutual co-operation, were in readiness to give him all the forces with which Frederic William thought himself able to bring his material means into action against the French power.

Several millions of Prussian subjects were Poles, more ready to fight against than for their king. In the electorate of Hanover the Prussians were regarded as usurpers, and thousands of the male inhabitants, headed by gentlemen of the first families of that country, had left, and were still fighting under the flags of their countrymen against the French in Sicily, Spain, and Portugal. In the western part of the monarchy there were several old possessions of the House of Brandenburg, the inhabitants of which
were among the most warlike and most loyal of the Prussian subjects; but in those which had been acquired since 1808, the people, mostly Roman Catholics, showed little sympathy for the king, while the wealthy nobles either served in the Austrian army or lived in proud retirement at their country seats in Westphalia. Different from these were the inhabitants of the ancient dominions of the house of Brandenburg in north-eastern Germany; and even in Silesia, though it had been annexed by the Revolution, as many as two-thirds of the inhabitants were Roman Catholics, King Frederic William could reckon upon as many loyal servants as he had subjects there. In these parts the peasant now enjoyed perfect freedom both in the household and in his occupation, as the owners of noble estates in their agricultural labours and to pay them tithes and similar contributions. But the vicious system of government education, and still more the social influence of the petty nobles, had a demoralizing effect upon the hearts and well-being of the people. The general speaking the Prussian of that time was more like a serf than a free man. To bring men down to that condition was however consistent with the plan of the government, because everything, down to the most trifling transaction of daily life, was under its immediate inspection; and blind obedience was the principal virtue of a Prussian citizen. The nobility were considered the main support of the king and the kingdom. But that nobility differed widely from what we understand by nobility, or by the nobility of the real German nobility, who previous to the dissolution of the empire participated in the government of Germany, as princes, counts, or knights of the empire, there were very few who retained more independence. Practically, the possessions of the House of Brandenburg there were none of that class. The cause of this was that Brandenburg and all the other German provinces east of the Elbe were originally inhabited by people of Slavonian origin, who were subdued by a few great barons of northern Germany, especially the dukes of Saxony of the house of Anhalt; and these barons alone formed the nobility in those provinces, as the term was then understood, namely, peers of the empire. But those barons, like all other peers, were acknowledged as such by the emperors, the Duke of Pomerania and the Duke of Mecklenburg, who, by submitting to the supremacy of the emperors, became peers of the empire, and henceforth belonged to the German nobility. A protracted resistance of the Slavonian population against their conquerors occasioned long and bloody wars, in which more than one-half of the oppressed race perished, while others emigrated into Poland. In order to keep the rest in subjection they had recourse to various modes of punishment, and in the last resort, a system of colonization was carried on in those provinces, of which the reader will find an excellent account in Von Werneke, Die Deutschen Colonien in den Wendschen Landern, and the main features of which were these:—A few of the officers and noblemen being allowed the possession of their estates, either as freeholders or as vassals of the conqueror; the bulk of the native population were made bondmen, and one part of their lands was given to the knights and other freemen who had assisted the German conqueror in subduing the country; and the other part was divided among thousands of German colonists, mostly Saxons and Westphalians, who were invited thither by the conquerors, and either lived as farmers or settled in the ruined towns. Henry the Lion, Duke of Saxony, was particularly successful in making Slavonian conquests, and he also was the first to introduce a regular system of colonization. The extent of country thus colonized and gradually Germanized was so great that it was not until the latter part of the eighteenth century that the last vestiges of the old Slavonian population could be found. This colonization was resented by the Slavons, as well as by the inhabitants of the countries on the Baltic, and the former was absorbed by the German colonists, while the latter was little regarded by the government; but it served to make those barbarous people into useful and industrious subjects. This sketch will show that the present kingdom of Prussia is originally a German colony, and although its assimilation to Germany was rendered complete through the loss of its cities and the reduction of its inhabitants, traces of its origin were still visible in 1808. The freemen who had received larger estates in those parts obtained the same privileges which the large landowners possessed in other parts of the kingdom, and the full location of their province; and they rendered knights' service to their prince, each bringing with him as many men as his estate would allow. The dignity of knight having become hereditary in their families, they claimed the title of nobles also, and as early as the sixteenth century the members of this class, or the landed gentry, were called nobles by courtesy, and they finally had the law and the right, thus constituting the lower nobility, but being still considered as inferior in rank to the higher nobility. In the time of Frederic William III. this class had lost their political privileges; but they took precedence of other gentlemen, from whom they were distinguished before the Revolution. As much as the places of officers in the army and in the higher branches of administration were nearly exclusively conferred upon them; nor could any man obtain a place of considera- tion in the government except by the merit of his family or some patent or immemorial prescription entitled to put the prefix Von before his family name. In consequence of these practices the whole class of petty nobles became the born servants of the crown, and we cannot wonder that they were proud of being rated upon as such. And truly, the service they rendered towards the government and the king. Most of them depended entirely upon the crown for their livelihood, for they were, generally speaking, not rich; swarms of younger sons had no property, and no other occupation was considered beneath them but that of the army or the numerous places in the judiciary. Such persons would seldom practise the law as advocates; not independence, dependence on government was their pride. There can be no doubt that it was as waving as their fortunes: owners of a country that draws its riches principally from the trade in corn, of which it produces four times more than it consumes, they were proud or humble according to the price of corn in England, and a falling off in the London market sufficient to bring some dozens of haughty landowners at the foot of the king who would otherwise have continued the independent occupations of their forefathers. The vanity and insolence of the officers of the army were a great height. Every new army officer represented a part of the glory of the great Frederic, and he who had served in the Seven Years' War was promoted to the highest military honours, however unfit he might be for the rank. Hence commands of the highest importance were given to officers broken by age, or envied by an idle army, the great many of them being mere courtiers and soundrels, void of every principle, virtue, and honour. A colonel of the king's guard, when he set out with his regiment and was cautioned to be on the watch against such an enemy as the French grenadiers, cried out, A shame it is for me to have the title of colonel, while I am of the French! Sticks and horsewhips are the weapons they ought to be beaten with.' This anecdote is from the work of Bishop Eylert, who is anything but a detractor of Prussian virtue. If King Frederic I.'s Cullum had possessed a bare justice, he would have discovered that his hopes rested on a rotten foundation, and that he was going to fight against the best general and the best troops of Europe, with an army whose natural courage and excellent discipline were led to the field by vanity and overbearing insolence.

The war broke out on the 1st of October, 1806: a fortnight afterwards the glory of the Prussian name was prostrated on the field of Jena. The king beheld most gallantly in the hot sorry sight two hundred and twenty regiments, and his cock was pierced by bullets. "Another fortnight, and Napoleon entered Berlin. The Prussian army was annihilated: corps of 20,000 or 30,000 men, commanded by heroes of the Seven Years' War, and good day to the sharpshooters of the French, Spandau, Stettin, Cstrin, Hameln, Glogau opened their gates, before their walls had been touched by a cannon-shot; Magdeburg surrendered without resistance, though occupied by a garrison of 20,000 veterans, who were to defend the town with the greatest bravery. In the Seven Years' War,' wrote Frederic William to his queen, 'Prussia stood alone against Europe, and was often in a more dangerous position than now: we are not alone now, and the greater part of Europe is favorable to us. Prussia having been victorious in the Seven Years' War was still considered as a proof that she would always remain so; but there is a difference between talking of great things and
doing them. The assistance of Russia only delayed the ruin of Prussia. In the battle of Eylau (8th of February, 1807) both the French and the Russians claimed the victory; but on the 9th of February, the anniversary of the battle of Marégné, the fate of Prussia was decided in the field of Friedland. A few days afterwards Napoleon entered Königsberg, his troops pushed still farther on towards the Russian frontier, and before the month of July the whole of the Prussian and the largest part of the Austrian dominions were in the hands of Napoleon and the German allies of Prussia, namely, Saxony and some smaller states. The town of Tilsit was chosen as the place for the ensuing negotiations. The three sovereigns were to meet on a raft constructed on the river Niemen, which flowed between Napoleon and Russia. The first interview took place between Napoleon and Alexander alone, on the 26th of June, 1807. On the following day Alexander presented Frederic William to his visitor. Napoleon was haughty, sometimes bitter; Frederic William, worn out by care, showed himself cold and reserved, speaking little, yet betraying his personal feelings towards Napoleon. Some days afterwards Queen Louise arrived, and it was expected that she would succeed through his amiable character and his talents Napoleon to form his conditions; for it was already known that he did not intend to give back many of his conquests. But so far she was from making the slightest alteration in Napoleon’s intentions, that he treated her with an air of contempt and ridicule, which he guessed very well the motive of her presence at Tilsit. When, in the course of the negotiations it became clear that Frederic William had to cede all his dominions west of the Elbe, the question in vain tried to persuade Napoleon to give Magdeburg back, and it is said that she threw herself at his feet, imploring him with tears to restore that great fortress to its former master. But this was also of no avail.

Peace was concluded at Tilsit on the 7th of July, 1807. The first article of this peace, referred to in the paper, was a proof that Napoleon not only despised Frederic William as a man, but wished to make him feel it, for the article begins with these words: ‘Moved by esteem for the Emperor of Russia, and in order to give a proof of his earnest desire to unite the Russian and French nations through the bonds of friendship and unalterable confidence, the Emperor Napoleon consents to give back to the King of Prussia part of his conquered kingdom.’ Upon this follows the description of those territories which Napoleon gave back, but not of those which the vanquished party ceded, as is generally the case in transactions of the kind, and this circumstance is another instance of Napoleon’s desire to humble his unfortunate enemy. By this peace Frederick William lost the greater part of his kingdom, all the territories west of the Elbe, and nearly the whole of his Polish dominions, altogether about 70,000 English square miles, with a population of 6,000,000. The Polish dominions were given to the Elector of Saxony, who had assumed the title of King of Saxony, as the grand-duke of Warmen, except the district of Bialostock, which Russia received; and thus the Emperor Alexander was rewarded at the expense of his unfortunate ally. Out of the German dominions was created the new kingdom of Westphalia, and some parts were given to Saxony and the grand-duke of Berg. The king was further required not to prevent any German prince from adhering to the Rhenish Confederation; to promise to become a member of the Rhenish Confederation at the earliest time; to reduce his army to 40,000 men, and to pay 146,000,000 francs (nearly 6,000,000. sterling) to France. Till this money was paid French troops were to occupy Berlin and the principal fortresses of Prussia. This blow prostrated Prussia, and reduced one of the great monarchies of Europe to the rank of a third-rate power. The remaining part of Prussia was completely exhausted. Upwards of 7,000,000 francs sterling had been paid during the wars of liberation, the title of tributary or fine, according to the circumstances; as much in money or in value had been taken by the French soldiery, and wherever the French had been quartered—and they had been quartered in all parts of the kingdom—the houses were burned, the cattle taken away. Under these calamities the king remained calm, and never for one minute betrayed any symptoms of despair. The reorganisation of his kingdom occupied all his thoughts. Such a sudden downfall of his power and glory at last taught him that he had laboured under a most fatal mistake, that his glory was that of his ancestors, and his power a phantom. He began to fear the plan of removing the causes of so much evil, and of introducing radical reforms into all the branches of administration; and he carried his plan out with a patience, a resignation, a perseverance for which he deserved more praise than he deerved blame. According to the treaty of Tilsit, he was deprived of Berlin, and the bishoprics taken away. No sooner was the peace concluded than he proceeded to St. Petersburg; he afterwards lived at Memel and Königsberg till the French troops evacuated Berlin, when he returned to Potsdam. It was not till 1809, after several years of three months. Most of his ministers, and many high functionaries, were dismissed, and the Baron Von Stein appointed prime minister. Those among the generals who had believed that a large field, or shamefully surrendered the strongest fortresses, were weeded out, and those who had behaved well were promoted, and among these were the generals Scharnhorst and Gneisenau, the regenerators of the Prussian army, and the brave Blücher, who alone saved the Prussian name from internal disintegration and treachery.

Napoleon having disposed of Prussia, the king was obliged to dismiss him; he had to dismiss Hardenberg in his stead, who however acted in the same spirit as his predecessor. The blows inflicted during this period were as follows:—The last remnants of the bondage of the peasantry were abolished; the difference existing between gentlemen who had the prefix Prince, and those who had the prefix Baron, was wiped out. The king with regard to their capacity to hold commissions in the army, in the judicature, or in any other branch of administration, was abolished, and the king solemnly declared that henceforth merit, talent, and learning alone should be his guiding principles; wealth, trade, and the exercise of all mechanical arts, were made free, and the existing corporations with their exclusive privileges were abolished; the municipal corporations in the towns received (1809) privileges of self-government of a newly commercial character, so that almost all the reforms intended to create a nation of independent men, and showed that Frederic William had been mistaken when he considered the descendants of the first conquerors as the chief support of the state; all difference between these, the descendants of the first German settlers, and even those of the subdued race, was now abolished for ever. The military system was radically reformed: every subject able to carry arms was declared under obligation to fight in case of necessity, and to serve in the army three years: so that a single army was apparently only 40,000 men strong, it was really much stronger. There is no doubt that Frederic William had a personal share in these reforms, and though he did not design them, he did not oppose them, and they were the actual originators. The greatest difficulties in the reformation of the kingdom arose from the state of its finances; a system of economy was therefore introduced of which history offers few parallels. Frederic William set a noble example by the payment of the duties on salt and the customs duties on coal, which had been paid for many years by foreign states. When the levies of the customs duties were suspended, he had recourse to a great many reforms, and the collection of duties was facilitated, the king approved of the plan of establishing a university at Berlin; and he showed much zeal in its foundation, which took place in 1810. He also invited distinguished men from
other parts of Germany to assist him in his difficult task of regenerating Prussia: the historian Niebuhr, who deserves so much praise for his indefatigable conduct in this period, had expressed his opinion that the whole population was in a state of deep despair, and that the very idea of Prussia was indeed a byword for destitution and disorganization. Napoleon looked with suspicious contempt till he became acquainted with the existence of the 'Tugendbank' or the 'League of Virtue', which in- duced him to undertake the organization of the army, and perhaps to form the plan of ruining her entirely at the first opportunity. That league was a secret association of patriotic men, and women, the object of which was to promote every social and political virtue, to raise the broken spirit of the nation, and by the moral reformation of the people to enable it to strive for independence at the first dawn of possibility. The queen Louise was one of the principal leaders of this association, and some say that she first conceived the plan. The power of Napoleon that no one could foretell when Prussia would find an opportunity of breaking her fetters.

During the five years that followed the peace of Tilsit, Frederic William was the humble vassal of Napoleon, who both rewarded and encouraged every opportunity of humiliating and weakening him still more. The means which he employed had however some- times the contrary effect, and in one instance he showed his anger at being disappointed, in very strong terms, Napoleon had been induced to stay his hand. The liberating decree, which included all the territory occupied by the French, was never allowed to go into execution. Though the Prussians could sell their corn, hemp, and timber, and Napoleon expected that as Prussia had already suffered so much, he would soon lose the last chance of raising money, and thus give him a pretext to put the whole country under his advertis- ed rule, she had not to pay her debt. Just at the time when Prussia was reduced to such a state that the royal family, after a short and a dishonorable retreat to Frankfort, had no better destination than the miserable mechanic, and the king's plate and jewels were at Hamburg to be sold, an immense quantity of English goods was discovered at Stettin, and in some other sea-ports. The Prussian officers specially and secretly sold them at war prices, and the money thus raised—1,000,000, sterling as some say, or 700,000, according to others—was employed in diminishing the French debt. When Napoleon was informed of the fact, he was outrageous, but it was then too late to seize the goods and put the money in his own purse.

In 1812 Napoleon set out on his campaign against Russia, and Frederic William was under the painful necessity of joining Russia, when peace was made; a separate treaty was made with the emperor Alexander. At Dresden Napoleon was received by a host of potentates. Among them was Frederic William, but though he was obliged to bow, he did it without any servility, spoke very little, and by re- served and dignified deportment increased the ill feelings of Napoleon against him.

If Napoleon had been victorious in Russia, Prussia would have disappeared from among the kingdoms of Europe; and Frederic William and his people would have been more unfortunate than even Prussia. The Prussian contingent fought under Marshal Macdonald, on the extreme left of the French, which was operating against Riga in the direction of St. Petersburg, and the Prussians behaved with conspicuous bravery for the whole campaign. In consequence of Napoleon's retreat from Moscow, the left wing of his army retreated also, but slowly. Closely pressed by the Russians, the Prussian general York, the descendant of an English family settled in Prussia, suddenly met them with 20,000 men, and was defeated. He was a German, who was afterwards created Prince Sabalkanski for his passage over the Balkan in the war between Russia and Turkey, in 1829. A few days afterwards, 30th of December, the whole Prussian army was defeated at Eylau, about 30 miles from the French.Attachments and accessories. From the account of which the Prussian army retreated into Prussia, and all hostilities between the corps of York and Diechitz ceased. York had no authority to make such a convention, though the French pretended he had acted under the orders of his master. The Prussians were then not convinced of the neutrality of Prussia, and were determined to prevent Prussia from being treated as an enemy, for he knew that now or never Prussia ought to break her fetters. Napoleon's wrath at this unexpected event was indescribable, and he sent a threatening letter to Frederic William, de- manding that York should be depriv'd of his command, and be tried by a court-martial for high treason. Frederic William was then so much alarmed that he could not resist the demands of Napoleon, who had brought upon him the fate of King Ferdinand VII. of Spain. He consequently declared the convention of Poarum null and void, and endeavored to be at peace with the empire, and dissolved the orders of Napoleon would have brought up upon him the fate of King Ferdinand VII. of Spain. He consequently declared the convention of Poarum null and void, and dissolved the orders of Napoleon; the French entered into a series of investigations of the case took place, but it was soon dropped, and subsequent events showed that, although without orders, York had acted according to the secret wishes of his royal master. No longer safe in Berlin, the king hastened to Prussia, where his son was determined to leave the house of Orange, Alexander. On the 28th of February, 1813, he signed a treaty of peace and alliance with Alexander of Kalisch, in Poland, but as yet no war was declared against France, and the remnants of the French army, which retreated through Prussia, were hospitably received by the inhabitants, although they brought unspeakable misery over the country. At last, on the 17th of March, 1813, Frederic William declared war against France, and issued the famous proclamation to his subjects which roused the whole nation. No man, having noblemans to the meanest ploughman, in arms against the foreign usurper, and made them ready to sacrifice their lives and the remnant of their property for the delivery of their country. The Prussians were roused, general Henry, the principal, the emperor of the French, the foreigner, the prince of the Blood, the Polish, the Russian, the Austrian, performed under the direction of aged veterans, the duties of the field. When the French, again victorious, were driven from the dead on the fields of Lützen and Bautzen, many a veteran of Napoleon was struck with surprise when on stripping the corpse of a slain enemy, he saw the naked body of a woman clad in the rough garment of a Prussian grenadier. One feeling united the whole Prussian army against the general; and supported by the general enthusiasm Frederic William was at last enabled to act decidedly, because he had now only to follow his own heart and was no longer in that position where his resolution was wavering under the influence of considerations from which his intellectual powers were not strong enough to extricate himself with dignity. In two pitched battles at Lützen, on the 2nd of May, and at Bautzen, on the 20th and 21st of May, Napoleon was victorious over the combined Prussians and Russians; but neither of these victories had any important consequences for him, and so far were the allies from being downcast, that they retreated only a short distance, and immediately reassumed a threatening attitude. Where Napoleon did not command in person, the discipline of his army was not properly established, and he was frequently surrounded by the populace, and the soldiers were regularly beaten; and he accordingly listened to the pro- position of Frederic William and Alexander to settle their differences peacefully. They made a truce at Potschowitz on the 7th of June, and the congress was assembled at Prague under the mediation of Austria, which, until then had kept a strict neutrality. Both of the belligerent parties endeavoured to draw Austria into their interest, and both of them wanted time to increase their armies in case of a new outbreak of hostility. Napoleon, having peremptorily rejected the main condition of definitive peace, namely, to give up all his conquests in Germany and to withdraw his armies beyond the Rhine, Sweden and Austria being left as Napoleon had declared for the allies, thereupon Napoleon offered his forces by new levies in France, and by withdrawing 50,000 veteran troops from Spain to Germany, he broke off the negotiations, and the war commenced again on the 17th of August. The patriotic enthusiasm which first animated Prussia was then extinguished in all Germany, and all the monarchs of Northern Germany, whence the French had been driven out by the inhabitants immediately afterPrusia's declaration of war against France; but although Marshal Davoust, and General Vandamme, who commanded the British, Germany, were prevented from engaging with the people again to obedience, the allies could reckon upon a general rising at the first opportunity; and the history of the war proves that they were not mistaken. The forces of the allies in August and September disposed of 100,000 men, of which about 200,000 were Prussians; but this estimate is below than above the real number. The army of Napoleon was considerably less; but in the north Denmark had declared for him and damaged the operations of the allies on
that side. On the 27th of August Napoleon gained another victory at Dresden; but having advanced upon Bohemia, part of the army encamped, and the rest, as an adm., by the Rus, and at Nollendorf by the Prussian general Kleist. Upon this the hopes of Napoleon were blighted by one defeat after another, and in the battles of Grossbeeren, Dennewitz, Katzbach, Glogau, and many others, the Prussians and their commander Blücher restored the honour of their arms, and reduced Napoleon to a most critical position in the neighbourhood of Leipzig. In the battle of Leipzig the French power was broken, or rather in three successive battles on the 16th, 19th, and 20th, the French and the allies met with such a resistance from the king of Saxony, as well as other potentates, that sincere fears were entertained of a rupture between Prussia and Russia on one side, and Austria, Great Britain, and France, on the other. The return of Napoleon from the island of Elba produced a salutary effect among the members of the congress, and Frederic William was obliged to be satisfied with the larger and northern half of the kingdom of Saxony. Besides this acquisition he received back the most western part of Poland, under the name of the grand-duchy of Pozan, nearly all his former possessions in Germany, and several other parts of that country, namely, a large tract on both sides of the Rhine and the Meuse, on which he had, with great difficulty, brought the Pomerania by exchange for Lauenburg, but left several small districts in the hands of some of the minor German princes. Cooperatively speaking Prussia acquired less than Russia, but, since the area of the kingdom as fixed by the treaty of Vienna, had been equal to four times the size of Thilt, and besides this the Prussian dominions were now divided into two large portions separated from each other by a small narrow tract belonging to Hanover and Hesse-Cassel, the former of which had been lost, and the latter tricked, had been dealt fairly with. Frederic William became a member of the German confederation for all his dominions which belonged to the German empire before its dissolution, namely, for the greater western portion of Prussia; but for the grand-duchy of Pozan, the kingdom of Saxony, and the grand-duchy of Mecklenburg, he did not become a member of the confederation.

A powerful Prussian army under Blücher was ready to meet Napoleon, after his return to Paris in 1815, in the Netherlands. Against him Napoleon aimed his first blow at Ligny, on the 16th of June, and Blücher lost the day, but the spirit of the Prussian army was so excellent, that Blücher retreated in good order upon Wavre, kept his word to aid the Duke of Wellington at the battle of Waterloo, and had his glorious share in that great victory, by which the power of Napoleon was broken. Frederic William followed his army to Paris, and there signed with the other powers the second peace of Paris, which, by the head-long inrush of forming that union called the Holy Alliance, Frederic William adhered with eagerness; piéts et enthousiasms praised him for it; lovers of civil and political freedom frowned; the people could not guess what the Holy Alliance meant; and they accused their king of treachery.

After his return Frederic William undertook the difficult task of organizing a kingdom composed of incongruous parts, and exhausted by oppression, rapine, war, and its great exertions; and he just to subdue them with a large personal share in bringing Prussia to that state of strength, wealth, and political importance, in which he left her at his death. His intellectual capacities were very limited, but he had plain sense, loved and knew how to create order, and, guided by the advice and experience, discretion, and untiring labours of those men who brought to a flourishing condition; trade, mechanical arts, agriculture, were promoted by liberal laws, and where laws were not sufficient the king would help with money from his own purse, lending or giving large sums to the great landholders, to the assistance of the poor, or even of the living decrepit. The returns of duties in England produced a stagnation of the corn trade in that province, and momentarily deprived the owners of immense estates of the means of paying the taxes or their debts. All sorts of laws were passed for living deceased, in reforming the administration of law and the post-office, in constructing roads, and in founding universities, colleges, and schools. Unfortunately for him, public opinion in Prussia, and indeed in all Germany, with regard to civil and political
freedom, became very liberal after the great war, during which the people were constantly urged to sacrifice their lives and property to appeals to their ancient and presentiments of future freedom, so that soon after the publication of the Constitution of 1819, a very liberal interpretation of the Constitution was promulgated to all the States of the Confederation, the people expected that they would soon enjoy the freedom of England or France, and showed symptoms of great discontent when one year after another elapsed without bringing any effects. The people were of the more just as they were not only founded upon their social wants, but upon rights also, and the Prussian in particular derived their right not only from the 18th Article of the Constitution, of which the author is William's edict of the 32nd of May, issued after the return of Napoleon from Elba, and before the battle of Waterloo had restored all fear of France, wherein he promised to establish a general representative constitution for the whole kingdom. Such claims were most disagreeable to Frederic William, and although it may be doubted if he intended to deceive his subjects by illusive promises when he issued that edict, he nevertheless broke his word, inasmuch as he never fulfilled it. He thought it perhaps more prudent to leave the glory of proclaiming Prussians on a level with England and France, by emancipating her by a constitution, to his son and successor, the present King Frederic William IV. The reasons why Frederic William III broke his solemn and royal word must be considered. A representative constitution, which should give the nation a participation in the legislation, was a thing utterly detested by Frederic William. He was a king brought up in the old German doctrines of absolutism; but he never aimed at despotism or tyranny. He would be of the opinion of those who declare that for a constitution to be useful it must first be liked. A representative constitution for a constitution became loud in Prussia, and as the people ventured to give additional weight to their claims by alluding to the enthusiastic readiness which they had shown in rescuing him from ruin, he behaved like a father saved from drowning by his son, who asks for half of his father's property as a reward for having done his duty. When Frederic William promised a constitution he did not precisely know what it was, and moreover he could not fancy the result. A representative constitution for it: this seems to be the only way of explaining why he broke his word.

The first to remind Frederic William of his promise were the students. The universal period that they were united with France, had enjoyed only as much of the benefit of a constitution as Napoleon would allow them; which, however, was much more than Frederic Wilham would allow them. Early in 1818 the inhabitants of Coblenz presented an address to the king in which they humbly established the justice of their demand on the ground of the 18th Article of the Confedertate Act, and the edict of the 22nd of May, 1815. Upon this they received the following answer:—

Neither the eighteenth article of the Confedertate Act, nor the edict of the 22nd of May, 1815, fixes the time when the representative constitution shall be introduced. Not every right is the right for making alterations in the constitution of the state. He who remits the king, who has voluntarily promised a constitution, of his word, manifests criminal doubts of the inviolability of his word, and anticipates his decision on the right of time of its introduction; a decision which ought to be made by the king himself, and could not but cause my just indignation. I myself will fix the time when I shall realize my promise of giving a representative constitution to my kingdom, and I shall not allow myself to be anticipated by others in my quiet advance towards my aim. It is the object of the State in Germany, not to infringe upon the free will, which led to the promise to which you allude, as well as to the above-named article of the Confedertate Act.

The German word is 'Landschaft,' land of the country, an old term, but now generally used, although civilized by the present generation, because it implies less of commerce and detailed description.
the subject: gentlemen holding or aspiring to hold offices under government, and refusing to adhere to the new Evangelical church, were either not promoted or entirely disregarded; many clergymen, and among them men of great repute, were not admitted to the new order. In both cases, the clergy were rewarded with pensions, titles, and the cross of the order of the Red Eagle, and thus the poet Heine said that the new agenda was flying on the wings of a red eagle from steeple to steeple at all the churches of Prussia. Indeed, so great was the respect of the Prussian aristocracy for the rule of their government, that the Evangelical church was established in a few years in most of the Protestant districts of the kingdom. Frederic William is said to have been the originator of the new church, and to have considered it as his greatest work.

Contemporary with this ecclesiastical reform was the establishment of the 'Landstände,' or provincial estates, a sort of patrician middle-age representation of the people in each province, but not a general representation of the whole nation. The provincial estates have only delibera-
tive power, and are treated by the government with so little regard, that they are not allowed to make their meetings public, or to publish their debates through the press. The people of Prussia, in conformity with this rule, do not consider gentlemen as always say Yes, and the following anecdote will show how they were considered by some of the great officers of the state.

During the meeting of the States of Westphalia, the parlia-
mentary debates were suddenly interrupted by the appearance of a Lithuania gentlemen, who was not a patrician, but nevertheless boldly advanced towards the speaker, and addressed the assembly. It was the military governor of the province, the General Baron von Muffling, one of the heroes of 1813-1815, who thus intimated upon the representatives of the people, and impudently told them to remember that their first duty was obedience to the king, and that non-compliance with his wishes was little better than high treason. It is true, we removed from the hall, but nobody dared to prosecute him for his offence, as they could not have been of any avail. A striking instance of Frederic William's misconception of the reciprocal 'obligations between king and subject,' was his conduct towards the inhab-

of the Rhenish provinces. On getting possession of this fine tract, he solemnly declared that they should continue to live under the French code, but it is only due to the manly resistance of the Rhenish people that they have not been de-

posed, and yet that they have not been strong enough to prevent several alterations that manifest the spirit of the French Code, and intended to give support to absolutism, and to create a privileged landed aristocracy. We allude to the decree of Frederic William by which the judicial and executive functions of the civil and military hierarchy withdrew from the courts in those provinces where, as in England, the accused is tried by a jury of twelve men; by the same decree these courts were deprived of power to try property actions, and in these cases judgment is now given by a special commission appointed by the king; and, lastly, by the decree of 1836, there was established an equestrian order in those provinces, by conferring upon nobles possessed of a certain extent of landed property the privilege of erecting them into fidei commissarii; also the privilege of autonomy, that is of fixing rules of succession, and making certain family regulations, contrary to the common law of succession, as well as that referring to landed property. For according to the French law, land is divided among the heirs either male or female of the deceased

The people were kept in such a state of ignorance by the clergy that they became proverbial in Germany; to German literature they contributed nothing, but spent their lives in the enjoyment of sensual pleasures; the higher classes were entirely enervated, while the commonalty were reduced to poverty and despair. The French occupation they made no progress, except in the appreciation of civil and political liberty; but they cultivated neither literature nor science, except mathematics, and they were far from being a healthy element in the army. The French government did anything for learning: trade, agriculture, and manufactures were languishing; the towns were decaying, and the country swarmed with smugglers and swindlers, who got a livelihood from the weakness of the state. Indeed, the military government of Napoleon and his unscrupulous and rapacious functionaries. No sooner had Prussia got possession of these countries than this immoral state of things ceased.

The new-established schools no teachers could be hired in the country, and they were consequently invited from other parts of Germany, and this created jealousy in the Rhenish people. Most of the functionaries of Napoleon being either unedu-
cated or men of bad character, Frederic William had to provide others from among his old subjects, and no one was appointed to any office of importance unless he had received a university education— a thing almost unknown in the Rhenish provinces, and this caused disappointment and anger among the new nobility. They were not only deprived of the material profits of the state, but they were even suspected of political advancement. Indeed, this bill was especially directed to the Prussian nobility, which considered itself as the only independent party. Thus it was to reduce the Roman Catholic religion, which is pro-

of the majority of the people in Rhenish Prussia, to a religion of the lower classes, and so create by all sorts of polit-

ical stratagems a Protestant gentry and nobility.

We have dwelt longer upon these topics since Frederic William and his government have been attacked in the Rhenish provinces, chiefly through the medium of the Belgian press, so much so that it is now said that the man who is studying the life of that king would resort to Rhenish or Belgian sources without knowing the causes of their discontent.

There is, however, no doubt that from the moment Frederic William was restored to the throne by his people he lost his popularity more and more, and gave occasion to just censure.

Small as the political liberties of Prussia were, and vexatious as the military system was which reigned during the last thirty years, was sufficient for Frederic William and his councillors to raise Prussia again to the rank which she occupied among the powers of Europe previous to the battle of Jena. In her relations with the outside world, the object of Frederic William was to make Prussia powerful, and he succeeded. He was an advocate of the Greeks in their struggle against the Turks, because he saw in them a nation that was throwing off the yoke of iniquitous powers, whom to impose upon them by a people who were not Christians; and he was active and successful in bringing Turkey to terms with Russia in 1829, since he dreaded a European war which would have thwarted his plans for the improvement of his king-

Peace was the great object that had constantly at heart, and he maintained peace even through the dangers occasioned by the French revolution in 1830. Though certainly averse to the principles of the French Revolution, he continued to believe in the old rights of the Rhenish Prussians, and that he would make common cause with Austria and Russia against her from the moment the French made their cause a European one by continuing to revolutionize Europe through her emisaries. He had to experience the dangers of the French Revolution in a most direct manner. In 1831, the first and also last outbreak of a well-organized plot to revolutionize the Rhenish provinces. He was severely blamed for having been a quiet spectator of the French revolution, and as a consequence of the 1830 law.
which enabled him thus to attack Warsaw and to put down the insurrection. A great number of Polish subjects of Frederic William, having joined the army of their brethren in Russia, were severely punished when they returned to Prussia after the death of the tsar; but in 1817 a large body of Prussians, after the French army against the Arabs and Khyables in Algeria were not punished; and Frederic William was so far from identifying the causes of the Poles and the Algerians, that he was a favorite of those whom he considered the enemies of that country. During the disturbances caused in Germany through the effects of the French revolution, Frederic William showed himself a decided though not violent adversary of constitutional reforms; and the constitutions newly adopted in several parts of Germany and in other states having been made more free than they were previously, he secretly aided the princes of those countries in their attempts to bring them back to their former condition as soon as possible.

Towards the end of his reign Frederic William committed an act of palpable despotism and injustice, which created a great sensation in Europe, by arresting and imprisoning the Archbishop of Cologne, the Baron Clement Augustus von Dohn-Verschering, for his energetic conduct in the disputes on mixed marriages. The archbishop of Gaessen, Mr. Von Dunin, imitated the example of the archbishop of Cologne, and was treated in the same way. The causes which led to these arrests have not yet been made public, neither have the writers in the pay of the Prussian government tried to persuade the public. According to the concordat of 1829, between Pope Pius VII, and Frederic William III, the issue of marriages from Protestant bachelors, to Catholics, was forbidden, unless the parents agreed otherwise. The Roman Catholic priests were enjoined not to withhold their blessing from such marriages. But when it became evident that by appointing a disproportionately number of Protestant functionaries in the Roman Catholic provinces, and encouraging Protestant gentlemen, especially bachelors, to settle in those parts, the Prussian government intended to create a Protestant gentry in these provinces, and to confine the Roman Catholic religion to those who were born in Protestant families, and could not easily conclude a marriage except with Roman Catholic ladies, from bringing up so many Protestant families. It is true that the king appointed a considerable number of Roman Catholic gentlemen to public places in the Protestant provinces; but as the government of the House of Hanover has often opportunity of bringing their children up in their own religious principles, and by placing them in the Roman Catholic religion. Annoyed by this policy of the archbishop of Cologne, the Prussian government set spies upon his transactions with the Belgian clergy; and as spies are always liars, and act from disinterested motives, they made up a plot and represented the archbishop as if he belonged to the league of Belgian Ultra-Montanists and democrats, and intended to kindle, with their help, a revolution in the Rhineland provinces. This led to the sudden arrest and extrajudicial imprisonment of the archbishop. The affair was settled between the Pope and the present king in such a way as to leave no doubt that Frederic William had not only acted unjustly, but also very imprudently, as he had undertaken a policy which neither his father nor his grandfather had the power to carry out. As a consequence of these disturbances, Frederic William lost the last remnant of his popularity among his Roman Catholic subjects, the number of which is about five millions. His policy in promoting the material welfare of his people has been highly beneficial; and he has encouraged manufactures, agriculture, and navigation of Prussia been in so flourishing a condition as towards the close of his reign. He attained his object in a great measure by concluding a commercial treaty with nations which have hitherto exercised great power over the commerce of Prussia, Mr. Von Masseen, and which is known under the name of the 'Zollverein.'

Even during the infirmities of age, Frederic William III. died after a short illness, on the 7th of June, 1840, still beloved by many of his subjects in the ancient dominions of the House of Brandenburg. He was twice married. By his first wife, Louise of Mecklenburg-Strelitz, he had four sons, the eldest of whom is the present King Frederic William IV., and three daughters. His second wife was Auguste, Countess von Harrecht, created Princess of Liegnitz, with the title of Duchess in 1824, in morganatic marriage, and by whom he had no issue.

Frederic William was the model of a good husband and father, and by his domestic virtues he often required the hearts of those whom he had alienated from him by his political conduct. Although his political principles were those of an absolute king, and consequently not always in harmony with truth and justice, he was upright in the application of established principles to particular cases, and he proved a good minister between his foreign powers which he had to choose was decided. His person was commanding; he was rather good-looking, but his features were harsh, and he was more like a general than a king. He did not speak well, was not required in his conversations, but was pleasant, and to guess the meaning of his answers. He disdained pomp and pageantry; in an unmeanly dark-colored carriage drawn by two ordinary brown horses, and seldom accompanied by more than one servant or attendant, he used to drive through the streets of Berlin, unobserved by all except those who happened to know the conveyance. His moral principles were pure, and his private conduct was an example to all his subjects. The absolute and inconsiderate conduct of some of his predecessors has often rendered it difficult for the people of Prussia to believe that the acts of the king and his plebe was certainly sincere. Although surrounded by philosophers and enlightened divines, he was rather superstitious; and we cannot refrain from finishing this sketch of his life by telling the following interesting fact: the faith of the unimformed author of his biography is 'Neuer Nekrolog der Deutschen.' During his sojourn in Paris he used to talk much with the celebrated Madame Lenoirmand. She once told him that Napoleon would die in 1821, and he in 1840. This prediction was very exact, as to the death of Napoleon, Frederic William was convinced that he would die in 1840. In the beginning of that year the king gave a great entertainment in his palace at Potsdam, and invited to the pills to some of the finest musicians, a large marble stone fell from the ceiling of the hall at the feet of the king, who immediately left the room, saying it was a bad omen, and foreboded his death. Soon afterwards a rumour was spread in Berlin that the 'White Lady' had made her appearance. The White Lady, according to an old belief, is a ghost which appears in the royal palace at Berlin shortly before the death of a member of the royal family; and the people believe that every case of death in the family has been announced by that mysterious being. The king was then already very weak, and great care was taken to prevent the rumour from reaching his ears; but he was nevertheless informed of it, and from that moment became the prey of a deep melancholy, which has accelerated his death, for he died a few weeks afterwards.

All works published on Frederic William, or the history of Prussia generally, since the accession of the present king; ought to be read with the greatest care; for a law has been issued, by Frederic William IV. which forbids any person to speak disrespectfully of any king of Prussia, either alive or dead, under a severe penalty. Speaking disrespectfully means, of course, mentioning or blaming the faults of a king.
The church became plenipotentiary divided into two parties, the supporters of patronage, or the ‘Moderates,’ and the anti-patronage men, or, as they were more familiarly styled, the ‘Perpetuities.’ In 1834 the latter party obtained the majority in the General Assembly, and on the 31st of May of that year the Assembly passed an ‘Overture and Interim Act on Calls,’ a measure generally known by the name of the ‘Veto Act.’

The object of this measure was to prevent the church from raising a complaint for breach of interdict; and on the 14th of June, 1836, they were reprimanded at the bar of the court, and informed that a repetition of the offence would be followed by imprisonment.

The celebrated Strathbogie case assumed an aspect considerably different. In June, 1847, Mr. Edwards received a presentation to the parish of Marnoch, which he laid before the presbytery of Strathbogie, the majority of whom were opposed to it. The presentation was naturally rejected by the presbytery, but vetoed by Mr. Edwards, the presbytery, by the direction of the superior church courts, rejected him. A second presentation to a different person was granted by the presbytery, but Mr. Edwards, on the 25th of October, 1847, in the case of a third presentation, protested against any such acts against the Veto Act taking any steps against the second presbyter, and raised an action to have it declared that his own election was illegal. In these circumstances the presbytery resolved to postpone their proceedings until the courts of law had given their decision. Professor of church history in December, 1847, Mr. Edwards professed that the refusal of the presbytery to take him on trial and induct him was to his hurt and prejudice, illegal, in violation of duty, &c., and engaging them to take him on trial, and act as if no law of the church such as the Veto Act existed. The presbytery applied to the superior church courts, which directed them still to put the Veto Act in force. Thus, being directed by the courts of law to take a particular step, and by the superior ecclesiastical judicatures to take one in the reverse direction, the presbytery was compelled to take no step, and the case should be referred to the superior courts. The opinion of the Church of Scotland must inevitably be split in two.

On the 18th Dec., 1830, the commission of the General Assembly suspended the majority of the presbytery of Strathbogie from their ecclesiastical functions, and directed them to perform their duties, and declared the minority of the presbytery to be entitled to perform the corporate functions of the presbytery. On the 27th May, 1841, this suspension was made perpetual by the General Assembly deposing the members of the presbytery from their ministry. Mr. Edwards then appealed, in the name of the Church of Scotland, to the Supreme Court, and it was decided that the Supreme Court had no jurisdiction in the matter.

On the 14th of September, 1834, Lord Kinnoul, patron of the parish of Auchterarder in Perthshire, issued a presentation to that parish in favour of Mr. Young. The presbytery and Synod were requested to this presentation, and it was requested that in a roll of 550 male heads of families, 257 dissenting and objecting to the presenter’s ordination. The presbytery accordingly rejected the presentation. An appeal against these proceedings was taken to the immediately superior ecclesiastical court, the Synod, and thence to the General Assembly, but the acts of the presbytery were confirmed in both these courts. The next step was to call in question the proceedings of these ecclesiastical tribunals in the civil courts. Accordingly, a declarator and an interdict were obtained in the Court of Session by the patron and the presenter, and on the 5th of March, 1838, the court, by a majority of eight to five, found that the presbytery, in rejecting the presentation on the sole ground of the majority of families in the congregation dissenting or objecting, had acted to the hurt and prejudice of the purser, illegally, in violation of their duty, and contrary to statute. On the 3rd of May, 1839, this decision was affirmed on appeal in the House of Lords. Mr. Young afterwards raised an action of damages against the presbytery, on the ground of his having been a sufferer by their illegal conduct, and obtained a verdict in his favour. This was called ‘the Auchterarder case.’ The presbytery had refused to retrace their steps, and had introduced another person before preventive legal measures could be taken in the matter. But the Lethendy case took a different shape. In 1835 Mr. Clark received a presentation to that parish from the crown, in which the patronage was vested. A majority having dissenting, he was rejected by the presbytery. In the mean time the crown, yielding to these proceedings as legal, issued a presentation to another person; and thus the two presentees were able to fight the battle of the legality as a question of patronial right. Mr. Clark not only brought an action into court, as his presentation in the Auchterarder case, but he likewise applied for an interdict, the counterpart of what is in England called an injunction, and the Court of Session accordingly interdicted the second presentee from proceeding in the presbytery, which was a practical decision in favour of the presbyteries. The presbytery applied to the General Assembly for instructions, and the Assembly directed them to disregard the interdict of the Court of Session, and to put in force the Veto Act. They therefore proceeded with the induction of the second presentee, who were cited to appear before the Court of Session, to answer to a complaint for breach of interdict; and on the 23rd of May, 1838, they were reprimanded at the bar of the court, and informed that a repetition of the offence would be followed by imprisonment.
preceding Assembly, read a protest against the constitution of the Assembly, signed by 120 ministers and 75 lay elders. A copy of this protest being left with the clerk of the Assembly, those who had signed it, and their adherents, left the Assembly in a body, and constituted in another place the Convention of Ministers and Elders of the Church of Scotland. On the 23rd of May an act of separation and deed of dissension was adopted by the General Assembly, for separating from the external air, and to constitute the clergy who were members of the Assembly, but by others who participated in their views. Thus no difficulties were put in the way of a complete separation of these persons from the benefits and burdens of the establishment. Whatever previous differences of opinion existed, and whatever objections there were to a body such as the General Assembly of the Church of Scotland, entitled to legislate and adjudicate for its own interests and according to its own feelings, being exempt from the control and regulation of the civil government and station thus made elicited general respect and sympathy, and was creditable to the sincerity of those who made it. The free church are now in possession of large sums supplied by voluntary contributions, and are widely extending their operations.

FREE TRADE. (Agriculture, P. C. S.; Capital, P. C. S.; Corn Trade, P. C. S.; Corn Trade, Ancient, P. C. S.; Demand and Supply, P. C. S.; Leases, P. C. S.; Merchants, P. C. S.)

FREEMAN. (Boroughs of England and Wales, P. C.)

FREEZE-APPARATUS, an air-pump which was invented by Professor (Sir John) Leslie for the purpose of freezing liquids in vacuo. It is well known that liquids evaporate more readily when the atmosphere is removed from their surfaces than when they are subject to its pressure; the caloric producing the evaporation being that which exists in the liquid itself, and that which is consequently the disturbance of the equilibrium, enters the liquid from the neighbouring bodies: hence, if there be a quantity of liquid either in a vessel under the receiver of an air-pump, and in it there be placed a vessel or tube containing a small quantity of water; on exhausting the receiver, the ether will rapidly evaporate, and the operation of exhausting being continued, the vapour will be carried off as fast as it is formed. The caloric in the water is withdrawn at the same time, and at length the water is converted into ice. In order to produce the congregation of water by a rapid evaporation from the vessel containing the water (vii. 9), Professor Leslie introduced in the receiver a shallow vessel containing highly concentrated sulphuric acid, above which was placed the vessel containing the water. The water above was divided into two parts, of which, in consequence of the removal of the pressure, escaped continually from the water, even at the medium temperature of the atmosphere, was, by the strong attraction of the acid for it, absorbed as fast as it rose; and in two or three minutes the quantity withdrawn from the water was sufficient to allow a congregation of the water to take place. Instead of sulphuric acid, any substance which, as dry potash, muriate of lime, or calcined powder of basalt, has a strong attraction for humidity, may be used; the temperature, if highly concentrated, is said to be the most efficacious.

The air-pump employed for the purpose by Professor Leslie was constructed in the usual manner, but of large dimensions, in order to obtain ice in considerable quantities, and the receiver was a segment less than half, being of such a size, that the air contained in it might be extracted as speedily as possible. The sulphuric acid or absorbent earth was contained in a shallow vessel of glass, nearly equal in diameter to the base of the cone, in the middle of which was a hollow cylinder, on the top of which, above the acid or earth, rested the cup of glass, or rather of unglazed earthenware, which contained the water to be frozen. Several machines of this kind have been exported to India, to be used for the purpose of freezing water for drinking. Leslie, by means of the like apparatus, succeeded in freezing mercury by the absorption of caloric from a coating of ice in which the bulb of a thermometer was enveloped. In the performance of this experiment the thermometer was suspended from a wire which, passing through a collar of leather at the top of the receiver, could be raised and lowered at pleasure. A cup of water was placed above the vessel containing the sulphuric acid, and the bulb of the thermometer, after being lowered into the cup, was drawn up and suffused with the concentration of the addition water in the exhausted receiver: this process being repeated several times, the bulb was at length covered with a film of ice. The cup of water was then removed, and the thermometer, having its bulb thus covered, was allowed to remain suspended for about half an hour above the sulphuric acid, the column of the air being made as complete as possible, so that the column of mercury in the barometer-gauge was within 1-20th inch as big as in a barometer which indicated the density of the air exhausted. Thus, on removing the thermometer, a portion of the mercury in the ball of the thermometer was found to be frozen.

Such experiments have since been more effectually performed by enclosing mercury in a mass of ice worked by heat in the form of a cup, and suspended above the sulphuric acid in a small net made of wire; the mercury was introduced into the cup of ice, and on it was poured a small quantity of water: on exhausting the receiver, the water was immediately converted into ice, and the bulb of the thermometer enveloped with ice; and in a few minutes, on removing the receiver, the mercury was found to be wholly frozen.

For the details of Leslie's experiments see his 'Short Account of Experiments, &c., on the relations of Air to Heat and Moisture,' Edinburgh, 1818.

FREIGHT. (Ships, P. C.)

FRESCO. A painting is said to be a fresco, or painted in fresco (sul fresco intonaco, upon the fresh coat), when it has been executed in water (vii. 9), and exposed to a drying vicissitude, either as a whole wall, or as a part of a wall; while the plaster is still wet; or upon wet plaster spread upon a wooden frame or any other object. Fresco is the most noble and imposing of all methods of painting. Colouring in fresco was practised by the ancients, though it has not yet been practised by modern artists. Frescoes were employed in Pompeii; frescoes are coloured in fresco, but their decorations are executed in some species of tempera upon the fresco coloured wall. This is evident, because in many places the paintings have cracked off, and exposed the original plaster, or a covering of another sort of material, placed upon the plaster. In this elaborate process the plaster formed a solid mass, as it were, of marble; was capable of being cut away and transported in a wooden frame to any distance; and sometimes even tablets were formed of it. (Vitruvius ii. 6; Pliny, xxxv. 49.)

The process of varnishing the walls when coloured, Vitruvius terms (vii. 9) a Greek practice, called hæmatos, 'a burning.' When the wall was coloured and dry, Punic, or purified and tempered, wax, or other tempering matter being rubbed over it with a hard brush; this was made smooth and even by applying a cæterium, or iron pan filled with live coals, to the surface, near enough to melt the wax; it was then polished with a linen cloth.

1. Walls. Fresco was not generally practised by the early Italian painters, and it appears to have been first used in the fourteenth century, simply as a preparatory process, the work being finished in tempera. The earliest frescoes are probably to be found in the church of Santa Maria del Popolo, at Rome, in the Campo Santo at Pisa, and in San Miniato and Santo Spirito at Florence. These and other later frescoes are painted on four different kinds of walls: in the old gothic buildings, on ashlar walls covered with a thin coat of plaster; in the more recent buildings, or in the breasts of the walls, in some of the most recent edifices, on lath covered with various thicknesses of plaster. In many instances the walls are very uneven, and no attempt has been made by the plasterer to correct this defect so detrimental to the appearance and pre-
servation of a painting, through the settlement of dirt and the injury it undergoes in cleaning. The plaster is liable to fall away from ashlar walls, especially if the stones are large and the joints close, as in the cathedral of Assisi, and on the church of Assisi, where the stones are small and not closely jointed, the plaster has a better hold and is generally still firm; but ashlar walls condense the damp and are the worst of all for frescoes; brick, rubble, and lath are much better and nearly all equally good if well constructed. Mr. Wilson, the director of the Government School of Design, in his report to Her Majesty's Commissioners on the Fine Arts, respecting the state of the middle age frescoes and other works, asks his commissioners to inquire into this subject and has expressly sent into Italy—accertained upon what species of wall the various frescoes of the most eminent Italian painters were executed, and has reported as to the present condition of those works, with reference to the walls on which they are painted, and the proviso was that the air was protected from the damp which rises from the soil, and that which infiltrates from the roof; the sea air therefore cannot have injured the other frescoes, or it would have injured this likewise. There are many frescoes at Florence and at Venice, on lath, and all are in tolerable preservation; many vaulted or coved ceilings are of lath, plastered above as well as below.

1. Plaster and Lime.—The method of plastering the walls for painting has been nearly uniform in most ages. The walls of the baths of Titus at Rome are covered first with a layer about half an inch thick of coarse sand and lime; above this a thicker layer of lime and pozzolana with an admixture of sand and pounded brick; the third and upper coat is of lime and pounded marble. The third loggia of the Vatican, painted by Giovanni da Udine, is made of the same as this; the first layer upon the lath is a thin coat of coarse sand and lime, and the second is also a thin coat of lime and pozzolana, and the third is of lime and marble-dust, but not finely pulverized. In all plastering for fresco painting the lime should be thoroughly burnt, even in the first coat or rough-cast; but it is indispensable in the last coat, or intonaco, upon which the painting is executed. Various directions are given by writers on art as to the proportion of lime and other materials for the several coats, and they all agree in essentials. The oldest writers are Cennino Cennini and Leon Battista Alberti. Cennini's 'Trattato della Pittura' was written in 1437, but was first published in Rome by the Cavaliere Tamborni in 1521; the work of Alberti, 'De Re Aedificatoria,' though written after the treatise of Cennini, was published shortly after Alberti's death, in 1485, by his brother Bernardo.

Cennini recommends that both lime and sand should be well sifted or recently alaked, that there should be two parts of sand to one of lime; that enough for fifteen or twenty days should be prepared at a time, and that it should be kept for some days to render it less caustic, for if too caustic, the intonaco will blister. Alberti speaks of three coats as necessary: in the first, or rough-cast, he recommends the use of pit sand and pounded bricks; in the second, or sand-coat, he recommends river sand; in the third coat, which should be white, he recommends pounded white marble instead of sand; and finally, a well-washed river sand makes a superior intonaco: these three coats were called by the Italians—the rinzeaffito, rough-cast; the arricciato, sand-coat; and the intonaco, the fresco ground. Cennini speaks only of two coats, both of which be termed intonaco. Similar directions are given by Armenini, in his treatise 'De' Veri Freccetti della Pittura,' Ravenna, 1587; and at the end of the treatise on perspective, 'La Prospettiva,' by Andrea Pozzo, Rome, 1693; and in still greater detail by Paolo Giovio, in his 'El Museo Pictorico y Escala Optica,' Madrid, 1715. Various other writers also have given more or less concise directions for fresco painting, but they contain scarcely any information that is not given at greater length in the above-mentioned works, from which Mr. Esdaile has given several important extracts in an Appendix to the Report of the Commissioners on the Fine Arts for 1842. There is however no occasion to repeat them here, as what follows from the directions of Cornelius, Hess, and other eminent living fresco painters, from the same Report, agrees in every material point with the advice of those earlier practitioners in the art.

The selection of the limestone to be employed in fresco painting, both for the ground and for the white, is a matter of great importance; it should be nearly pure carbonate of lime, and should contain as few foreign materials as possible. The early Italian painters found Travertine the stone best fitted for the purpose; it is in great abundance in the Roman Campagna, being a deposit of calcareous sediment from the streams of water which run from the Apennines, which consist in Central Italy chiefly excised on brick. The following analysis of limestones are by Mr. Richard Phillips. The analysis of Travertine is—

<table>
<thead>
<tr>
<th>Component</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbonate of lime</td>
<td>99-4</td>
</tr>
<tr>
<td>Alumina, with a trace of oxide of iron</td>
<td>6</td>
</tr>
</tbody>
</table>

Its lime is pure white. The lime used now by the Florentine fresco painters is so nearly pure carbonate of lime that so appreciable quantity of any admixture can be detected. The following analysis of the paints of Genoese is also extremely good:

<table>
<thead>
<tr>
<th>Component</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbonate of lime</td>
<td>63</td>
</tr>
<tr>
<td>Carbonate of magnesium</td>
<td>36</td>
</tr>
<tr>
<td>Earthy matter, oxide of iron, bituminous matter</td>
<td>1</td>
</tr>
</tbody>
</table>

This lime is of the purest white, and the Genoese frescoes, notwithstanding their vicinity to the sea, are perfectly durable. The first fresco that was executed in Genoa, according to Soprani, is still in excellent preservation: it is the Assunzione of the Virgin, in Santa Maria di Castello, painted by Justus de Alemania, or Justus of Germany, in 1451. The lime used by the fresco painters of Munich is also excellent: it is made of a marble pebbles brought down from the Bavarian Alps by the Isar: the analysis of the stone is—

<table>
<thead>
<tr>
<th>Component</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbonate of lime</td>
<td>80</td>
</tr>
<tr>
<td>Carbonate of magnesium</td>
<td>100</td>
</tr>
</tbody>
</table>

Excellent limestone for the purpose is found also in England, in the neighbourhood of Bristol and in other parts. That of the White Quarry on Durdham Down, near Bristol, gives:

<table>
<thead>
<tr>
<th>Component</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbonate of lime</td>
<td>99-5</td>
</tr>
<tr>
<td>Bituminous matter</td>
<td>9</td>
</tr>
<tr>
<td>Earthy matter</td>
<td>2</td>
</tr>
</tbody>
</table>

The analysis of the Wiek (Bath) stone is—

<table>
<thead>
<tr>
<th>Component</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbonate of lime</td>
<td>97</td>
</tr>
<tr>
<td>Impurity, chiefly oxide of iron</td>
<td>3</td>
</tr>
</tbody>
</table>

Of that of the Vogrie quarry near Edinburgh, the analysis is—

<table>
<thead>
<tr>
<th>Component</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbonate of lime</td>
<td>94-5</td>
</tr>
<tr>
<td>Silica, alumina, and a little oxide of iron and bituminous matter</td>
<td>5-5</td>
</tr>
</tbody>
</table>

From these examples it appears that a rich or pure lime is used and is necessary for fresco painting, and that there are several limestones fit for the purpose in this country, and that that of Bristol (Durdham Down) is of more than an average purity, and eminently fit for the purpose.

Modern fresco painters recommend the lime to be kept a much longer period than Cennini and other early writers direct. If it is used too fresh, it blister, and sometimes turns
the colours to a brownish red: its caustic quality requires to be mitigated, but not destroyed, before it is used. On this subject Mr. Eastlake's Report contains several scientific observations, upon the authority of the Rev. B. Phillips, of which the following is the substance:

The purest limestone consists, in atomic proportions, solely of—

| Carbonate | 22 |
| Lime     | 28 |

Carbonate of lime 50

Thus constituted, whether in its original state or reproduced by chemical agency, it is not at all caustic. If the limestone be subjected to sufficient heat, it loses the carbonate, and there is left—

Lime (commonly called quicklime) 28

Let there be added to this lime as much water as will combine with it, and the result is a compound of—

| Carbonate | 22 |
| Lime     | 28 |

Hydrate of lime (commonly called slaked lime) 37

It is to be observed that this proportion of water in combination with the lime does not (apparently) moisten it. Hydration takes place; in the air dry lime will absorb moisture, and the water either mixes with the lime mechanically or dissolves it. If hydrate of lime is exposed to the air, the water is expelled by carbonic acid, and the result is, as at first, carbonate of lime:

| Carbonate | 22 |
| Lime     | 28 |

Carbonate of lime 50

which is, chemically speaking, the original limestone, although the original state of cohesion is never regained. The non-caustic state of lime therefore is arrived at when, by exposure to the air or by other means, it is restored to the state of a carbonate or has regained its maximum of carbonic acid. If burned and kept air-dried, it cannot acquire the carbonic acid which renders it non-caustic. Time therefore has no effect on pure lime, whether slaked or unslaked, provided it be not exposed to the air or some other source of carbonic acid.

One of these sources, though not an abundant one, is spring or river water, which contains carbonic acid and carbonate of lime (recently boiled or distilled water does not contain either), and the frequent washing recommended by all the authorities on fresco-painting is a means of restoring the lime to a state of carbonate; pure or caustic lime being constantly carried off in solution with the water that is thrown away, and carbonate of lime being formed. The mixture of water and lime to form a paste is difficult; non-caustic lime may therefore be kept in a moist state. It might also be kept in a dry state without further change, but whether moist or dry it would be wholly useless for the composition of mortar, and would possess no adhesive quality. In the last state of moistness it would resemble mere moistened chalk, and would crumble to dust. But as long as the lime is still caustic, as long as, in other words, it has not recovered its quantum of carbonic acid, it will, on exposure to the air in a moist state, rapidly attract it, and the surface soon becomes consumed, and in a manner petrified. This is what takes place during and after the process of fresco-painting; moisture being always the medium—the conductor, so to speak—of carbonic acid.

It is evident, therefore, that the lime used for the intonaco in fresco painting must not be entirely carbonated, or it would not set; a certain degree of causticity is necessary—how much, however, can be learnt probably by practice only; and this is the general practical difficulty in the art. This picture must be executed while the intonaco is wet or soft; no more work ought to be commenced than can be completed within the time (a few hours) that the plaster requires to harden. Numerous joints are thus necessary in a large fresco, and the judicious painter will contrive that these joints shall be identical with the inner outlines of the parts of the figures and their draperies, or any other object, so as to be no disfigurement to the work. To retard the process and to keep the surface of the intonaco a great desideratum in fresco-painting.

Cornellius recommends the following mode of preparing the lime.

P. C. B., No. 79.

| Carbonate | 22 |
| Lime     | 28 |

Limestones, which, on being slaked, are stirred continually until the substance is reduced to an impalpable consistence. Clean river-sand is then spread over the surface, to the depth of a foot or more, and then the whole is agitated, so as completely to exclude the air. It is allowed to remain in this condition for at least three years: it retains its moisture for many years. It is excluded from the air, for the reasons assigned above, that it may retain its causticity, and not become entirely case hardened.

3. Execution of the Fresco. — Cornelius recommends three years' interval between the rough coating of the wall and the commencement of the actual preparation for painting, unless the lime used in the first instance be kept so, between six and twelve months will be sufficient. Before laying on the intonaco the prepared ground must be repeatedly wetted with rain-water or boiled water, until it will absorb no more; then a thin moderately rough coat of plaster of sand and lime must be laid on, or the surface to be painted in one day; as soon as this coat begins to set, in about ten minutes or so, another thin coat must be laid on with a wooden trowel, somewhat fatter, that is, with more lime and less sand, or with about an equal proportion of lime and fine river-sand; both layers together being scarcely a quarter of an inch thick. Upon this coat the fresco is to be painted: if the surface as left by the wooden trowel is found to be too smooth, it can be made slightly rough with a dry brush. This intonaco will be fit to set in from an hour to three hours; it is hard enough to receive the colour as soon as it will not yield to the pressure of the finger; if too soft, the wet brush will wash up the sand. The first process in executing the picture is to retouch the bare or unfinished portion of allotted work, from the expressly prepared cartoon, of the same size as the fresco, upon the intonaco with a hard point (the artist must please himself as to the method of tracing); then the painting may be commenced with thin water-washes, from the finished coloured sketch, which must be placed so as to be conveniently seen while at work; for the process of fresco-painting should be simple copying; the mere execution requires so much attention, that it is necessary for the painter to be relieved of every other consideration. The surface thus washed may be kept moist with a wet brush; a sheet of glass or wooden surface may be placed on the work, the painter will be kept moist (but not wet) while painting, or the super-added colour will not unite with what is beneath; the work is finished by glazings and washings. When the portion of the picture is as near the darker work as can be made, the superfluous portions of the intonaco should be carefully cut away. In the next day's operation the surface must be wetted as before, and the edge of the finished piece carefully moistened with a brush. If it should be necessary to leave the work for an hour or two, it may be kept moist by pressing a wet linen cloth against it, by means of a board padded and covered with a waxed cloth; the board may be propped against the wall by a pole from the ground.

If a piece of work should be unintentionally excised, or accidentally damaged, it must be entirely cut away, and the whole operation be commenced afresh. A fresco cannot safely be retouched when dry, but if retouched the vehicle should be vinegar and the white of egg; this answer well for black and for shadows that are to be retraced: the whites are made of pounded egg-shells. It is useless, however, to retouch a fresco in the open air, as the rain would wash all retouches away: the fresco itself is not injured by rain.

The colours are kept in a bottle and mixed in water, boiled or distilled; they are chiefly earths; no vegetable and few mineral colours can be used with safety, but there is a mode of rendering vermillion durable. The white used is exclusively lime, which has been well burnt vitriol; green, terra-vert, or Verona green, cobalt-green, and chrome-green; blue, ultramarine pure and factitious, cobalt. These colours are perfectly safe; chrome-yellow.
and vermilion are also used, but not in every case with success. Lime destroys all animal and vegetable colours.

The tints should be carefully prepared and kept in pots, and if a great quantity of any tint is required, the method of oil-painting should be prepared at once, as it is almost impossible to match tints exactly, as they are of different degrees when wet and when dry.

The brushes of the ordinary materials, but should be somewhat longer than those used for oil-painting. In addition to the usual tools, small pencils of other hair in quills are used: other hairs will not resist the lime, but burn and curl them. The palette, commonly made of tin, with an edge to prevent the colours from running off, should be covered with varnish to keep the tin from rusting.

To know when to leave off is a great art in oil-painting, but in fresco it is of the utmost importance. On this subject Hess says, if the touches of the pencil remain wet on the surface, and are marked by a glossy appearance, the painter must cease to work, for henceforth the colour no longer unites with the plaster, but when dry will exhibit chalky spots. As this moment of time approaches, the absorbing power increases, the wet brush is sucked dry by mere contact with the wall, and the operation of painting becomes more difficult. It is therefore advisable to cease as soon as these indications appear.

If the wall begins to show these symptoms too soon, for example in the morning, the weather some time may be gained by moistening the surface with a large brush, and trying to remove the crust or settling that has already begun to take place: but this remedy affords but a short respite.

Fresco-painting, as thus described, is a somewhat difficult art and distinguishes it from another method which they term fresco-secco, dry fresco.

Fresco-secco is practised at Munich as follows, as described in Mr. Wilson's report:—The plastering of the wall has been completed as for fresco-secco, the whole is allowed to dry thoroughly. Before painting, the surface of the intonaco must be rubbed with pumice-stone, and on the evening of the day before the painting is to be commenced, it must be thoroughly washed with water mixed with a little whitewash. The next morning it is then ready for gessoing or tracing the outline, and painting; the wall must be kept constantly moist by means of a syringe. The colours used are the same as in buon-fresco, and the work is very durable. All fresco painters do not trace their outlines from cartoons, but is the safest practice, and has been adopted by all the best masters. Fresco-secco is a good method for decorative painting.

4. Cleaning and transferring Frescoes.—In the opinion of many the frescoes should be cleaned with bread. The muddy appearance which sometimes shows itself can be removed with a wet sponge, unless it arises from salt-petre in the walls, in which case there is no remedy. These injuries must be provided against in the construction of the walls: the ventilation of damp air may be intercepted by covering one of the lower courses of bricks or stones with sheet lead, which must be protected on each side by a coat of pitch; the wall may then be continued as usual. Frescoes may be safely washed with a soft sponge and water; vinegar and wine may likewise be used with safety; even frescoes that have been whitewashed over can be washed clean. The frescoes by Raphael, in the Stanze of the Vatican, of nearly two centuries of dirt, were washed with what Mr. Carafato.

As very valuable frescoes, if left in their original localities, must have inevitably perished, through the bad construction of the walls, unfitted situations, or from other causes, the invention of some mode of removing them from their objectionable situations became of great interest, and several very ingenious methods of transferring frescoes from walls have been devised, and often practised with success. Mr. Ludwig Gruner removed and transferred to canvas, in 1829, at Brescia, some frescoes by Lazzaro Bastianini; the process of doing this was as follows:—the first process was to clean the wall perfectly; then to pass a strong glue over the surface, and by this means to fasten a sheet of fine calico upon it. The calico, being made fast by the glue to the irregularities of the wall, should be covered over with a sufficient quantity of plaster, and some strong glue let over it. In this state this was applied, which caused the glue, even on the fresco, to sweat through the clothes, and to incorporate the whole. After this a third layer of strong cloth was applied on a new coat of glue. The whole remained in this state two or three days (the time required may vary according to the heat of the weather). The superficial cloth extending beyond the painting was now cut off as to leave a sharp edge: the operation of stripping or rolling off the clothes began at the corners above and below, till at last the whole wascsrashed off. The whole of the cloth and what adhered to it was then detached, and spent the whole wall behind appeared white, while every particle of colour remained attached to the cloth.

To transfer the painting again to cloth, a stronger glue is used, which resists moisture, it being necessary to place the cloth again on the same wall, then again to wet and scrape the surface, by means of a hammer composed of bristles.

Several works on this subject have recently appeared in Italy.—Leopoldo Cioconam, Della Pictura Sotto la Firma di, "Fresco," 1825, in "Annali dell'Arte," vol. xvii. num. 22; Girolamo Baruffaldi, Vita di Antonio Conti, Pittore e Riferitore di Pitture dal Muro, Venice, 1834; Cenni, Sopra diverse Piture staccate dal Muro e trasportate su Tela, Scic., Bologna, 1840. See the Appendices to the Reports of the Committee of Fine Arts, 1842, 1845, which contain many details on subjects connected with fresco-painting, to which there is no space in this article even to allude.

FRESNEL, AUGUSTIN JEAN, a very distinguished French physicist. Born in Paris, November 17, 1788, at Broglie near Bernay: his father, who was an architect, endeavoured early to communicate to him the rudiments of education; but considerable difficulty was experienced in connection with the very delicate and easily broken nature of the pupil's health, and partly, it is supposed, from a distance in the latter for the acquisition of that kind of knowledge which depends chiefly on the exercise of the memory; hence the youth made such progress in the study of languages, and was eight years of age when he was able to write in a legible manner. An inquiring faculty was however manifest in him even at that time by the experiments which he made to determine the best materials and the best constructions for the small experimental apparatus in which he worked.

At the age of sixteen years and a half he was admitted a pupil in the Ecole Polytechnique, where he soon made great progress in the study of the sciences, and where he attracted the notice of Legendre by his solution of a problem which had been proposed by that mathematician as a trial of the abilities of the students. On leaving that institution he was appointed engineer in the department of the Ponts et Chaussées. It is remarkable, however, that it was not till the year 1814 that Fresnel began to study and meditate seriously. He afterwards became so much distinguished: in that year he requested a friend, by letter, to inquire of his uncle what was meant by the 'polarization of light;' and it is to be presumed that he obtained the information he sought, for he forthwith showed experiments which he had been carefully self-acquainted with the subject. In 1823 he was a member of the Académie des Sciences at Paris; in 1825 he was elected a Fellow of the Royal Society of London, and two years later the learned body awarded him the gold medal for his optical discoveries. At the time of his death, which happened in 1827, he held the post of secretary to the Commission for the Lighthouses of France, and he was succeeded in this post by his brother M. Léonard Fresnel.

The phenomena of the colours exhibited by crystallized plates when exposed to polarized light, and the rings which appear to surround their axes, were attentively examined by Fresnel, and, in conjunction with his friend Arago, he succeeded in reducing the interference of light to simple laws, which were duly verified by experimental analysis. This subject, which has also been investigated by Sir David Brewster, M. Biot, and subsequently by M. Mitscherlich, is treated by Fresnel in a Mémoire which was read by the Institute of France in 1816. He gave a formula for the intensity of a previously polarized ray when reflected from a surface under any angle of incidence in a plane inclined to the plane of primitive polarization; and this, with a general account of the deviations which are produced in the plane of polarization by the phenomena of reflection, is contained in two memoirs which were presented to the Académie des Sciences in 1817 and 1818.

In 1819 he gained the prize which, in the preceding year, had been awarded by the Institute for the best memoir on the reflection of light. In his Mémoire he showed that rays passing at a sensible distance from a reflecting body de-
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and magnet on Milan distinguished Lucern beautifully C.

Considerations his and the he and the but, list and cousin, 1762. Frisi current made a complete explanation, on the undulatory theory, he ascribed the effect to a number of small waves which originate with each portion of the surface of the primitive wave when it arrives at the reflecting surface. In his Mémoire sur la Diffraction de la Lumière, he gives on page 257 a beautiful representation of the place of the geometrical shadow, and he determined that, within those limits, the light gradually diminishes till total darkness takes place. In order to examine the effects produced by the diffraction of light when it is made to pass through a small aperture and by the action of the eye-glass, Fresnel measured the diameters of these rings, and he has given an explanation of the variations produced in the intensity of the light of the central spot and of the central diameter of the eye-glass from the origin is varied. He observed also the succession of bright and dark bands which are produced when light from a radiant point is reflected from two plane mirrors inclined to one another at an angle of incidence, or in planes perpendicular to the direction of the motion of the wave. Unpolished light he conceived to consist of a rapid succession of waves in which the vibrations are performed in every direction in a perpendicular plane of the ray; and common polished light to consist in the transverse vibrations being parallel to one plane passing through the direction of the ray. By combining the hypothesis of transverse vibrations with the theory of undulations, Fresnel obtained formulae for the intensity of reflected light angles of incidence, or in planes perpendicular to the direction of the light of the wave, when the action of the eye will be supposed to be different from the elasticity in a direction parallel to the axis. In the year 1821 Fresnel presented to the Académie des Sciences a Mémoire in which the properties of double refraction and polarization of the light is explained. He investigated what he called the surface of elasticity: a supercilious conception to be such that the force of elasticity by which the vibrations of a molecule in the direction of the radiation are of equal magnitude as regards the direction of that radiation. He also gave, for doubly refracting crystals with two axes, an indication of the general equation to a wave surface, which has since been investigated by Ampère and Maxwell.

Fresnel's inquiries were also directed to the subject of rotatory polarization; and he found by experiments that the phenomena might be explained by conceiving the molecules of ether, which give rise to the rays in the direction of the axis of the crystal, or of the fluids in which the like phenomena are exhibited, as being constituted by a number of old mass which lined the walls of the corridors, and he made considerable progress in the study of mathematics with almost no other aid than that of a few books of which he obtained possession.

From Milan he was sent to the university of Paris, where he studied theology; and at intervals of leisure he greatly extended his knowledge of mathematics. He was afterwards appointed to give instruction in philosophy at Lodi; and while at this place he composed a Dissertation sur la Diffraction de la Lumière, and the explanation of the phenomena of double refraction exhibited by a crystal plate. He also observed that the light transmitted through the system exhibited phenomena similar to those which are seen along the axis of quartz. He succeeded in exhibiting before the Academy des Sciences de Paris a representation of the phenomena of double refraction, by making the light pass through prisms of glass which were subject to strong pressure by means of screws; and he was the first who observed the change produced by heat on the tints of sulphate of lime, a subject which has since been more completely investigated by M. Mitscherlich.

Apparently unacquainted with what had been previously proposed by Brewster for a like purpose, this philosopher and engineer devised several constructions of great lenses for lighthouses; one of these constructions consisted of five concentric spherical zones (plano-convex) of glass disposed at a central lens, the whole being contained in a square frame. Eight of these, in vertical positions, constituted an octagonal case or lantern, which revolved about a vertical axis, and had in its centre a powerful lamp. Another construction, however, in which Fresnel was interested, was called, one within the other; the convex surface of each was formed of thin cylindrical refractors, and both revolved about a lamp in their common axis: the cylinders were so disposed as to produce, by the revolution, incessant flashes of light of the sun.

Fresnel made some experiments for the purpose of decomposing water by means of a magnet; and the method which he pursued consisted in producing a current in an electro-magnetic helix enclosing a bar-magnet surrounded with silk; on plunging the end of the wire in water, he obtained some remarkable effects; but, being unable to account for certain anomalies which he observed, he abandoned the project.

(Frémont, Notices sur Fresnel; Biographie Universelle, Supplement, the everlasting idol, and the great lover of his country.)

FRÉY, JACOB, one of the most able engravers of the eighteenth century, was born at Lucern in 1761. After learning the first rudiments of engraving of a cousin, in his sixteenth year, he was placed in the studio of Johann Georg Caracci, whom he excited that painter's admiration and astonishment. Frey had used the needle more than was customary at that time with engravers; a practice which Maratta recommended him steady to pursue.

Frey soon obtained the reputation of the greatest engraver at Rome and of his time. He engraved in all eighty places, including many of the finest works of Italian art. Among the principal are St. Jerome, and Martyrdom of St. Sebastian, after Domenichino, after Raphael; The Holy Family, by Edelinck, after Raphael; the Aurora, by Guido; and several admirable plates after Maratta, Cignani, Caracci, and others. The Aurora, after Guido, was one of Frey's favourite pieces; it is beautifully drawn, and the Hours have a surprising degree of liveliness and motion; though less careful in the detail of the accessories, Frey's is a very superior print to that made by Raphael Morghen of the same subject, especially in the extremities and general expression. Chrisostom, and other plates, from the Aurora to the Aurora, are among the most important plates in Frey's portion of the composition. He died at Rome in 1752.

There is a notice of him and a list of his works in J. C. Fussell's Geschichte der besten Künstler in der graphischen Kunst; three of them amount of him in Gandellini's Notizie Udici delle Incisioni.

FRICITION WHEELS. [WHEELS, P. C.]

FRIBI, PAOLO, a distinguished Italian mathematician, was born at Milan, April 18, 1728, of a family which came originally from Strassburg; and at fifteen years of age he was placed in a monastery of the Barnabites, of whose order he became a member. At this time, apparently, the cultivation of the sciences formed no part of the discipline of the institution; Frisi accepted, however, some notions of mathematics which procured for him the author an invitation from the king of Sardinia to deliver lectures in philosophy at Casal. Frisi accepted the invitation; but the Académie des Sciences of Paris having, in 1748, nominated him one of its foreign correspondents, the honour thus conferred upon him secures to

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have induced the principals of his order, at Milan, to give him the appointment of professor of philosophy in the college of St. Alexander in that city. He proceeded on the foundation of this appointment time criticized by an ill-informed person, a Jesuit, who asserted that the arguments were inconclusive, and who reproached the author with attempting to obscure the glory of Italian science by the adoption of English. It is to his credit to have silenced this attack produced in the mind of Friuni a rooted dislike to the Jesuits in general. In answer to the objections made to some of the propositions he wrote a work called "Estrofe del Capo Quaroni della Universita' di Pisa," &c., which was published at Milan in 1755.

In the same year he published at Lugano a tract entitled "Saggio della Morale Filosofia," &c.; and, at Milan, his work "De Existentia et Motu Atterius, seu de Theoria Electrice," &c. About the same time he took occasion to oppose in the public the belief in witchcraft and magic, which then existed in Italy; and this boldness, together with a certain freedom in his manner of living, appears to have raised up against him many enemies: fearing their machinations, he wished to withdraw from Milan, and he gladly accepted an appointment in the university of Pisa, which was conferred upon him in 1756 by the grand-duc Leopold. While holding this post he published, in Latin (Lucca, 1767), select dissertations on the subject of plants, to which two years later he added, by Euler, Resaul, and himself, for the prize proposed by the Academy of Sciences at St. Petersburg; and a tract entitled "De Motu Diurno Terrae" (Pisa, 1758), which had obtained the Royal Academy of Berlin. Five plants published "Dissertationes Variae" in two volumes; of which the first (Lucca, 1760) contains a tract entitled "De Atmospher Celesium Corporum," and the second (Lucca, 1761) two others, entitled "De Inaequalia Motus Planetarum omnium in Circulo equ Circulo Elipticae" (in two books), and "De Metodo Fluxionum Geometricorum." In 1760 Friuni made a journey to Rome and Naples in consequence of a commission which he received from the pope, Clement XIII, to examine and report upon a subject in dispute between the people of Ferrara and Bologna respecting the navigation of certain rivers: he also assisted with his advice the commissioners appointed by the Venetians to repair the damages caused by the overflowing of the Brenta; and for these services, though he appears to have excited the jealousy of the engineers of the country, and to have made enemies of many persons whose estates were affected by the measures which were taken in consequence of his reports, he was liberally remunerated both by the Pope and the Venetians. In 1761 he published, at Lucca, a tract entitled "Piano de' Lavori da farsi per liberare e assecurare dalle Acque le Province di Bologna, di Ferrara, di Ravenna," &c.; and, in the following year, one in three books, entitled "Del Modo di reducere i torrenti prim'acqua dei monti del Borromago e della Romagna." Of these there have been four editions. He returned to Milan in 1764, having been appointed professor of mathematics in that city, and, except occasional absences, has continued to reside there ever since. In the year 1766 he made a visit to France, and from thence he came to London, where, as well as in Paris, he received great attention from the learned; the Portuguese ambassador in the latter city proposed to him an appointment in Lisbon, but this he declined, being unwilling entirely to leave his country. Two years afterwards he went to Vienna, where also he was well received, and where he was consulted on the subject of the disputes between the pope and the empress.

Soon after his return, the pope (Pius VI.) gave him a dispensation from his monastic engagements, and he lived subsequently as a secular priest. In 1778 he made a journey to Britain, and was, according to the custom of writing a sketch on subterranean rivers; and this, with dissertations on the meteorological influence of the moon, on conductors of electricity, and on the heat of the earth, he published at Milan, in 1781, under the title of "Opusculi Filosofici." In 1781, having previously enjoyed excellent health, he first felt the symptoms of a painful disease; these gradually increased in violence, and eight years afterwards, in the hope of obtaining relief, he underwent an operation: a mortification in consequence, and terminated his life at Milan on November 22, 1784, in his sixty-seventh year. He was buried in the church of St. Alexander in that city, and the Bernarbites honoured his tomb with an epitaph in Latin.

In 1776 Friuni was elected a Fellow of the Royal Society of London: he was also a member of the Academy of Sciences of St. Petersburg, of the Academies of Berlin, Pisa, Bologna, Copenhagen, and Berne, and of the Institute of Bologna. He was presented a gold medal by the archives of the archduke Joseph, afterwards emperor; and the empress Maria Theresa granted him a pension for life.

Besides the works which have been mentioned Friuni published several others, of which the following are the most important: — "Prefacio labita Mediolanii" viii., Idus Maii, (1764); "Saggio sopra l'Architettura Gotica" (Leghorn, 1766); "De Gravitate Universali libri tres" (Milan, 1768), a work on gravitation; and "De Alemantae et Frisii Principum Maniera sopra reservare gli Edifici del Fulmine" (Milan, 1768); "Danielis Melandri et Paulli Friuni alterius ad alterum de Theoria Lune Commentaria" (Parma, 1769); "Cosmographia Physice et Mathematica," 2 tom. 4to. (Milan, 1774, 1775) — this is contained in his practical work "De Tempe- ratura, Statica, e Idraulica" (Milan, 1777); "Pauli Friuni Operum: tom. 1, Algebra et Geometria Analytica continens (Milan, 1783); tom. 2, Mechanicam Universam et Mechanicam Applicationem ad Aquam Fluminum Theoriam (ibid. 1783). The third volume, which treats of Cosmography, was published by two of his brothers after his death. He published, at various times, notices of the lives of Galileo Galilei and Bonarensis Cavalieri, of Sir Isaac Newton, and of other authors.

Friulii is celebrated for his practical work "De Medicinam et Chirurgiam Principiis," 2 vol. 8vo. (Milan, 1755), which is considered his principal work. The "Del Drevenor Techne," in the "Scien- tia, Statica, e Idraulica" (Milan, 1777); "Pauli Friuni Operum: tom. 1, Algebra et Geometria Analytica continens (Milan, 1783); tom. 2, Mechanicam Universam et Mechanicam Applicationem ad Aquam Fluminum Theoriam (ibid. 1783). The third volume, which treats of Cosmography, was published by two of his brothers after his death. He published, at various times, notices of the lives of Galileo Galilei and Bonarensis Cavalieri, of Sir Isaac Newton, and of other authors.

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F. microphylla. Small-leaved Fuchsia, has pungent branches, with opposite, small, elliptico-oblance, acutish, toothed, glabrous, a little eliatted leaves; the pedicels axillary, shorter than the flowers; the calyx funnel-shaped, with ovate, acute, denticulated, low petals; the pedicels yellow longer than flowers; the lobes of the calyx oblong, acute, exceeding the petals, which are obovate and convolute. It is a native of Chile, in manzy districts, and is found as far south as the Straits of Magalhens. It is one of the species earliest introduced into the gardens of Great Britain.

F. cocinea. Scarlet Fuchsia, has glabrous branches, opposite, ovate, acute, denticulated, on petioles; the pedicels yellow longer than flowers; the lobes of the calyx oblong, acute, exceeding the petals, which are obovate and convolute. It is a native of Chili, in manzy districts, and is found as far south as the Straits of Magalhens. It is one of the species earliest introduced into the gardens of Great Britain; and was first described by Alston in the "Hortus Kewensis." It has a scarlet calyx, with violaceous petals. In its native countries the wood is used for obtaining a black colouring-matter, and the leaves and young branches are used as mucilage. It grows and blooms in the open air in the summer, but requires protection in the winter.

F. corystofera (corystofera). Walpers. Corynbuse Fuchsia, has the internode part of the leaf ovate, pungent, petiole, oblong-lanceolate, almost entire, the pedicels 8, nearly terminal, nodding, shorter than the flowers; the lobes of the calyx lanceolate-spatulate, twice the length of the pedicel, which is oblong-lanceolate. This elegant shrub is about 6 feet in height, with handsome flowers, and the leaves are ovate-oblong, in Muna, in shady groves. It has scarlet flowers two inches long, which hang down in beautiful corymbs. The berries are ovo-oblong, of a reddish purple color. This plant, although described by Ruiz and Pavon, has only been recently introduced into our gardens, and is now justly considered the most ornamental species of this beautiful genus.

F. arboreascens. Arboreous Fuchsia, has glabrous branches, the stem 3 in a whorl, oval-oblong, acuminate at both ends, petiole, oval-oblong, pubescent, 3-4 inches long, pubescent, nearly naked; the calyx funnel-shaped, with the lobes acute, and spreadingly reflexed, also the petals. It is a native of Mexico, and has been introduced into this country since 1824. It is a larger plant than most of the species, not unfrequently attaining a height of 15 feet.

F. gracilis. Slender Fuchsia, has the branches finely pungent; the leaves opposite, glabrous, on long petioles recurved, denticulated; the pedicels axillary, nodding, as long as the calyx, pubescent. This is an excellent species, and is exceeding the petals, which are convolute and retenue; the stigmas undivided. This plant was first described by Lindley, and has been grown in this country since 1828. It is a very handsome plant.

About fifty species of Fuchsia have been described, and many more than those named above have been introduced into the gardens of Europe. They are all American plants. They thrive well in a rich light soil; and young cuttings of them strike root readily in the same kind of soil when covered over with a hand-glass. Many will grow in the open air in this country throughout the winter with a very slight protection. When planted in clumps on lawns or borders, they should be cut to the root to preserve them through the winter. In the spring, when the ground is cleared, the stems of the preceding year, which are generally dead, should be cut off quite close to the ground, to allow the young stems to spring from the root.


FUODES. The vague title for many fossil marine plants described by Brockerhoff as having the vicinity of the sickle. It is a genus of few others generally by later writers. There is a peculiar geological interest in the distribution of Fucoids, since Dr. Forchhammer (Reports to the British Association, 1844) has shown the probability of their influence in the metamorphosis of rocks.

FUENTE RABIA. (i.e. the Frontier River; in English, Fontaroba) is a strong town in Spain, in the province of Galicia, and is one of the keys of the kingdom. It is situated in 43° 21' N. lat. and 1° 47' W. long., on a small peninsula on the left bank of the river Bidasoa, which forms the frontier between Spain and France, and falls into the Bay of Biscay between Fuente Raba and Andayas. It is built on a small hill facing the sea; on the land side it is covered by a lofty mountain, and on the sea side it has a fort. It is, however, a place of small importance, with only 210 inhabitants, and the harbour is partly obstructed by only a small burden. At the mouth of the Bidasoa is the Pheasant’s Island, or Isle of Conferences, remarkable for the negotiations which led to the conclusion of the treaty of the Pyrenees in 1659. It is 150 yards from Andayas, and, according to a convention, Spain leaves the fare on passengers from France, and France on passengers coming from Spain, the Bidasoa being considered as a neutral river.
ever the leichens that cover the rocks. In 1819 some fields were covered with a layer of locust four feet in thickness. The climate is very equable, the temperature between the hottest and coldest season not differing more than twenty or twenty-five degrees.

Mac Gregor states that this island contains a greater proportion of cultivable land than any of the Canary Islands, but that for several reasons agriculture is much neglected. The principal objects of cultivation are wheat and barley; try, maize, and tobacco are grown to a certain extent; oil is bad and not abundant. In the middle of the last century the culture of a soda plant (Mesembryanthemum crystallinum) was introduced, and since that time barley has been exported, amounting in 1800 to 40,000 bushels. Llamas, goats, and camels are reared in great numbers; but other animals are rare. Wild bees are numerous, and honey constitutes an article of export; but the attempts to introduce domestic bees have not succeeded.

The population amounted in 1831, according to a statement of Mac Gregor, to 13,500 individuals; but later accounts increase it to 16,000. If the area given by Mac Gregor is not exaggerated, not quite twenty persons are found on a square mile. They are very differently distributed over the surface of the island, five-sixths being found in the northern agricultural districts, and only one-sixth in the pastoral parts of the island. They are the descendants of the Spaniards who settled here in the beginning of the fifteenth century, but their complexion is more Indian than European. A frequent mixture of the inhabitants of the Sahara has taken place. They are a robust race of men, fit for hard work, and patient, but they are lazy and improvident.

The capital of the island is Santa Maria de Betancourt, a small town with about 100 houses and 600 inhabitants. The largest place is Oliva, situated in the vale of that name, with more than 2000 inhabitants. Antigua, which lies in a fertile plain, is nearly as large.

Fugger was born in 1406 by John the Bethancourt, a nobleman from Normandy, who however took it as a fief from King Henry III. of Castile and Leon. It is now the private property of the Marquis of Velazquez. During the first seven or eight centuries of the island, it was frequently laid waste by the inhabitants of Morocco, and to these circumstances the bad state is ascribed in which the island remained up to the middle of the last century, when the cultivation of the barley plant was introduced, which is now grown to a great extent, and constitutes the principal commercial wealth of the country. As late as 1802 all the produce of the island (barley, orichilla, goats, skins, corn, camels, and honey) was exported to Lanzarote, and thence to other parts of Spain, and English vessels were on an average more than twenty in one year, here arrived from London and Liverpool at Puerto de Cabras, the only tolerable harbour of the island, where the anchorage is but indifferent, and the landing-place, which is a beach of shingles, still worse. The place itself is only inhabited by 900 inhabitants.

(Glas's History and Conquest of the Canary Islands; Von Buch, Physikalische Beschreibung der Germanischen Inseln; die Germanischen Inseln nach ihrem gegenwartigen Zustande von Mac Gregor; and Lieut. Arlott's Survey of some of the Canary Islands, etc., in 'London Geogr. Journal,' vol. vi.)

FULGER, FRIEDRICH HEINRICH, a distinguished German painter, was born at Heilbronn in Wurttemberg, in 1761. He studied first in the academy at Dresden, whence he went in 1774 to that of Vienna, where he obtained the privilege of being an imperial painter. He remained about eight years in Rome, and in 1782 visited Naples, where he was employed to paint a series of frescoes in the library of Queen Caroline at Caserta, which he satisfactorily accomplished. In 1784 Fugger was recalled to Vienna, and was appointed professor in and vice-director of the academy, and subsequently director. He died at Vienna in 1818. Fugger distinguished himself in fresco, oil, and miniature painting, and likewise etched several plates with skill. His style of painting was more severe, but more like that of Mengs and imitated his style, and therefore, as with his model, the attainment of an imaginary ideal form engrossed his attention and became the chief object in his works, at the expense of other qualities and other traits. He painted several pictures from Roman history; some from mythology and Homer; a few from early Bible history; and a series of twenty illustrations of the 'Messiah' of Klopstock. Many of his works have been engraved; the series from Klopstock, by J. P. Leybold and others. His last picture was a large allegory of the Restoration of Peace, painted in 1815, to the glory of Francis I.; it represents the gratitude of the people on the banks of the Danube, but the composition is very poor: it was engraved by G. V. Kinninger in 1831. Some of his best works have been published by J. P. Fischer.

FUGLORA, a genus of hemipterous insects, popularly known as Lantern-flies, on account of their power of emitting light in the dark. The Fulgora interna of Linnæus-linea is the best known of the species; but probably the F. aurota is the closest relative. This insect is very remarkable, on account of the irregular inflated and enormous head, out of which the phosphorescence was said to proceed. The celebrated Madame Du Merian, who visited Surinam in 1671, states that the great work on the insects of Surinam she gives an account of her discovery. Strange to say, however, many travellers deny altogether the luminosity of the Lantern-fly, whilst others as strongly assert it. It is probably a sexual peculiarity, and only exhibited at certain periods in the animal's life.

FULLER, REV. ANDREW, was born February 6, 1754, at the village of Wicken, in Cambridgeshire, but received his very limited education chiefly at Soham, whither his father, who was a small farmer, of dissenting principles, removed while he was yet young. He was a younger son, and during his youth assisted his father in his farm, his relations having no intention to train him for any higher position in society. In 1770 he became a member of the Baptist church at Soham, and subjected himself to the charge by his father; and in 1772 he began to preach occasionally at a very early age. Early in 1776, his ministers, having proved very acceptable, he was regularly ordained pastor of the church of which he had for three years been the charge by his members; and in 1782 he accepted an invitation to remove to a Baptist church at Kettering, in Northamptonshire, over which he presided until his death on the 7th of May, 1815. In his sixty-second year Fuller took an active part in the formation of the First National Baptist Association, which was established on the 13th of December, 1799, and of which was secretary until his death; and he travelled extensively in England, Scotland, and Ireland to preach in behalf of this institution, the interests of which he promoted with untried success during his last year. His theological works are numerous and highly prized, though many of them are small, and relate to controversial subjects, often of temporary interest. His first appearance in print was in 1784, when he published a valuable sermon on 'The Nature and Importance of Walking by Faith,' shortly after which he printed a treatise, which was written in 1781, entitled 'The Gospel worthy of all acceptance; or the duty of all sinners to believe in Jesus Christ,' a work which, from its alleged tendency to undermine the authority of the Church of England, was, for some time, under the ban of the church. Its controversial importance was raised by the publication, in 1793, of the first edition of his 'Calvinistic and Socinian systems examined and compared, as to their moral tendency.' The author's views promulgated in this work were attacked by Dr. Joshua Toulmin and Mr. Kentish, to whom he replied in 1797 in his 'Socinianism indefensible, on the ground of its moral tendency.' Toulmin's reply to the first of those works, entitled 'The Practical Efficacy of the Unitarian Doctrine of the Trinity,' was published in 1792, and was first published in 1801. Fuller engaged in the Deistical controversy by the publication, in 1800, of 'The Gospel its own Witness; or the holy and divine harmony of the Christian Religion, considered as the best argument for a form of the human mind, and whether it be collected into a small volume a series of 'Letters to Mr. Vidler, on the doctrine of Universal Salvation,' which had originally appeared in the 'Evangelical Magazine' and the 'Universalist's Miscellany,' and in 1810 he entered upon another which was the controversy between the Unitarians and the Socinians on Sandemanianism. About the year 1808 he wrote, in answer to numerous attacks by the enemies of Christian missions, his 'Apology for the Christian Missions in India.' Among the less controversial works of Fuller were many small tracts and pamphlets, and other treatises, which in high esteem, and the following larger works: — Memoirs of the Rev. Samuel Pearce, of Birmingham, 1800; 'The Backslider; or an inquiry into the nature, symptoms, and effects of religious declension, with the means of recovery,' 1801; 'Expository Discourses on the Book of Genesis,' two volu
1806, 'Dialogues, Letters, and Essays on various subjects';
1807; a volume of 'Sermons on various subjects,' 1814; and
'Expository Discourses on the Apocalypse,' 1816, the latter
being prepared for publication just before, but not issued till
after his death. Of these, one appears to have been
written by his works. Fuller also edited works by other
writers, among which was 'A View of all Religious,' by Hannah
Adams, an American writer, to which he prefixed an original
Essay on Truth. A poem called 'Fuller appeared in 1816, in an octavo volume,
collected by John Ryland, D.D., chiefly from his own papers,
which contains large extracts from his diary and correspond-
ence, and a copious account of his writings, including his
numerous unpublished writings. The works prefixed to this
name were published in 1820, accompanied by a supplementary
volume of his 'Miscellaneous Pieces on various religious subjects,'
chiefly selected from his magazine papers.

Fuller's works have been repeatedly reprinted in America
as well as in this country, and the college of New Jersey,
about the year 1789, conferred upon him the degree of D.D.,
which, however, he declined to use. His 'Complete Works'
have recently (1845) been collected and published in one very
thick super-radio octavo volume, with a new memoir by his
son, Andrew Gunton Fuller; and from the advertisement to
this volume, it appears that the works were not collected
and published in 1831, in several volumes, of which this is a reprint.
Portraits of Fuller accompany both these editions and the
memorials of Ryland and Morris.

The Fumitory, or 'fumus,' smoke, in allusion to the unpleasant
smell which it exhalts: the French, with the same meaning,
call it fumiterre, and hence our English word fumitory,
a genus of plants the type of the natural order Fumaricae.
It has 4 petals, the upper one spurred at the base, 2 sepals,
discolute, stamens, fruit indescendent and 1-seeded. There are about twelve species of Fumaria,
which are smooth slender herbs, with small racemose white
or purplish flowers.

The B.S. of the Fumitory has ovate acute sepals,
toothed, as broad as the corolla, and half its length;
globose emarginate fruit; bracts a third shorter than the
fruit-stalks. It is a climbing plant, and has cream-coloured flowers
tipped with red or purple.

P. officinalis, Common Fumitory, has ovate lanceolate
sepals, narrower and two-thirds shorter than the corolla, broader
than the peduncle; fruit globose truncate, slightly emarginate;
bracts two or three times shorter than the fruit-stalks. It grows
in clover, nettles, and dandelions, and is not common, but is
plentiful in Britain. The flowers are of a pale red colour,
deepest red at the summit, with a green keel to the upper and
under petals. The leaves are succulent, satiny, and bitter.
the pressed juice is recommended as a remedy In cases of
hiccoughs and croupy states of the body, it is said to
correct acidity and strengthen the stomach. Boerhaave
used to prescribe it in black jaundice and bilious affections.
He had also gained some reputation as a cosmetic. Dr. Cullen
recommended an infusion of the leaves in cutaneous disorders,
and he also advised the use of it as a tonic whenever bitter
remedies are desirable.

P. micrantha is distinguished by its sepals being obovate
dentate, broader than and nearly half as long as the corolla;
fruit nearly globose; bracts two-thirds shorter than the fruit-
stalks. This species is found both in England and Scotland,
and has pale purple flowers in dense spikes.

P. parviflora has ovate sepals as broad as the corolla and
about two-thirds shorter than the fruit-stalks. The flowers
are smaller in all its parts. The flowers are of a pale red
colour. It is found in Kent, and is also very common in the
East Indies, where it is used as a medicine. The leaves have
a bitter taste, and Dr. Whitley Alnarde mentions it in his
Familiarbotan. The Mohammedans employ it as a diuretic, and
in medicinal cases.

P. Veilamii has its sepals narrower than the pedicel and
some times shorter than the corolla. Globose fruit, scarcely
pointed at the tuber. It is found in the pedicel. The flowers
are mostly white with a purple tip. This is a British species,
and is also found in sandy fields in the neighbourhood of
Paris and Montpellier.

With the exception of one or two species, this genus seems
hardly worth cultivation, having but a weedy and insignificant
appearance. Such, however, as having a climbing

look well if sown under a hedge and allowed to twine amongst
the stems and branches.


FUMITORY. [FUMARIA, P. C. S.]

FUMARIA, plants belonging to the natural order Malac., or Mosses. It has terminal fruit-stalks, with
an oblique double peristome, both the outer and the inner hav-
ing each 10 teeth, the inner ones opposite to those of the
outer. There are three British species of this moss: F. pe-rigaster, F. officinalis, and
F. hygrometra. The leaves have very concave, ovate, api-
culate, entire, the nerves excurrent; the fruit-stalk curved flex-
uous. It is a native of Great Britain, and is found by way-
side and under hedges mostly on banks where a wood fire has been burning on the ground. It may be thus constantly
found on the site of gipsies' encampments. It has obtained
its specific name hygrometrica from its fruit-stalk having the
property of twisting in different directions when moisture is
applied to it. On taking a dry fruit-stalk into the hand and
moistening the lower part with the finger, the capsule will
turn itself from the right to the left by making two, three,
more turns; on moistening the upper part in the same manner,
the capsule turns itself more rapidly in an opposite direction.
Under the microscope the stalk exhibits an elongated cellular
tissue twisted in a spiral form. The cellular tissue is not,
however, turned uniformly, but at two-thirds of the length of the
stalk it commences to assume a straighter form, and at the
upper part it turns itself, so as to remain almost opposite to
that of the lower part.

The cause of the turning in two different directions depends on this structure of the
cellular tissue. The capsule turns itself in an opposite
direction, which is more rapid, and the circum-
stance of its turning more rapidly on the upper end being
wetted, depends on the more acute angles made by the upper
apex. The dryness of the fibre is not the cause of this
phenomenon, as the green fruit-stalks, although perfectly
moistened, do not set the nerves of the capsule. This
phenomenon is probably owing to the shortening of the vegetable
fibres by the contact of moisture. In the green stalk the
three fluid contents of the cells leave a precipitate when they
are dried, which, when moistened, and the circum-
stance of its turning more rapidly on the upper end being
wetted, depends on the more acute angles made by the upper
apex. It is natural to suppose, therefore, that the
moisture is applied. In the ripened stalk this precipitate
is dissolved and absorbed, and otherwise applied; and thus the
cells, being empty, act like hollow tubes.

(Lancaster, 'On the Structure of Fumaria hygrometrica:'
Ann. of Nat. Hist., vol. iv. ; :
Hocker and Taylor, Muscologia Britannica."

FUNCTION, ARBITRARY. In the integration of
partial differential equations, arbitrary functions are intro-
duced, that is, functions which may be of any form whatso-
ever. Thus, in the problem of the vibrations of a thin
column of air, which leads to an equation of the form
\[
d^2x/dz^2 = a^2 d^2x/dy^2,
\]
the complete solution of the equation is
\[
x = \phi (y + ax) + \psi (y - az)
\]
when \(\phi\) and \(\psi\) stand for any functions whatever. The an-
termination of these arbitrary functions must depend upon the
data of the problem. Thus, if we were required to

\[
\phi (x + ax) + \psi (x - ax) = x
\]
Suppose, for example, that by introduction of external air, a certain amount of compression, $c$, is generated at the first moment ($x=0$) throughout the portion of the tube which extends from $y=0$ to $y=\infty$. When $x=0$, $c$ is $q$ and $y$, and the conditions of the problem require that $qy+qy$ should be equal to $c$ when $y$ lies between 0 and $m$, and equally equal to nothing when $y$ is greater than $m$. Hence, $qy+qy$ must be a discontinuous function; so that in this simple problem mathematical methods are insufficient to express a solution, unless discontinuous functions can be admitted among the solutions of partial differential equations.

There was, at one time, a spirited discussion between Euler and Lagrange, to which the discontinuous functions probably adopted among the solutions of differential equations. We cannot enter into the details of this discussion, but we shall state the manner in which the question has been settled.

The considerations in CURVE, P. C. S., give some approach to the notion that curves which are perfectly independent may be combined in one equation; and also that a continuous curve may be drawn, the arc of which runs as near as we please to two distinct branches of two independent curves. The power of expression given by means of definite integrals and periodic series [Integrals, Definite, P. C. S.] puts this result in a stronger light. Suppose, for example, that an axis of being taken, we may to express mathematically the ordinate $y$, in such a manner that it shall be nothing from $x=-\infty$ to $x=0$; that of a certain straight line from $x=0$ to $x=\infty$; that of a certain circle from $x=a$ to $x=b$, and nothing again from $x=b$ to $x=\infty$. In other words, we make a curve which is both limited and discontinuous, being a part of a straight line and a part of a circle, can be put upon the same sort of footing as an algebraic curve; so that a definite equation $x=y$ shall always give $y=0$ when there is no ordinate, and shall give the proper value of $y$ whenever there is an ordinate. The answer to this, that such an expression for $x, y$ can be given, when the notation of the integral calculus is assumed. And more than this, a continuous curve can be found which fulfills all the conditions above noted, as nearly as we please. That is, $m$ being a small quantity which we may name as small as we please, it is possible to find a continuous curve, the ordinate of which shall never be so great as $m$ from $x=-\infty$ to $x=0$, shall never differ by so much as $m$ from the ordinate of the straight line while $x$ passes from 0 to $a$, nor from that of the circle while $x$ passes from $a$ to $b$, and finally, shall never be so great as $m$ from $x=b$ to $x=\infty$. Having the power of making $m$ as small as we please, we thus trace the expression, as close as we please, to the five terms of the binomial.

In this manner, it appears that every discontinuous function may be regarded as the limiting form of a continuous one; and the various modes in which this is established take away all idea of the FUNDAMENTAL DIFFERENTIATION as the solution of differential equations. This subject is well studied in its application to physics.

FUNICULAR MACHINE is a name given by some mechanicians to a cord or chain attached at one extremity to an immovable point, the other end passing over a fixed pulley or friction wheel and having a weight suspended from it; a weight being also suspended from the cord or chain in some part of its length between the fixed extremity and the pulley. The cord or chain becomes thus a mechanical agent, since unequal weights, applied as has been said, may be in equilibrio.

![Diagram](image)

Let ABC in a vertical plane be the position of a cord suspended between two points A and B, but capable of moving freely on each of those points, and let w be a given weight suspended from any point C; the weight of the cord, and $q$, which should be applied to the cord, at the extremities vertically below A and B, in order to produce equilibrium, may be thus determined. Through C draw the vertical line $CZ$ to represent the weight $w$, and draw $Zn$, $Zu$ parallel to $BC$, $AC$, respectively; then, by mechanics, the lines $Cn$, $Cu$ will respectively represent the strains in the directions $AC$, $BC$, and consequently the lines $Zn$, $Zu$ represent the forces at the case of equilibrium, must be equivalent to those strains.

Now since the angles ACZ, BCZ are known, representing them by $a$ and $b$, the sine of the angle $CnZu$ may be expressed by $\sin (a+b)$; and by trigonometry,

$$p = w + \sin a + b - \sin a + b,$$

therefore if the cord were attached to a fixed object at one end, as A or B, with a weight $w$ hanging on a pulley at the other, and a weight $w$ were applied at any point C in its length, a weight $q$ or $p$, found as above, would hold the cord in equilibrium.

Again, if the weights $p$, $q$, $w$, and the position of the pulleys at A and B be given, the cord moving freely on the pulleys and the weight $w$ being capable of sliding by means of a ring along the cord; then the positions of the parts AC, BC of the cord, when the system is in equilibrium, may be found in the following manner.

For the parallellogram of forces; then since $CZ, Cn, Zn$ may be represented respectively by the known quantities $w, q, a$, the values of the angles ACZ and CnZu or BCZ may be found. With these values taken by a geometrical manner, or otherwise, the required position may be readily determined, since AC and BC make with horizontal lines, as Ad, being passed through A and B angles equal to the complement of ACZ, BCZ.

A funicular, suspended in a vertical plane between two fixed points and acted on by weights placed at different points in its length, is called a funicular polygon; and the form of the suspended cord being given, with the weight to be applied at one or more points, as AC, the weight at all the other points, in the case of equilibrium, may be found thus. Let A and B be angular points on the left and right of C, and having determined the strains represented by $Cn, Cu$ by the parallelogram of forces at C, construct a parallellogram at A and another at B, be the vertical lines passing through A and B for the directions of their diagonals, and having two sides of each coincident in direction with the adjacent sides of the funicular polygon, also making the sides (Ar and Br) on AC and BC equal to $Cn$ and $Cu$ respectively: then the diagonals will represent the weights to be suspended at A and C, in order to counteract the strains in AC and BC arising from the weight $w$ at C. By forming parallelograms in a similar manner at the other angular points, the whole system may be represented to the Funicular Machine in its description.

In like manner may the equilibrium of the rafters in a curb roof be determined. (Roof, P. C. p. 146.)

FUNISHED LODGINGS, [lodgins, P. C. S.] FUT, FURNISHED, and Furnished. Description of the Hudson's Bay Company and of the North American fur trade is briefly given in Furs and Fur-trade, P. C., and the further history of the company is given under OZOOCOL. The various kinds of fur mentioned in the first of these articles, as well as some found in India and Persia, may be classed according to their use as felted furs and dressed furs.

Felted furs. These include all those so employed in hat-making, and are principally the skins of the hare, the rabbit, the beaver, and the nutria. If the skin is taken of the animal in winter when the fur is full, soft, and fine, it is called 'seasoned,' and obtains the highest price; but if taken off at any other period of the year, it is comparatively coarse, harder, and less valuable, and obtains the name of 'unseasoned skin.'

In the preparation of hare's fur for the latter, the skin, after being opened and spread out flat, is rubbed with a kind of bleaching powder, for the purpose of 'bleaching the skin' by dirt and dried blood without detaching any of the fur itself. Then the skin is dampened on the felt, or inner side, and several are pressed one over another to remove creases and irregularities. The next ensures the 'gumming of the felt beneath.' This covering is of two kinds: an external coat of long hairs which possess no felting properties, and an internal coat of fine or true fur. These are removed separately. A pair of shears, something like a pair of scissors, is next employed to cut off the coarse hair without damaging the fine fur beneath; and to effect this properly it is a difficult operation. The skin before this shearing was of a brownish colour, but
when the external hair is removed the fur beareth appears as a beautiful black jet. To remove this fur is the next stage.

The skirt, extended smooth and even, is placed upon a square cutting-board or table, and the table is covered by an outer spread of white or black cloth so as to cover the cutting-board, or of a blue or green cloth, so as to prevent any blunting of the edge of the knife employed in the cutting. This knife is about six inches long by three broad, and has a rough edge; it is shaped something like a cheese-cutter, so as to be used both for cutting and for marking. With the use of a knife thus prepared, the fur is cut gradually in every part of the pelt; the knife follows in the direction which the fur naturally takes on the animal's skin: that is, from the head towards the tail. The whole of the fur from one skin is either collected together as a light fleecy mass, or is divided into parts according to the different qualities of the different parts.

The preparation of rabbits' fur for the hatter is somewhat different from the above in its earlier stages, on account of the greater softness of the pelt, or indeed of its less value. By the use of a knife in the usual way, the thin cuticle on which the grease or fat is deposited is stripped off, bringing the impurities away with it. The surface beneath is then rubbed with whiting. The rabbit skin, like that of the hare, has two kinds of hair or fur; but the coarser, instead of being removed by shearing, requires to be pulled; this is done by a short knife about three inches long, held against a leathern shield worn over the thumb: the hairs are grasped, a few at a time, and then pulled over the edge of the shield. The double care is here requisite: to avoid cutting the hair instead of pulling it, and to avoid pulling or cutting the fine fur beneath. When this is done, the fine fur is cut off in the same manner as hare's fur.

For the manufacture of fur skins (the commercial name of the skin obtained from the Cervus or Coypou, P. C.), the processes are nearly the same. The skin has derived its name (variously written, neutria, nutria, neutra, neutra,) from the Spanish name for the same, whose skin it bears some resemblance. It is full of fat and grease, and requires a thorough washing with soap and boiling water before being 'pulled.' The outer or coarse hairs are treated like those of the rabbit, and not like those of the hare; being stronger, too, they require a sharper knife and a stronger pull. Between the two sides of the pelt, but also the fur-side is full of grease, and need a thorough purification before the removal of the hairs and fur. When the external hair has been pulled, the inner fur is cut off in the same manner as hare's fur.

The skin of the beaver is, in many respects, the most serviceable of them all for the hatter's purpose. It is, however, so full of grease that the pelt requires to be soiled with fuller's earth and whiting before it attains a sufficient state of cleanliness. The coarse hairs are pulled out by the knife and thumb, and being of no use to the hatter, they are sold as a stuffing for cushions. Then comes the cutting or cropping, which is, at the present day and in the largest establishments, effected by a two-handed machine, with a thicker blade, equaling in length the full width of the beaver-skin, and so adjusted as to fall rapidly with a chopping action against or near the edge of another blade beneath. The skin is placed between the two, and is attached to a piece of mechanism by which it is drawn gradually from end to end between them; as it passes, the sharp blade crops the fur from off the pelt, which it does so effectually that not a particle of fur is left behind, and yet the pelt is not cut through in any part. The fur falls down in a light fleecy layer, and so an endless apron beneath, from whence it is removed when the pelt is denuded. This fur is of three or four different qualities, that from the cheek being the finest and most valuable; and to separate them one from another a method at once simple and easy is employed. The pelt is placed upon a large chest or trough, where it comes within the action of a fan revolving two thousand times in a minute; the current excited by this fan is so violent that it whisks the fur along a thick-board made of wood; the pelt is rolled in this fan, and so the passage of the fur, the relative specific gravities of the filaments effect a separation without any farther interference: those which are largest and coarsest fall first, and are deposited on the bottom of the first compartment of the trough; those which are next in size fall in the second compartment; and so on. Lastly, the finest and best parts of the fur are blown to the extreme end of the trough, whence they can be taken without mixture with any of the others.

The quality of a beaver pelt by machinery has been attempted for various furrs, but it has succeeded only in respect to beaver; this is said to be owing to the circumstance that the beaver-pelt is very regular in thickness and uniform in surface; whereas, most of the other pelts are irregular or unequal. If the blade of the machine by passing over an irregular part of the pelt should cut off a small bit of it, it would spoil the value of the whole pelt of fur unless removed. Attempts have been made to detach the fur from the pelt by chemical instead of mechanical means. In tanning and leather-dressing, the hair and wool of the animal are often loosened by being exposed for some hours to the action of some chemical, and it has been supposed that the same result would be obtained in respect to fur for hatters' purposes; but it is found, that though separable by such means, the fur is injured in its felting properties—an objection fatal to the adoption of the plan.

Other kinds of fur besides the four above-named are employed in hat-making, but are not so generally serviceable. Mink fur is small, fine, and regular, but is almost too short to be available. Musquash fur is finer than that of the seal, and indeed the pike's, but it does not take a good black-dye. According to the price at which a hat is intended to be sold so is the selection of the fur employed. A good beaver hat contains in the pelt of a single animal a large proportion of the best fur, and in the covering beaver-fur alone; this is the standard, from which a departure takes place according to the price.

[HAT, P. C.]

Some kinds of fur which are rather deficient in the felting property are made to undergo a process termed 'carretting,' so called from the colour imparted thereby to the fur. This consists in wetting the skin (before the fur has been yet cropped from the pelt) with dilute sulphuric acid, and quickly drying it either near a strong fire or by means of a heated iron passed over it. The fur of the same species of animal often differs very much in felting quality, according to the district where the animal is found. Thus, the fur of the rabbit is said to possess a stronger felting quality when obtained from an animal reared near the sea-coast than from animals, which are reared in the inland districts. A beaver-fur from those of the eastern coast of England, from Lincolnshire to the Tweed, are considered the finest. The fur of the English hare, as a second example, is found to be both finer in quality and stronger in felting power than that of any other variety of the hare.

Dressed Furs.—By this term may be designated those furs which are retained on the original pelt, and in that state worn as garments or trimmings of garments, in the forms of cloaks, caplets, cuffs, collars, &c. Such an employment of them is very much a matter of necessity among the rude tribes where the custom was first followed. At first the skins were worn almost in the state in which they were taken from the animals; but, from a desire of increasing the value of the skins, and of dressing them, the furriers employed the skins and fur in the covering-beaver-fur alone, and fur took rank as an adornment as well as a covering. We find that, by about the beginning of the fourteenth century in England, the custom of wearing costly furs had reached such a height, that Edward III., in one of his sumptuary laws (a.d. 1337) enacted that all persons could not spend a hundred pounds a year should be absolutely prohibited the use of furs.

The dressing of furs for this purpose, or 'furrery,' is much more simple than the preparation of furs for the hatter, since it does not involve the separation of the filaments from the pelt beneath.

The fur-hunters of America, when they have captured a beaver or other fur-bearing animal, strip off the skin, and hang it up to dry; and this is the general custom of the fur-traders, except in a room where there is no fire. Great importance is attached both to the drying and to the careful packing of the skins; for if the slightest degree of putrefaction ensues, the fur loses the firm hold of the pelt, and is not fit for any purposed use. When the skins are brought to England, and placed in the hands of the furrier, he examines them minutely, to see that the dyeing has been properly effected, and the pelt in a firm state. He then proceeds to the main part of his business, viz. extracting the grease from the pelt, and also a kind of oil which is in the pelt itself. The skin is put into a liquid containing bran, alum, and salt; and after sufficient steeping it is worked about and stirred, so as to clean the skin and dried, and remove its oiliness by an application of soda and fine soap. The cleansed skin is finally washed thoroughly in cold water, and hung up to dry. The alum and other ingredients employed

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in scorning the pelt effect a kind of tanning or tawing process, by which the pelt is converted into a sort of thin leather, and thereby rendered more durable.

When thus far prepared, the skins are ready to be worked up into the form of garments, or materials for garments. In order to give the surface of the fur a uniform length and colour of fibre, it is often necessary to cut up a great many skins, and sew certain pieces of each edge to edge; for it is rarely if ever the case that every part of the same skin is of one uniform colour. The cutting up of a skin thus becomes an important affair; for unless considerable tact be exhibited, many of the smaller pieces would run to waste. The furs which are used for these purposes are in general different from those selected for felting; they comprise usually the grey, the silver, and the black fox, the sable, the bear, the lynx, the mink, the chinchilla, the marten, the wolf, the otter, and a few others of less common character.

The preservation of furs, when kept in hand for manufacturing purposes, is a point of considerable importance, from the several sources of injury to which they are exposed. If kept too damp, they rot; if too dry, they diminish in weight. 'The greatest enemy to all furs,' says a practical writer on this subject in the 'Encyclopaedia Britannica,' is the common moth. This destroys the felting principle. Whenever the slightest appearance in the fur indicates the secure lodgment of this little creature it ought immediately to be used; or, if this cannot be done, it should be taken out of the paper-bags, and broken all over with a small switch rod, or, what will answer the purpose still better, a batter's bow. The same rules apply to the keeping of skins in good condition as to fur. The utmost ought to be cool, dry, and well aired. They will seldom keep longer than twelve or eighteen months, without running great risk of suffering injury from the moth or black beetle.

Too many ought not to be hooped together, and particularly if they be rabbit-skins, because the fat or grease about these skins will get heated, run amongst the fur, and become of such an acid nature as to corrode the very pelt itself. Many persons are inclined to keep hare and rabbit skins a long time, from a notion that the fur upon them will increase in length from the moisture left in the pelt. This is an entirely erroneous opinion. Any one who will make the experiment will find that the amount of fur obtained off any given quantity of skins is much greater in weight when manufactured immediately after they are taken off the animal, than after having been kept for six or twelve months.

FURZE. [ULM, P. C.]

FUTURE. [CONJUGATION, P. C.]

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GADDE GADDI. The name of a celebrated old Florentine family of artists of the thirteenth and fourteenth centuries.

GADDE, the contemporary friend and confidant of Andrea Tafi, and Gimabue, was born at Florence in 1349, according to Vasari. Gaddi was a painter and mosaic-worker, and assisted Tafi in the Mosaics of San Giovanni. He executed the mosaic of the 'Coronation of the Madonna,' in Santa Maria del Fiore, which is still extant. This work obtained for him a reputation all over Italy, and he was called by Filippo Brunelleschi in 1308 by Clement V. to Rome, to complete some mosaics in the new church and palace of San Giovanni in Laterano, which was rebuilt after the fire of 1807. He executed other works in St. Peter's, and in Santa Maria Maggiore, which last still exist. There is also a Madonna by him in mosaic in the cathedral of Pisa. He executed some paintings in tempera, but they have all perished. He died in 1312, and was buried in Santa Croce, where his son Taddeo painted his portrait beside that of Andrea Tafi, in a Marriage of the Virgin in the Capella Barborelli.

TADDEO GADDI was a much more able man than his father, after whose death he lived twenty-four years with Giotto, who was his godfather. He was the most distinguished of Giotto's chief assistants.

Vasari mentions the paintings of the sanctity of Santa Croce in Florence, as Taddeo's first works; the altarpiece, however, of this chapel, is altogether similar to the other paintings, as it belongs to the class of those which was started five years earlier than the death of Taddeo; the portion which Vasari attributes to Taddeo are the five subjects from the life of the Magdalen. The frescoes of the Barocenelle (now Giugi) chapel in the same church, representing the life of the Virgin, also by Taddeo, according to Vasari, are in a different style, and in one which assimilates more with the characteristic style of the period. Taddeo enlarged somewhat upon the style of Giotto; he gave more bulk and movement to his figures. The frescoes of this chapel are perhaps the best of his works that are still extant. He also painted in the church of the Holy Ghost, and Peter saved from Shipwreck; in the Resurrection light proceeds from the body of Christ. The painting of the wall is apparently a replica of the glory of St. Thomas Aquinas, considerably above his extensive services to the church. The other walls of the chapel were painted by Memmi at the same time as the works of Taddeo were executed, but are much inferior to them; on one of the walls are the reputed portraits of his wife and Laura. Taddeo's works in this chapel are the most considerable efforts in painting of the fourteenth century; but they are not in a sufficient state of preservation to judge adequately of their merits, yet sufficient to justify his reputation of the best draftsman of his age or century. In composition he was symmetrical and crude; in character natural, and in expression not superior but equal to Giotto. Taddeo was likewise a distinguished architect; he built the present Ponte Vecchio in 1325, and midstone della Trinita, which was destroyed by the flood of 1557, and was replaced by the present bridge by Ammanati.

Taddeo Gaddi amassed great wealth, by means of which he established his family, and the Gaddi have been numbered among the most distinguished families of Florence. It is not known when Taddeo died, but Rumohr has shown that he was still living in 1366, when, according to Vasari, he must have been in his sixty-sixth year. He was buried in his father in Santa Croce.

His most distinguished scholars were Giovanni da Milano and Jacopo da Casentino, to whom he entrusted the care of his sons Giovanni and Angelo: the former died young, after giving great promise as a painter.

ANGELO GADDI excelled in colour, and generally in the technical practice of the period, which appears to have been thoroughly established in his time. He, however, executed several great works, especially in Santa Croce, where he painted the history of the Discovery of the Cross; but they are all in imitation of Giotto, and he was inferior to both in expression and to his father in design.

He executed many works in Florence in various churches, and he visited Venice not only in the capacity of a painter but also as a merchant, there established a commercial house there, together with his sons, and realized a great deal of his son's deceased himself to mercantile pursuits. He died, according to Vasari, aged 63, and according to Baldinucci, in 1386; but if he died at that age the date can scarcely be correct, if the fact, as implied above, is true, that he was young when his father died.

Angelo left two distinguished scholars, Stefano da Verona, and Cennino Cennini, who is the author of the earliest known treatise on painting—'Trattato della Pittura,' Rome, 1821: it was written 1347. (Vasari, Vie de Pittori, &c.; Speth, Kunst in Italien; Rumohr, 'Italienische Forschungen."

GAERTNER, JOHANN ANDREAS. Descended himself from a family of artists, and also on account of his own professional talents, and as being the father of the present celebrated FRIEDRICH VON GAERTNER (born at Coblenz in 1793, now (1845) chief architect to the king of Bavaria, and who has adorned Munich with some of the noblest and most monumental structures.

Though we speak of this architect (Friedrich) merely incidentally, not biographically, yet as the opportunity offers itself we give a list of his principal buildings down to 1844, viz.:—

1. The Ludwigskirche, a beautiful and noble ecclesiastical building, with a magnificent Library, University, Denkstätte, Priester-Seminar, Blinden-Institut, Salzamt, the Ludwig Gate, and Feldhernhalle, all at Munich; the Residenz, or new palace, at Athens; the Befreiungshalle at Xelheim, a colossal monument of rotunda form, intended to commemorate the liberation of Germany; the Palace at Wittenberg; the magnificent Pump-room at Kissingen, and the Pompeian House at Aschenaffenburg. Contrary to either Schinkel or Kienze, this architect chiefly affects the Byzantine or round-arch style. He has just begun to publish University, Academy, etc., and architected a number of the noblest buildings, large and small, and even its entire length.

When he visited Vienna, Berlin, and Paris, in which last capital he remained nine years, when he was invited to Coblenz, to finish the Residenz or electoral palace there. He next entered the service of the Prince-bishop of Würzburg, being glad to quit Coblenz (where his son Friedrich was born), the disturbances arising out of the French Revolution having both rendered that city an insecure place of abode, and cut off all prospect of professional success. He was at Würzburg, and in its neighbourhood, all of which display superior talent and taste; among others the theatre, and restorations of the Church of St. Michael at Würzburg, and Count Schönborn's château at Galbach; and he continued to reside at Würzburg till his death. He approached, from his political connections, most of the royal palaces of Bavaria, and after he himself had been nominated as a Bavarian architect, for he did not remove to Munich till 1804, when he had been appointed Hofbauprincipal there. He did not however find opportunity to indulge that enlarged scope for the display of his abilities which he had promised himself, for of the various designs which he produced, scarcely any—none of the more important ones—were adopted for execution. Towards the close of his life he felt the disappointment so bitterly, that instead of selecting his

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best designs and publishing them as a memorial of his talents, he did try them with his own hands, as if to prevent others from a sulling themselves of the ideas which he had been able to form, without any aid from others. From this circumstance it may be inferred that he felt protracted life—and he did not die till 1626, when he was in his eighty-third year—to be attended with other penalties than those annexed to old age. Could he have foreseen how much more prosperous a career was reserved for the son of a humble condition? Would he have borne his own disappointments with less impatience of temper.

GAIEA, a genus of plants belonging to the natural order Liliaceae, and the tribe Asphodeleae. It has a perianth of six parts, but is adherent to the base of the perianth; the anthers erect, attached by their bases. The flowers of the species are cormyose or umbellate.

G. lutea (the Ornithogalum luteum of many botanists) has the radical leaves usually solitary, linear-lanceolate, flat; the bracts 3, opposite; the peduncles umbellate, simple, glabrous; the segments of the perianth oblong, obtuse; the bulb ovate, solitary. The stem of this plant is about six inches high, and shorter than the leaves. Its flowers are yellow. It is native of England and Scotland in woods, but is a rare plant. It is a native of Europe, and is found on the Alps in Switzerland. Koch describes ten species of this genus as natives of Germany and Switzerland.

Babington, Manual of British Botany; Koch, Flora Germanica.

GAILLONIERA, one of the abundant infusoria fossils of Franzenbad in Bohemia.

GALANISNO, the name by which Balsamai Aloisi is generally known. He was born at Bologna in 1575, was ordinated at the University of Padua, and was probably the most distinguished of the Italian portrait painters: he is sometimes called the Italian Vandyck. He practised chiefly at Rome. Galanino was also a very able historical painter and a skillful etcher: he died in 1627.

(Baglione, Vita de’ Pittori, &c.; Malvasia, Pellea Pictura; Bartsch, Peintre Graveur.)

GALASHIELS. [Selkirkshire. P. C.]

GALOEISIS, from γάλακτος, a ‘wesel,’ and ὄψις, ‘sight,’ a plant name for the corolla glandular of a wesel, a genus of plants belonging to the natural order Labiate or Lamiaceae. It has the anthers approaching in pairs, opposite cells bursting by two valves transversely; the upper lip of the corolla arched, and the lower lip three lobed, unequal, with two teeth on its upper side; a tubular 5-toothed calyx, with equal teeth, or the two upper ones longest. The nuts are rounded at the end. The species of this genus are annual, divaricately branched, erect herbs and rarely decumbent at the base, with or without catkins, or corymbs, with both these colours. This genus may be easily recognized by the peculiar formation of its anthers, which differs from any other of the Labiate.

Hemp Nettle, a cream-coloured Hemp Nettle, has a softly pubescent stem with deflexed hairs, not thinned below the joints, oblong or oblong-lanceolate leaves, clothed with soft villi on both surfaces. The calyx is short and glandular, and the upper lip of the corolla deeply cut. This species is found in the sandy corn-fields of Middle Europe, and also in England and Wales. The flowers are of a pale yellow or cream-colour, and bloom during the months of July and August.

G. indorum, the red Hemp Nettle, is distinguished by having the upper lip of the corolla slightly notched. It is a native throughout Europe, and is found plentifully in the sandy corn-fields of Great Britain. The flowers are of a purple colour, variegated with crimson and white. A variety of this species, with flowers half the usual size, is the G. intermedia of Reichenbach, and the G. parrisiforla of Lambert.

G. tubethus, the common Hemp Nettle, has a hispid stem, thickened below the joints, with oblong, ovate, acuminate, serrate leaves. The calyx has tubular teeth, and a tube not more equal. The tube of the corolla is as long as the calyx, and has an ovate upper lip. It is of a purple colour, and is a native of cultivated ground throughout Europe and Middle Asia, and is plentiful in Great Britain.

G. hirsutum; the tube of the corolla much longer than the calyx. The flowers are very large, yellow, and have a broad purple spot on the lower lip. It is not easily distinguished by description from G. tubethus, of which it is regarded as a variety.

(Don, Gardener’s Dictionary; Babington, Manual of British Botany.)

GALILEO. A short time after the article Galileo, P. C., was published, there appeared in a leading Roman Catholic publication, the ‘Dublin Review’ (July, 1858, vol. viii, p. 405), a paper upon the trial and condemnation of Galileo and the Celestial Inquisition. The article has been appropriately cited, and seems to be considered by some, at least, of the English and Irish Roman Catholics as a triumphant reply to the account usually given. We shall here briefly examine the main points of this account. Our purpose in doing so is not to detract from the fame of Galileo, but this article has not been fairly handled by Protestants, is, how far those parties can claim to be the representatives of the church which declares itself infallible in matters of faith. The importance of Galileo’s trial depends upon the connection with this question; and party zeal has mixed up with it all manner of discussion upon the character of the proceeding itself, and the motives of those who originated it. Englishmen would do well to remember, with regard to the latter points, their own Star-Chamber procedure and its results, and the astronomical and historical truths which it involved.

Even in Italy the defence of the Inquisition has been long and openly given up by many. Witness the expressive silence of the account of Galileo, in the ‘Elogi degli Uomini Illustri Tommasi’; Lucchesi, 1772, taken from the contemporary Milan periodical dedicated on 15th March, 1770 (Milles 1770) that ‘the imagination is horrified, and the virtuous and feeling mind shudders,’ at the language applied to Galileo in the sentence passed upon him; and that of Fabroni (Fisa, 1784), that ‘it is better to be silent upon the details in order to increase the horror which every virtuous mind ought to feel against the injustice of that time.’ And the article in the Dublin Review styles the Inquisition ‘supervitally cruel in Spain, more mild and sparing of human life in Rome’—only more mild the less cruel.

That the Roman Church decided against the earth’s motion has been generally affirmed by Protestants, and denied by Catholics, we believe with justice. But that the church which claims infallibility in essential matters suffered two local tribunals, the office of which was the suppression of heresy, to pronounce, and, as it turns out, to pronounce wrongly, upon a question of astronomical fact, is all but universally admitted. Nevertheless, even this is denied, and insistently by those who claim the moral right to speak of the Inquisition as a thing of the matter is as follows—that Galileo, in 1615, not content with supporting the Copernican doctrine as a trutl, which it was open to him to do, persisted in invading what him admitted, and premised a peremptory and altogether erroneous declaration that the sacred Scriptures could be interpreted against Ptolemy and for Copernicus; and this, in spite of many friendly warnings, that he must confine himself to ‘demonstrating his system,’ and writing ‘as a mathematician, and by way of hypothesis.’ That when the first attempt was made upon him in 1615 (which was rejected by the Inquisition for informality), as much licence as the above was distinctly mentioned as given to all. That the prohibition of 1616, to teach or write in favour of the Copernican doctrine, was in prohibition to Galileo only, not to others, and was brought about partly by Galileo’s persisting in forcing the theological question upon the court, and partly by the imprudence of his advocate, Cardinal Ossini, in pressing the subject upon the pope. That before this prohibition was given, on the occasion of Galileo’s first personal appearance, the qualificators of the Inquisition, whose office it is to put the propositions bearing on the points at issue before the court, drew up the two famous theses, in which the doctrine of the earth’s motion was censured and heretical. That when Galileo, in 1623, brought on the proceeding of 1633, not only by a breach of the prohibition, but by a sarcastic reference to it, and a caricature of the arguments of his friend and benefactor, the reigning pope, these

1 The poor misconformity (see Galileo’s ‘Liber De Bello’) pleased in vain that they were used by Galileo ‘as a weapon to sell the Jews, which distinctly implied that he was full and at times at any one could see that he was a little biased in much of his work. We should be remembered, that in the year following it was proposed to insert one of those theses in the act of condemnation which was decided in favor of, and the latter is a charge declaring the consent and consent to be nothing more than a declaration of obedience. This charge accused the Lord was rejected by the Commons.
These were merely cited in the preamble of the sentence, and are not to be taken as anything but recapitulation. That the word heretical, in the proceedings of the Inquisition, is the "stilus curiae," and that even offenses against morals or the public peace might be tried in said clerical court, and be styled heretical, before that court can assume jurisdiction.

In the above are the following assertions. 1. That any one (except Galileo, restrained for his own misconduct) was at liberty to teach the earth moved. 2. That the arguments cited as doing violence to the first point confined himself to philosophy, and let theology alone. 3. That the Inquisition pronounced no opinion upon the truth of the doctrine. 4. That it pronounced no opinion upon the orthodoxy of the same. We deny each of these positions, upon the clearstress of its own records, and that of Galileo's, still less will we deny that it pronounced no opinion upon the orthodoxy of the same. But we do not deny that much has been stated which, when closely examined (for articles in reviews do not deal in references), would probably establish the fact that the prohibition of this was mainly due to the injury to two works of which Galileo pressed the theological question. Nor do we deny that the conduct of the philosopher was weak and ungrateful in putting into the mouth of the wrongheaded personage of his dialogue the arguments urged to him in personal conference by a benefactor, Urban, with a hint that they came from a high quarter. All parties admit that it was the irritation of the pope at this conduct which led to the final proceeding.

As to the first of the preceding assertions. There were, at the time, more than enough of such arguments to rend the theory. First, as a mathematical hypothesis, assuming it not as true, but as sufficient to explain phenomena, and leaving its truth or falsehood aside, or even implying the latter. Secondly, as a truth, but without any reference to the Scriptures, and contradicted by arguments, which, nothing less than the witnesses. The Scriptures really assert the contrary, there must be something wrong in those arguments, but that if the latter really amount to demonstration, then the interpretation of the Scriptures, which makes them assert the contrary, must be wrong. Thirdly, as an absolute truth, confirmed by reason and Scripture both. In the article we are examining, the first and second of these modes are confounded: and it is thought that what makes the latter true is the fact that the former is false. It is thought that a mathematical hypothesis is a mathematical and by way of hypothesis, and to confine himself to demonstration, he was left with permission to use the second mode. This is not correct, but the mistake is a natural one. We have already seen [Damos- stratos, P. C.] that demonstration, as applied to physical hypothesis, meant only explanation: and that it could be said that a false hypothesis might give true demonstration; that is, might be shown to be capable of accounting for phenomena. So much of the doctrine of the Scriptures must look to the words of the authorities. Of these there were two, the Inquisition, which took cognizance of the acts of heretics, and the Congregation of the Index, which examined and censured their books. In one and the same year (1616) the public far-reaching, in its judgment the great work of Copernicus, and the writings of his followers. The decree which condemns them calls the doctrine of the earth's motion false, and altogether contrary to Scripture. And this decree prohibits no inquiry as to what was the real intention of the author, which endeavour to show that the doctrine is not contrary to Scripture, but also that of Copernicus, which does not touch the question of theology. This is plain enough, but we can make it still plainer. Four years after (1620), the same Cardinals of the Inquisition, finding that the work of Copernicus could by slight alterations be made to speak the language of hypothesis, published the corrections under which they would allow it to be read. We put a few sentences of the work side by side with the alterations demanded by the Inquisition.

Copernicus. This question (of the motion of the earth) is not yet settled, and is not to be despised by any means.

Since then there is nothing to hinder the motion of the earth.

On the motion of the earth (heading of a chapter). The three stars (the earth being one)

This surely will settle, in reasonable minds of all persuasions, the question how much is permitted to a person speaking as a mathematician, and by way of hypothesis. If Copernicus says the earth is a star (a word implying motion), the cardinals strike it out; if not so, he is to be judged by the court, and not by that of the Inquisition. But this is a strong argument, and to make it relevant it must be shown that the declaratory power of the Inquisition was lodged in its inferior officers, and not in its judges. If the tribunal were so constituted, it might be said that the cardinals had declared against the doctrine, that is, the court did pronounce a decision in its usual form and manner, and we assert nothing more. All that was done in any other case was done in this one. But in point of fact, it will be found that the cardinals are only the assistants of the judges; and the voluntary adoption of their conclusions by the cardinals makes those cardinals the responsible parties. But further: it is not true that the final sentence of 1653 did pronounce the doctrine of the earth moved to be false. It is true that the proceedings of 1653. The defence before us asserts that the Inquisitors did not at all trouble themselves with considering the truth or falsehood, the innocence or poison, of the opinion assailed. To this the sentence itself reply: And that this sentence, corrected, and even modified, and might not further creep in, to the great injury of Catholic truth, a decree emanated from the Sacred Congregation of the Index, by which the books which treat of this doctrine were prohibited, and it was declared that of the false opinion of the motion of the earth has increased more and more from day to day, the said book was diligently considered. And in the recantation Galileo is made to say that the opinion of the earth's motion is false and heretical, and that he abjures and detests that error and heresy. It thus appears that there are four parties who declare the doctrine false and heretical—the cardinals, the Inquisitors, the Congregation of the Index, and the public; and that there is no room for difference.

Next, as to the question whether the Inquisition declared the doctrine heretical. That, as far as its authority extended, and in its own usual sense and meaning of the word, it did so, is clear enough from what precedes. But, as may be seen, the public who have brought this matter before the Inquisition, as well as the cardinals, have come to know the doctrine of the Copernican system of the world, and those who declare it is the basis of all the ideas about his work have been compelled to consider every point with as much reference to heresy and orthodoxy, as the Court of King's Bench to decide whether a case was in a good or bad position of money detained by force. Whether the maxim of our law—In fictione juris semper substitit aequitas—can be applied to the Office called Holy; whether the high authority which Catholics reckon to be infallible when it does pronounce a decision, is not morally as much as it is in its power from the scene of action, and in allowing an inferior tribunal to assume the function of interpretation which it asserts to belong peculiarly to itself—are questions on which Catholics themselves will be likely to be divided in opinion. But however this may be, to require them to admit that their church has decided against the motion of the earth, as a matter of fact, and in its asserted infallible character, is to ask them to yield more than the opponents of the disputed doctrine ever thought they could do, or even thought for them. On this point we can cite a most unwilling contemporary witness, Fromond de Louvain, whose *Antistar
GAL

chus,' written against the motion of the earth, was published
at Antwerp in 1631. Fromond was a very zealous Catholic,
an ardent opponent of the Copernican doctrine, and a firm
believer in the fact of the sacred writers having intended to
declare the stability of the earth. One of his chapters is thus
headed, 'Is the Copernican opinion now to be held heretical?'
This of itself is something, for it is to be remembered that
the Inquisition, through the united council of Philip V. of Spain
and the ecclesiastical authoritie.

What would these examiners have said to a work on the
Nicene Council with a chapter headed 'Are the followers of
Arius to be considered as heretics?' But to proceed—
Fromond, who failed to get all the argument of his opponents,
for his opponents, begins by citing Catholics who have ex-
pressed opinions on the subject: and it is remarkable how
mild the censure is, even of those who wrote after the decree of
of the Council, when Galileo was silenced, 'Galsan says, and
cannot any longer be safely held'; Mersenne, that 'any
one may justly think it rash,' particularly after the manner
in which the cardinals have expressed themselves.' The author
 goes on to state, with a slight, but very slight, tone of re-
proach, that there are men, both learned and Catholic, in
Italy, France, Germany, and Belgium, who care little for
the opinion of the cardinals, and who say that the power
of these dignitaries is not supreme and pontifical, and that
until this power is certainly established, the safety and
limits of heresy. But Fromond doubts whether they are
'safe enough.' He points out that the books which are in
the Index are condemned (according to the bull of Sextus V.,
which modelled both the Index and the Inquisition into
the form in which it was when) Galileo, the authority of the pope,
expressly delegated for that purpose; and he then feels justified in
drawing the following inference.

"If he says, 'the general opinion of the Catholics of our
time he concede, namely, that the pope speaking ex cathedra
cannot err, though not supported by a general conciliar
authority, he (Galileo) speaks ex cathedra, and his
words) appear rash, and next thing to heresy, ay, even more.'
Having thus, as it were, made his utmost point, and still not
get things as far as heresy infers, he turns upon himself thus:
"This is what a severe judge might think.

But when I consider how circumstantial and free from haste pontiffs
 generally are in their decrees on matters of faith ex cathedra,
and also their practice of making those decrees in their own
names and not in those of others, and since Sextus V., in
the diploma which established the fifteen congregations of cardi-
nals, expressly says, "Of those decrees which relate to
the dogmas of the faith, we reserve the interpretation to
ourselves," it seems necessary to mitigate the censure a little,
right to suppose that the authority of the congregation of
the Index is not equal, but inferior, to that of the pope.'
He ends by saying that though the Copernican has (Galileo
and the word decide) one foot inside the door of heresy, yet he would not go so far as to pronounce
an open heretic, without something more express from the
head of the church. The bull of Sextus V., as we see,
contains an express limitation of the power of the several con-
gregations; and the language and arguments of Fromond
(to whom we might join other writers, but not of so satis-
factory a character, as being themselves Copernicans prove
that this renunciation of the charge of heresy, this declaration
that the asserted infallibility of a power never showed itself, is no
subterfuge of modern Romanists, but was the argument
the time when Galileo was under the ban; was held,
among others, by a distinguished opponent of the Copernican doctrine,
the very last person who was likely to have had any bias toward the
charge; and was allowed to pass a strict censorship of the press.

But not only do Catholic writers thus express themselves,
but contemporary Protestants, the most staunch opponents of
Copernicanism, even with reservation. John Wilkins, bishop of
Dunwich, writing in 1640, after stating that some
individuals, as Sarrissius, expressly condemn the Copernican
doctrine as a heresy, proceeds as follows: 'And since him, it
hath bin called in [question] by two Sessions of the Curia-

* This word rash, temerarious, is of great force. It had a technical meaning,
and an ecclesiastical application. A word used of the time of which we are
sought to have something now, as an epithet distinctive of an officer minor to heresy.
Accordingly when a priest styles the opinion rash, it is to be inferred that he
would raise a very mild censure; it is just, as he has called an opinion, a murder,
which we should suppose him to deny that it amounted to murder. So
then you have here two distinct ideas which he made of what the
which he is speaking had pronounced. Julian et formaliter hereticum, he limits
himself to that of such as Fromond did, though more
brevily.

dinals as being an opinion both absurd and dangerous. And
therefore likewise do they punish it, by casting the De-
defenders of it into the Pope's most Fugitive, the Inquisition;
by yet neither the Council, nor many (that I know of) to
then, have proceeded to such a peremptory censure of it, as
to conclude it a heresia; fearing, perhaps, lest a more exact
examination, and the discovery of future times, finding it
to be false, might not be the read and found to the
prejudice of their church, and its infalliblity.'

It is moreover to be remembered that the Inquisition, and
even the Congregation of the Index, was a local authority,
incompetent to legislate for the faith of all Roman
Christians, or for the community of Spain. That the
Spanish Inquisitors from declaring in favour of Copernicus,
if such had been their pleasure: and, in fact, we have searched
the Spanish Index of 1667 in vain for the name of Coper-
nicus in the Congregation of the Index or the Index is.

Lastly, if we remember the controversy which has always
existed in the Roman world as to the character of decrees
emanating from the Roman See alone, without a general
council, we shall see that it would have been very unlikely
that a pope should have risked the displeasure of Spain, and
Germany, upon a matter which might any day be set
against him by absolute demonstration. Tirisbach looks up
it as a special Providence that the Church was not allowed
to have an opinion which would so directly affect the
will be of his opinion. But they must admit, as they have
had to do in many other cases, that their earthly head used
his power in a most unworthy manner, and found agents
who were the subservient creatures of his irritated feelings.
For, besides, though he did not himself act, he was
the general argument against the infallibility of the Roman
church, by practically owning that it cannot be successfully
attacked except by denying to those who maintain it the
right to be the interpreters of the sense in which they use
their own words.

Though we differ entirely from the article in the 'Dab\nReview,' the substance of which we have quoted, yet it is
right to say that we find in it a large quantity of collateral
matters, of importance, besides the point on which it
pursued. One curious thing strikingly ex-
hbits the under current of favour which was
setting towards the doctrines of Copernicus, when its
imprudent advocates began to mix theological with their
physical arguments. Had we intended this comment to be a
biographical one, we should have had to make use of its
details, and we should be very glad to see the numerou
interesting citations which it con-
tains worked into true history; supported by fuller reference,
and dignified by milder language towards
opponents.

G. molugo, Great Hedge-betstand, or Wild Madder, has
about 8 leaves in a whorl, they are lanceolate-obovate or
obovate-oblong; the margins rough with prickles pointing
forwards; the branch has a tuft of flowers, the lower
ones spreading horizontally; the fruit glabrous.
This species is a native almost throughout Europe and the
Caucassus, and is found in Britain. The flowers are white, and
sometimes yellow. The roots are creeping, and yield a red
dye, useful for the dyer in the Mother woad, but otherwise
have the property of colouring the bones of animals red
that feed upon them. This plant has been extolled by M.
Jourdan, the director of the hospital at Tain in Dampny,
'that in the way of rolls, Galileo, no doubt, and
famous. The species is distinguished from other
0. g. trifidum, is distinguished by the stems
mild and the flowers always 4-parted.

G. palustris, a native of Great Britain, nearly resembles

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G. tectorrium when the leaves are more numerous than usual. It is said that from the roots of this plant the Indians extract the red dye with which they colour their feathers and the ornaments of their dress. The Northern Bedstraw, or Northern Pride, has erect tetragonal smooth stems; obovate lanceolate leaves, 4 in a whorl. The fruit is beset with hooked bristles; the flowers are numerous and of a milk-white colour. The Cree women use the roots of this plant to dye their clothes. It is distributed throughout North America, about the lakes of Canada and the United States.

G. vernum, Ladies’ Bedstraw, or Cheese-rennet, is distinguished by having its leaves about 8 in a whorl, linear-lanceolate with revolute margins, channelled above, downy beneath. The flowers in numbers are gathered into a golden yellow colour. On loose sandy soils the flowers are sometimes solitary and the stems much more hunched, but agreeing in other respects with this species. It is a native of Europe and Siberia, in meadows, woods, and among hedges, and is found in Britain very commonly in dry soils. The stalks and flowers of this plant have been used in the cheese-counties for the purpose of curdling milk, and also for colouring it. Mathioli says it produces an agreeable flavour and makes the cheese ‘eat sweeter.’ The French formerly used to prescribe the flowers in hysteria and epilepsy. The roots afford a rich red dye, superior in colour to madder. It was grown at one time as a substitute for the true madder, Rubia tinctorum, but the roots are too small to render its culture remunerative. This plant seems to be the ąndus of Dioscorides.

G. aparine, the common Goose-grass, or Cleavers, has from six to eight leaves in a whorl; they are linear-lanceolate at first, but are curved and pointing towards the root. The flowers are small, 3-flowered peduncles; reflexed granulated fruit. It is a native throughout the whole of Europe, north of Asia, and North America, in hedges, fields, and most cultivated places; it is plentiful in Great Britain. This plant, according to Burnett, was fancifully called by the Greeks Phyandrosopyros, as they attributed the readiness with which it cleaves to our habitations to a love of the human species. A mechanical cause will however fully account for this tendency. It is thus that we are enabled to see ‘the border line of the Castle’ Cleavers. Cleavers are usually derived from being a favourite food or medicine of goose; that of Goose-grass. Dioscorides relates that this plant was used by the shepherds of his time as a snare to strain milk, and Linnaeus tells us it is still made use of in Sweden for the same purpose. It is the ądoripis of Theophrastus. The expressed juice of this herb taken in doses of four ounces or a quarter of a pint night and morning, during several weeks, is said to be a very beneficial remedy in cutaneous disorders, and to act in a similar manner upon whose skin is a spot of the blood and an anticorps. The seeds have a corny albumen, and when roasted have been used instead of coffee. We are not aware that they have been analysed, but it is not improbable, of the same nature as date seeds, because of its name, and if this be the case, they would form a valuable substitute for coffee. The roots of this species, like most of the genus, afford a rich red dye, and birds that feed on them have their beaks tinged with the colour. The roots of G. tuberosum are farinaceous, and in China are cultivated as a diuretic vegetable. Loureiro says that, when boiled, they are both wholesome and nutritious. Don enumerates 164 species of Galium, which are distributed in every quarter of the world. The common name Bedstraw, given to all the species, is from the verb to streæ, antiently written streæ. Before the introduction of modern luxuries beds were made by strewing with various herbs, and doubtless this was one used for that purpose, and has thence acquired its common name. These plants are very easily cultivated and propagated; they will grow in any common soil, care being paid to the situations in which they are placed, which should as much resemble their natural positions as possible; those brought from meadows are much the best. The natives of warmer climates should be protected during the winter. None of them however are worth cultivation unless in botanical gardens.

GALLA, or Glycyrrhiza, Synopsia Plant. Flora Classiciæ; Don, Gardner’s Dictionary; Burnett’s Outlines of Botany; Botanist’s Manual of British Botany.

GALLA [Atriplex, P. C. S., p. 25.] GALLERIES, a name of distinction given to a room either of the same name, which are distinguished by being either rooms especially appropriated to pictures and other works of art, whence the term ‘Gallery’ is extended to the collection itself, without any reference to the building. Thus what answers to the term in one sense may not in the other; or it may do so in both. In architectural language a room can properly be called a gallery unless its length be three times its width, for, otherwise, a room might be too narrow to be looked at, as a gallery; it would be short; therefore if a spacious apartment, it would answer to the character of a hall, as is the case with the Waterloo Gallery in Windsor Castle, whereas the adjoining St. George’s Hall, might be termed a gallery, its proportions being those of one [WINDSOR CASTLE, P. C. J.]; on the contrary, the Victoria Gallery, in the new Palace of Westminster, will, according to the architect’s own illustration, be exactly a hall, and not a gallery; its dimensions being those of a great hall, or any architectural manomier has been intentionally given to it. But though the length of a gallery as compared with its breadth ought not to be less than what has been stated, it may be increased to any extent without danger of excess; unless the gallery should thereby be rendered far too pompous and spacious to be at all in keeping with the other apartments, as was generally the case in Elizabethan mansions. The proportion as to height in galleries is regulated solely by width, which may be nearly equal to each other, the height being a little more or less than the breadth, according as the ceiling is arched or flat, because the height being the same, the walls will be lower in the former case than in the other. It is to be observed, however, that if the gallery is of a somewhat lighter colour than one of moderate length; at the same time it must be borne in mind that the height must not be so as to occasion the effect of narrowness and produce the proportions of a salon corridor; very low proportions, on the contrary, render the room without ornament, a series of galleries of the Elizabethan period, so much so that some of them look quite depressed by their heavy flat ceilings, whereas halls in the same buildings are frequently disproportionately high, owing to their occupying two stories at the building; and being, besides, sometimes not twice their width in length.

There is hardly anything in the interior of a building which lends itself so readily to architectural effect as a gallery, since, if it at all answers to the name, it will have those proportions of lengthened perspective and vista. In fact the very name itself excites expectations of superior design and taste, because rooms of the kind belong to the luxuries of architecture and are rather intended for state and display than for any actual use as rooms, except on extraordinary occasions. Hence galleries are by no means common even in spacious and sumptuous mansions; consequently it very rarely happens that an architect has an opportunity of exercising his talent for interior decoration in so much breadth of design as he is likely to find in a gallery; and this, no doubt, is one chief reason why the subject itself is so slurred over in professional treatises; for it certainly does lie quite out of the track of everyday practice. But it lies there; and, so very much so, that it is rather surprising that no one should ever have thought of giving us a ‘Recueil et Parallèle’ exhibiting the principal varieties of galleries.

All that can be done here is to indicate some of the principal varieties with regard to more matters of plan, section, and lighting, independently of style and decoration, and we hardly need say that the value of these latter is greatly enhanced by the effect arising out of the first-mentioned circumstances, for great taste may be shown in the embellishments of such an apartment, and yet its general design may be exceedingly common-place, so that though it may say very much for those who are employed to give the finishing touches to the architect’s work, it may say nothing at all for the architect himself. As far as plan alone is concerned, there is nothing calling for remark further than what has already been touched upon with respect to proportions, when a gallery forms a single uniform space from end to end. It is only when we come to compound plans that we can make such comparisons.

The first step towards these is the usual mode of merely dividing the room into three compartments by means of columns, but which is practiced with scarcely any variety, the number of columns between them and the shape and size of the spaces of the plan very rarely exceeding two, and there being only a decided expression given of division, by boldly projecting anta-piers so as to contract the openings between the several compartments of the plan, and thereby define these latter the only ones in the room. The only simple sort of division of plan into compartments admits of arises from the proportions of the respective spaces, and the
ratio which they bear to other; that is, accordingly as the end compartments are shallower or deeper in themselves, or are either deep or shallow in comparison with the principal division of the room.

Next, the approaching combination of plan in the simplest form of it, is the making the end compartments curvilinear, that is, either semicircular or segmental but otherwise of the same width as the rest of the room. In regard to the height, the same holding off of the gallery by columns, almost the only other matter of plan calling for observation, is that the door leading into the room is almost invariably placed in one of the end compartments, but it should also, if at all practicable, be on one of the sides, but at the same time, and occupying a central position there in the entering any room of the kind at one angle of it, being attended with a disagreeable awkward effect, for we ought to advance directly forward into a gallery, and behold it before us in full extent instead of squirting into it.

We now come to those combinations where the plan is divided into distinct compartments, all opening into each other, instead of forming a suite of separate rooms. In galleries of this class the arrangement is usually a triple one, and the middle division or body of the gallery is almost always considerably larger—that is, longer than the two end ones, besides being distinguished in other respects, whether by greater plainness or greater richness of architecture, or by any other means. Accordingly most not otherwise hold fund of combinations and contrasts thus opens itself to the architect: first, as regards Plan, there may be more or less of difference and contrast between one portion of it and another in the outline, the divisions, and proportions; and the variety hence obtainable will be greatly increased, instead of the entire plan being of the same width throughout, some parts of it being wider or narrower than others. Neither is this all.

For similar contrasts and combinations hold themselves out with regard to Section; since, instead of being of uniform height throughout, some parts of a gallery may be considerably loftier than the rest, whether the increased height be given to the body or the extremities; neither is difference of height that only in reference connected with section, because the height being the same throughout, some of the parts of the plan may have flat ceilings, others vaulted ones. And again, in respect to lighting, the body of a gallery may be lighted entirely from above through a lantern or other skylight, &c., while the extremities are lighted either from one side, or by a window at each end of the gallery; or else the opposite mode may be adopted—matters of this kind depending upon local circumstances and necessarily are the general plan of a building.

In order to illustrate what has just been said with reference to varieties of Plan and Section, by positive instances of them, we will merely take three examples of galleries, which all agree in consisting of three divisions, yet in every other respect exhibit a well-chosen contrast: first of all, the Statue-galler at Holkham (the seat of the Earl of Leicester) is a singularly beautiful though by no means a particularly splendid interior, or one remarkable for its size, the entire length being only 106 feet. It consists altogether of two octagons (21 feet in diameter) and a square (60 feet by 21), connected together only by an open arch at each end, so that the body is almost shut up from the other two divisions, more especially as although open arches are set back within tribunes, or large recesses, the whole of the length of the body is increased to 60 feet. Were it not, therefore, that the whole is thrown open from end to end without any separation by doors, the centre would of itself demand a gallery in that meaning of the term, nor would it be a particularly large, though still a very elegant and characteristic room. In this example the centre one is the lowest of the three divisions, its height being 23 feet, while that of the octagons is 32 feet, the ceilings of the latter forming domes, while that of the centre is flat.

The gallery at Castle Howard (the designs of which were published by the architect, the late C. H. Tatham, together with those of the Picture-galler at Brockley) is of quite a different character from the Holkam one, for the centre division of it, is, though much shorter, of greater diameter than the other two, and also much loftier, it being an octagon of 58 feet, and of the same height, while the other two divisions are 38 feet and 29 feet. The two end compartments of the plan are connected into one gallery by two spacious open arches. The effect would, no doubt, have been greatly enhanced bad the central octagon been lighted from above instead of from one of its sides. Our third example is the Gallery at Shelburne or Lansdowno House, in Berkshire, which was designed as in all other respects, where, however, it is far from being satisfactorily explained, why the central compartment is not so much as a single section of it. Here the three divisions of the plan are very nearly equal in size, the two end ones being roundabouts 30 feet in diameter, and the middle one 40 feet, of the same height. The reason why, however, is thrown more into a single apartment than is the case in the two preceding instances, the openings between the respective portions being wider, each consisting of three open interior arches, one on each side, &c. It may be observed that the two roundabouts are lighted from above, yet whether they to the east or west and if so, in what way, is not shown, although some express information would certainly not have been altogether wanting; on the contrary, far more to the purpose than those trivial matters which occupy so many of the plates in Adam's work.

These few instances must suffice, and they will at least serve to make manifest how many combinations of it (in those of both plans and sections together), and what infinite variety of proportions may be produced. To bring forward other examples would not be difficult; we cannot however forbear advertiting to Soane's ' Royal Gallery,' at the House of Lords (which will now shortly disappear), for although the general effect was not distinguished, the plan of it, consisting of a square of 24 feet, exclusive of the portion cut off by columns at one end as a vestibule between it and the staircase—it is of exceedingly scenic design and impressive character, replete with picturesque effect, and picturesque in the most artistically contrived, so to say, that much of the detail is in very poor, not to say very bad taste. For much of its character and effect it is indebted almost entirely to the mode of lighting it, to the arrangement of the windows and lanterns, and to the use of coloured glass in the ceiling, all of a uniform tint, so as to shone a sunny hue over the architecture. There is, besides, very great play of outline in the section, the average height of the gallery being only 21 feet, while that of the central compartment is 52 feet, which is finished in a sort of tambour done with eight Ionic columns, forming an open peristyle within that lantern; of the smaller lanterns over the two other compartments of the plan the height from the floor is 31 feet. The plan also is marked by a somewhat similar degree of play and variety, for each of the end compartments has an arched recess on each side of it, and likewise two columns on each side; and this variety and complexity of both plan and section render it impossible to show this gallery in a perspective drawing; other than otherwise it is required to be looked at from so many and such different points of view, affording as it does a succession of effects which drawings, even when they are perfectly understood, leave it to the imagination to shape out for itself.

We may now briefly notice a few other examples of the same kind, one, namely in forming an extended line; or if they branch out in any direction, the separate parts are still so many straight lines. We are aware of but one instance of a circle being employed for the plan of a gallery, and it is one remarkable for its beauty as well as singularity of effect as to claim particular notice here, more especially as, besides being quite a new idea in itself, it is capable of being further applied under a variety of circumstances. We allude to the Ephialtes of the Colosseum in the Region which, as now fitted up for the exhibition of sculpture (1845), forms a complete circle, with a peristyle of twenty columns of the Ionic order, and as many recesses within the colonnade, answering to the number of the columns. The central portion, as the principal architect of the plan, and which may be considered the core of the structure, rising up through what would else be a dome covering the entire space; and in like manner, were it not for that cylinder within it, this interior would be merely a rotunda of the usual kind, whereas now it is converted into one of altogether different character; though no doubt not with any view at all in the first instance to architectural character or effect of any kind, but solely in consequence of the indispensable necessity of carrying the light. The great difficulty in the building to the platform which the Panorama is viewed from. It was accordingly seen necessity which originally compelled the
architect to adopt a peculiarity of plan that has since been so admirably turned to account; and besides being unusually attractive for its architectural beauty, this gallery is excellingly convenient for the exhibition of the executive of pictures; because, though the peristyle is circular, the wall behind it may be a polygon of as many planes as there are intercolumns—in this instance twenty: and by being so divided, it may be arranged better with regard to some sort of classification than when hung up on the side of a long wall without division of any kind from end to end. The convex part of such a double cylindrical plan might in like manner be rendered available for hanging pictures; were it possible to preserve the gallery—by making that also a circle of columns; the columns being in this case engaged or attached to the wall, which last would consist of as many separate planes or flat surfaces as intercolumns; and in order to keep up perfect symmetry in regard to intercommunication the two circles might be so proportioned to each other that the larger or outer circle would have just twice the number of the columns on the circumference of the smaller circle or cylinder, the intercolumns being of the same width in both circles. This would of course very greatly increase the diameter of the cylinder, to somewhat more than half that of the larger circle; consequently, supposing the breadth of the gallery, or space between the two concentric circles of the columns, to be assigned a lawyer and after the Colosseum, the whole plan would be greatly enlarged, and there might be a rotunda fifty feet in diameter in the centre of it; so that in a gallery thus planned the ring or outer portion might be appropriated to pictures, and the inner one form a circulation to each group of pictures. Ciceronius, having just the same as at the Colosseum, the architectural character of the structure would become different, inasmuch as by being increased in circumference the ring would acquire more of the appearance of a gallery, and in some degree at least, that of a rotunda with another structure either in the centre or at the sides. Though it has hitherto been quite overlooked, the same general disposition of plan—and it is one that plainly enough shows itself in the concentric circles of Druidical pillars, as at Stonehenge—in the Gentleman and Stonehenge—is applicable to a very great variety of cases.

Other circumstances being the same, the character of a gallery is greatly modified by the manner in which it is fitted up in accordance with either some specific destination or a general one; for it may be only a superior kind of corridor uniting the principal apartments, or intended exclusively as a picture-gallery, statue-gallery, or library, or partake of the character of all; and that, again, either by a miscellaneous distribution of its contents, or by one division of the room being assigned to pictures, another to statues, a third to books. There is a great difference between a long room of the kind that is merely hung with pictures, as is the case with galleries in Elisabethan manors, and the rooms in which whole pictures are assigned for the purpose of displaying both the entire collection and the individual works to the best advantage. We subjoin a list of some galleries, in addition to those noticed, in order that their respective dimensions and proportions may be compared.

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<td>Woburn Abbey, Statue Gallery</td>
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<td>Woburn Abbey, Library</td>
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<td>Sion House, Library</td>
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GALLUS, C. AQUILLIUS, was a Roman eques and a friend of Cicero. He was praetor a.c. 66. Gallus was a pupil of Q. Mucius Scorva, the Pontifex, and obtained a great reputation as a jurist. He was both a skillful advocate and a learned expounder of the law. The distinguished jurist Servius Sulpicius was a pupil of Gallus; and either edited his works or incorporated them in his own writings. Gallus was praetor in the same year that Cicero previ- and accordingly Cicero calls him his colleague (Topic, 7), and in another passage he has preserved the legal definition of a 'man of genius' to which occasion he refers himself for the edictal rule or form (as to dolus malus (fraud) in matters of buying and selling, which he promulgated as praetor (Cic. De Officiis, ii. 14; Dig. 9, tit. 2, 9). The Lex Aquilis, which gave the actio damnii infra (Dig. 9, tit. 2; Gal. App. 210), was promulgated by this Apii- lius, but by a tribune Aquilis. The high opinion which Cicero entertained of his friend Gallus is expressed in his oration Pro A. Caecina (c. 27), where he pronounces upon him the eulogy: "Gallus, a great man, a man of genius, with a reputation of such a man can never have too much weight, whose judgment the Roman people have seen tried in providing security against fraud, not in showing how fraud may be practised; a man who never separated the principles of law (ius civile) from those of equity, who, for so many years dedi- cated his genius, his industry, and his integrity to the Roman people, which integrity was ever ready and ever at command; who is so great and good a man that he seems to have been born with the power of eloquence, and not having attained it so and so learned that not knowledge only but goodness too appears to be the product of the law; whose genius is so power- ful, whose integrity so manifest, that whatever you draw from that source you will find to be pure and clear. Cicero's own education was made up to a large extent of Gallus is cited several times in the Digest (50, tit. 15, 87; 46, tit. 4, 18, &c.), but there is no excerpt from his writings. Gallus devised or expounded some clauses of the formula of Acceptatio (Dig. 46, tit. 10, 18). Valerius Maximus (viii. c. 2) relates a case in which Gallus refused to allow a woman with whom C. Viscellius Varro had cohabited, to sue on a security which Varro in his illness had given her, and which the woman attempted to enforce when he recovered. Gallus of Grotius, Vitae Juristorum; Orrelli, Onomasticon Gallus, AELIIUS, a contemporary of Cicero, and a learned jurist, wrote a treatise on the signification of terms (Gellius, x. 22), from which a single excerpt is given in the Digest (50, tit. 15, 87). GALUS, AELIIUS. [ARABIA, P. C., p. 215.] GALLUS, JULIUS AQUILA, or Julius Gallus Aquila, a jurist under the empire, of uncertain date. There are two excerpts in the Digest (Dig. 18, tit. 7, s. 34, and 26, tit. 10, s. 12.) GALIT, JOHN, was born at Irvine in Ayrshire, on the 2nd of May, 1779. His father was a sea-captain in the West India trade. About the eleventh year of his age his father's profession being moved to England, he received an education for commercial pursuits, any literary cul- tivation beyond this point being the fruit of his exertions in hours of leisure. In conformity to his mercantile destination, he spent some time as a clerk in the Greenock custom-house; whence he was transferred, in the same character, to the counting-house of a mercantile firm in the place. When he was between twenty and twenty-five years of age he left Scotland for London, where he intended to establish himself as a merchant. His literary propensities, however, which had previously led him into frequent compositions, were further nourished by a few months of inaction in the metropolis. The result was, the production of a poem in octo-syllabic verse called The Battle of the Fates, and was noticed in the 'Scots Magazine' in the course of the years 1803 and 1804, and on the originality of which (as having preceded Sir Walter Scott's metrical romances) he prided himself not a little in after-life. Other studies, chiefly in history and political economy, were prosecuted occasionally after he had embarked in commerce. He did so in partnership with an- other young Scottichman; but the partners disagreed, their affairs became entangled, and in about three years the firm was bankrupt. Gallus had meantime been engaged in business along with a brother, Mr. Galt entered himself at Lincoln's Inn; but determining (partly for the sake of his health) to spend a part of some time before his being called to the bar, he left England in 1805. His travels lasted little more than three years. He afterwards described them in two works: Voyages and Travels in the years 1809, 1810, and 1811, containing Statistical, Commor-

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and Miscellaneous Observations on Gibraltar, Sardinia, Sicily, Malta, and Turkey,' 1812, 4to.; and 'Letters from the Levant, containing Views of the State of Society, Manners, Opinions, and Commerce, in Greece and several of the Principal Islands of the Archipelago,' 1813, 8vo. Soon after his return he married Elizabeth, daughter of Dr. Tillich, the editor of the 'Philosophical Magazine,' and also proprietor of the 'Star' newspaper, on which Mr. Galt was for some time editor. He left the lady he left two of the following works:—'The Life and Administration of Cardinal Wolsey,' 1812, 4to., 1818, 8vo.; 'Reflections on Political and Commercial Subjects,' 1812, 8vo.; a volume of 'Tragedies (Maddalen, Agamemnon, Lady Macbeth, Ambrose, Clytemnestra, &c.),' 1812, 4to. The Life and Studies of Benjamin West, Esq.,' 1816, 8vo., 1818, 8vo. He edited also, during its short career, 'The New British Theatre,' which was at first intended to contain a series of dramatic productions by contributing authors, but which, besides contributions from the editor, was printed a vigorous tragedy called 'The Witness.' These productions however were composed in the intervals left under undertakings of other kinds, chiefly commercial. In the course of his travels he had devised a scheme for importing British goods into the Continent by way of Turkey, notwithstanding Napoleon's decrees of exclusion; and he spent some time in vain endeavours to obtain support for this plan. On another occasion he acted as a parliamentary agent in Scotland. In short, although he had in the course of his life given up the design of studying the law, he was resolutely determined to obtain a footing in some department of active business, and entertained a strong reluctance to considering literature as the main employment of his life.

Indeed, his literary success had by no means been great. His works had not generally obtained credit even for the shrewdness and comprehensiveness of thinking, and the acute observation of life, which they really evinced: while his tendency to parody in opinion, his oddity and clumsiness of language, and the coarseness with which his vigour of feeling was allowed, had furnished topics of ridicule to some who thought his works worth criticism. It was particularly provoking to him, that not only his poetical efforts, but also his political speculations on matters of government, had been most severely in the 'Quarterly Review,' the literary organ of the party to which, although too independent and eccentric to be relied upon as a partisan, he always professed to belong.

He was by far the more successful in his next literary attempt, 'The Earthquake,' 3 vols. 12mo. 1820, a serious novel, marked by that clumsy and gloomy strength of feeling which pervaded his dramas. But he soon hit upon the ground in which lay his true vocation. His imagination of eighteenth life, and his own inimitable vein of quiet, shrewd, homely, observant humour. In 1820 and 1821 his 'Ayrshire Legatees' appeared in successive numbers of 'Blackwood's Magazine;' and the work was immediately published separately. Its popularity led it to a second and third edition, and it is now in a fourth. The next of these was 'The Annals of the Parish,' 1821; which, by the way, had been written several years before, and offered for publication to the bookseller Constable, who refused to venture on it. Then came the 'Provost,' 'The Steamboat,' and 'Sir Andrew Wylie' (3 vols.), all in 1822; and 'The Gathering of the West,' 1823. After this he was tempted to desert his own peculiar path, by his incessant hankering after more ambitious themes and more elevated characters. To this motive he was led to write a novel of 'The Entail,' 3 vols. 1823; and it led him quite away in his two historical novels 'Ringhan Gilhaze' and 'The Spae-wife,' both published in 1823.

But Mr. Galt did not acquire for shrewdness and activity in business, and for acquaintance with the principles and practice of commerce, now opened up for him the most brilliant prospects of his life. Inhabitants of Canada gave him as a mission their commerce, to prosecute their claims against the government, and even against the state, for which the French soldiers suffered during the occupation of the province by the forces of the United States. The negotiations arising out of this affair issued in the adoption by the government of a proposal made by Mr. Galt, to sell crown lands. Upon the proposal thus made, the government commissioned him to sell the lands, and he undertook to purchase those lands and to colonise them. Before the company obtained its charter, Mr. Galt had gone out as one of the government commissioners for purchasing the lands, and had returned to England in the summer of 1825. In the autumn of 1826, when the sales had taken place, he was sent out by the Company, being at first employed in making inquiries for them and in arranging their system of management; but being afterwards appointed the superintendent of their operations in Canada, he visited the different settlements which are now acquiring so much importance. Guelph was entirely a place of his making; and the village of Galt received its name from him. In his last days, before he went to Canada, Mr. Galt was possessed of the consciousness of having benefited his country materially, by his services in the colony, which was almost his only consolation in looking back upon a life full of bitterness and disappointment. But even these services were not so performed as to secure to him a title to the honours of great intelligence, energy, and enterprise, appears to have been deficient not only in commercial caution, but in deference both to the provincial government and to his employers. He and his friends were always removed by the colonial authorities were prejudiced against him as a dangerous and misrepresentations of the tenor of his books of travels. The governor, Sir Peregrine Maitland, sent him complaints against him; alarm was expressed about the Company's affairs; and the directors superseded him. He returned to England in the spring of 1829, after a residence of about two years and a half. Soon afterwards, being pressed by some of his creditors, he took the benefit of the insolvent debtors' Act. And after a very short residence in London he died. At fifty years old, did not again make any sustained attempt at obtaining mercantile occupation. The emigration of his affairs forced him upon authorship for the subsistence of himself and his family; and, although he was not able to produce any great work of importance, he became a considerable literary celebrity, the circumstances in which his exertions were made were such as to render his active industry at once meritorious and touching. His earliest works in this period were his novels of 'Lawrie Todd' and 'Southerndown,' and the caustic 'Life of Lord Byron,' 1830. While writing the last of these he undertook the editorship of the 'Courier' newspaper, which however he very speedily resigned. His health now broke up rapidly. He had already had a slight shock of paralysis, which subsequently increased. He had been wont to employ himself in reading, writing, and society; but now he was too much embarrassed by unavoidable defects, but the compassionate forbearance due to the manly fortitude of the ill-fated author. Among these fruits of decay, there were, besides several novels and tales, and contributions to periodicals, two works which give, in a very incomplete and disjointed state, much information about his life and writings; 'The Autobiography of John Galt,' 3 vols. 8vo., 1833; and 'The Literary Life and Miscellaneous of John Galt,' 3 vols. 12mo., 1834.
A penalty not exceeding 2l. over and above the value of the
bird is incurred for killing, wounding, or taking any house-
hold bird, and such offence does not amount to a larceny.
(7 & 8 Geo. iv. c. 29.)
Any person who purchases a certificate or licence may kill
a game upon his own land, or on the land of any other person
with the consent of such person. This provision was enacted
by 2 Wm. iv. c. 32, before which time a person was
required to be possessed of a qualification by estate or
birth to entitle him to kill game. The statute 13 Richard II.
c. 13, the title of which was, 'None shall hunt but they
who have sufficient living,' was the first introduction of a quall-
fication to kill game. This statute prohibited laymen who
had not lands or tenement of 40s. a year, and priests who had
not 10l. a year, from taking or destroying deer, hares, or
cougies, upon pain of one year's imprisonment. By 3 Jac. c.
11, the qualification to kill game was increased to 40l. a
year in land and 200l. in personal property. By 22 & 23
Car. ii. c. 25, the qualification was limited to persons who
had an estate of inheritance of 100l. per annum or an estate
occupied under a lease not exceeding 21 years. On this Blackstone
remarKs, there was 'fifty times the property required to enable
a man to kill a partridge, as to vote for a knight of the shire.' Qualifications were also of a
personal nature, as being the son and heir apparent of an
existing estate. These qualifications were not allowed to have or keep game
dogs.
Certificates were first required to be taken out by persons
qualified to kill game by the act 25 Geo. iii. c. 50. The
quantification itself, which costs 3l., now gives a qualifi-
cation. It must be taken out annually, and expires in July.
A sportsman who refuses to show his certificate when
demanded by collectors of taxes, gamekeepers, landlords, occu-
piers, and lessors, is liable to a penalty of 20l. Unoffending persons
who kill birds of a game, dog, gun, &c. for the purpose of searching for or killing
taking game, are liable, on conviction before two justices, to a penalty
not exceeding 5l. for each offence, with additional penalties
under the Act of 22 & 31 Geo. iv. c. 32 are given to the parish, to be applied in
aid of the county-rate, and in some cases a portion of the penalty goes to the
informor.
The right which a certificate gives to kill game is subject to
certain conditions. A certificated person is liable to a penalty of 5l., with costs, for taking or killing game on
Sunday or Christmas-day, and to a penalty not exceeding 20s.
for each head of game taken or killed at the season when the
certificate is not in force, or if he is subject to the general law of trespass for going upon another person's
land. The right to the game is vested by 1 & 2 Wm. iv.
c. 32, in the tenant in all cases where it is not reserved to the
landlord in his agreement with the tenant; but the game is
generally conveyed by the landlord, if a few tenants are in
a situation to oppose their landlord. The consequence is
that the game is reserved by the landlord when he lets his
land, and when this is the case, the occupier can neither kill
the game nor give permission to any person to do so. He is
liable under 1 & 2 Wm. iv. c. 32, to a penalty of 20s.,
with costs, for every head of game killed by him or other persons
authorized by him. When the landlord reserves the game, he
may kill it on the tenant's land, or authorize any certificated
person to enter on the land and kill the game. The tenant
may kill woodcocks, snipes, quails, landbirds, or rabbits,
on the land which he occupies, but he cannot authorize other persons
to kill them. The person who has the right of killing the
game, or the tenant, or, generally speaking, any person
authorized by either of them, must require a person found
trespassing in pursuit of game to quit the land, and to give
his name and place of abode; and in case of refusal, the
trespasser may be taken instantly before a magistrate, who may
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lord of a manor may appoint to each manor, and that power authorized to kill game within the manor for their own use. Lords of
manors may depute any person to be a gamekeeper to a manor, with authority to kill game for his own use or that of any
other person named in the deputation. The gamekeepers appointed to manors may kill game within the manor for their own use.
Until the passing of the act 1 & 2 Wm. iv. c. 32, no person
was allowed to sell game; but it was made saleable by this
act. The manor lord, the tenant, or any other person having
approached them for the purpose of requiring them to
quit the land, or to tell their names and abodes, every person
so offending is liable to a penalty not exceeding 5l., in addition to
any other penalty with costs.
The law is very severe against persons not authorized, who
take, destroy, or destroy game, and against persons who shall
kill, sell, or export game, and who shall possess or carry
Game stock or the instruments for killing game, who are
and two other persons, or one in each, or one security in
10l. In case of not finding sureties (and it is not a lik-
ely case that night-poachers should be able to find them),
the offender may be further imprisoned six months. For a
second offence the term of imprisonment is extended to six
months, the sureties are doubled, and required for a period of tw
years. If the offender cannot find sureties, he may be fur-
ther imprisoned for twelve months. The third offence
is punishable with transportation for seven years, or
imprisonment with hard labour in the house of correction
for a term not exceeding two years. Offenders under this act may
be apprehended on the spot by owners and occupiers of lands,
their servants and assistants; and if they assault or offer vi-
ence with gun, club, stick, or otherwise, they are liable to be
seized and delivered to the proper authority, or to be cashiered.
The penalty for night-poaching is still more severe when three or more persons enter any land
for the purpose of taking or destroying game or rabbits, armed with a gun, bludgeon, or other offensive weapon, and
are subject to the general law of trespass. The penalty for a
fourteen years, or to imprisonment with hard labour for not
exceeding three years. In 1844 an act was passed
(7 & 8 Vict. c. 29) which extended the provisions of 9 Geo. iv.
c. 69, against night-poaching to persons who take or kill game or
rabbits upon public roads or highways, and other roads and
paths leading to enclosed gates, and also at the gates, outlets,
and openings between such lands and roads or paths.
By s. 36 of 1 & 2 Wm. iv. c. 32, it is enacted, that if
any unauthorized person takes or kills game, or rabbits,
in or on any land in search of game, and have in his possession any game which
'appears to have recently been killed,' any authorized
persons, as gamekeepers, occupiers, or others who have the
right of killing the game, may demand such game and seize it if
not immediately delivered.
A penalty not exceeding 10l. is incurred for laying poison
with intent to destroy game (1 & 2 Wm. iv. c. 32).
If any person who is not authorized to kill game himself, or
who has not permission from the person who has such a right,
shall take out of the nest or destroy the eggs of any bird of
game, or of any swan, wild duck, teal, or widgeon, or shall
knowingly have in his possession any such eggs so taken, he
shall be liable to a fine not exceeding 50s., and costs, for
each egg (1 & 2 Wm. iv. c. 32, s. 24).
By the act 7 & 8 Geo. iv. c. 29, it is felony to course,
hunt, snare, carry away, kill or wound, or attempt to kill of
wound, any deer kept in any inclosed land, whether forest,
chase, or park, or other place wherein deer is usually kept.
The punishment is transportation for seven years, or imprison-
ment for two years. If the offence be committed in the un-
closed part of a forest, chase, &c., the penalty for the first
offence is a sum not exceeding 50l.; and for a second offence,
transportation or imprisonment.
Such are the principal legal provisions respecting game
which exist at the present day. This right of appointing
persons called gamekeepers, who are, properly speaking,
a police, does not belong to all owners of forest lands.
Gamekeepers were first allowed to be appointed by 22 & 23 Car.
i. c. 25. Before the act 1 & 2 Wm. iv. c. 32 was passed, a
person could only appoint one gamekeeper. By this act lords
and manors may appoint more than one, and may kill game
within the manor for their own use. Lords of
manors may depute any person to be a gamekeeper to a manor,
with authority to kill game for his own use or that of any
other person named in the deputation. The gamekeepers
appointed to manors may kill game within the manor for their own use.
Until the passing of the act 1 & 2 Wm. iv. c. 32, no person
was allowed to sell game; but it was made saleable by this
act. The manor lord, the tenant, or any other person having
approached them for the purpose of requiring them to
quit the land, or to tell their names and abodes, every person

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licences. Innkeepers, victuallers, retail beer-sellers, guards, coaches, carriers or higglers, or persons in the employ of any of these, it adds, are also, and who are deprived from dealing in licensed. Licensed dealers who buy game of any person not authorized to sell it are liable to a penalty of 10l. with costs. A person not being licensed, who buys game of an unlicensed person, subjects himself to a penalty not exceeding 5l. for each offence with costs.

The preservation of game is an object of constant solicitude to nearly all those who belong to the landed gentry in this country. The pursuit of game is not only followed for the sport of young gentlemen, but because derived from feudal times still attach a social distinction to the right of killing birds and beasts of game. It is only fifteen years since this privilege was acquired only by property or birth. It is still sufficiently restricted to a few persons, who enjoy patents and privileges.

Within the last fifty years game has been preserved to an extent which was previously unknown. Most of the laws relating to game which have been passed within this period have been made to enable game-preservers to indulge in this taste, and to visit with greater severity those who are tempted by the abundance of game to become poachers. The accumulation of game in preserves, watched and guarded by numerous keepers, has led to changes in the modes of sporting for the most part of the old schools. Contests were just a little spoil, but found enjoyment in healthful recreation and exercise, and was sided by the sagacity of his dogs. In the modern system of battue-shooting, the woods and plantations are beaten by men and boys; attendants load the sportsman’s gun or act as gun-boys, and many hundred heads of game are slaughtered in a few hours. The true sportsman would as soon think of spoiling a poultry-yard.

Battue-shooting is the end of excessive game-preserving and the destruction of game. These sportsmen, members of the royal families, ministers of state, and many of the gentry eagerly participate. In an ordinary day’s sport of this description, seven or eight hundred head of game may be killed by three or four sportsmen in about four hours, and perhaps fifty or sixty wounded may be picked up on the following day. A couple of gentlemen may kill nine hundred hares in one day. On a great field-day, when the sportsmen are more numerous, the slaughter is immense. Whole waggon-loads of hares are sent off to the London and other great markets for sale, as the result of one day’s sport.

The effect of protecting game by oppressive laws is, perhaps, more injurious to the morals of the rural population than any other single cause. With a densely crowded population, thousands of whom are often pressed by hunger, and frequented in a state of the most lamentable poverty, the temptation to sell game is irresistible. It swarms before the labourer as he returns home in the evening from his long day of hard toil. He does not possess property in no man can claim an individual hare or rabbit, for it is all the right of the sporter. The latter must be fed at the expense of their owners; but game is fed by no one in particular. This man, then, who would probably not, for all his poverty, violate the laws of property in poultry, and yet, the tax collecting, has no greater right of property in the cartridge than in a swallow, sets a snare in the haunts frequented by game near his cottage, and is pounced upon by the keeper. When he comes out of the groal, the hunter perhaps dare not employ him lest they should offend the poachers-preserving their landlords. The justice and rural police look upon the groal-bird with suspicion; and only at the beer-shop, with men of his own stamp and character, does he feel at home. It is hard, perhaps, to detect his further ploys, but out of ten, it is from bad to worse; and this because for objects of selfish gratification men have given to a bird or beast of little worth in itself an arbitrary value, and protected it by acts of legislation stricter than are applied to many other things which are recognised as objects of property by all mankind.

The number of persons convicted at assizes and sessions in 1843, for infractions of the game-laws in England and Wales, was stated to be 3,593; in 1844 there were 41 inquests on gamekeepers found dead, and in 26 cases verdicts of wilful murder were returned. In 1843, out of 201 persons summarily convicted in Bedfordshire, 143 were committed for poaching, and sentenced to prison for an average period of seven weeks each. In the same year, out of 339 persons committed to the county gaol for Buckinghamshire, 169 were for offences against the game-laws. The wives and families of these men must be maintained during the husbands’ imprisonment; and hence the poor-rates and the county-rates are at the same time increased. Gaols require increase; and the expense of the police is increased, and the aggregate is increased by the police is increased, and the aggregate of the game-preservers. The game-laws are in this way a heavy burden on the occupiers of land.

The expediency of the expenditure of game-laws is probably more onerous than that which is required for the support of pauperism in this country. Game, and the game-laws, are among the greatest hindrances to the improvement of the land, for they are an unremunerative expense, and on occasion a loss to the actual aggregate of agricultural products.

Many landowners in their enthusiasm respecting game take means to ensure its preservation which none but tenants in a high degree of dependence would submit to. The tenant is not always enabled to use his game for his own benefit. His capital to the land, but is interfered with on account of the game. This game devours the produce of the land. It is fattened at the tenant’s expense (compensation for the destructiveness of game being fully felt and deceptive) and the landlord pockets the money which the game thus fed produces in the market. The effect would be far less injurious if the landlord turned a certain proportion of his oxen and sheep to the same purpose. There are instances where the landlord lets the game on the tenancy to a third person, and thus gets two rents, one for the land, and another rent for the game after it has been fed by the farmer.

Game-laws have been often been stated that from three to five hares est and destroy as much as would keep one sheep. On many farms the number of hares averages at least two per acre; and the destruction by hares alone is too often equal to an additional expense of 10s. per acre on the whole of the farm; there is, besides, the waste and destruction caused by run tits, pheasants, and partridges. On some farms of 600 acres where the game is strictly preserved, but not excessively, the loss caused by hares will often amount to above 200l. The landlord sells the hares at perhaps 5s. per hundred, and poachers 2.5s. This is a sight short-hand, setting aside the bad moral effect of the practice. The operations of the poacher, if he escape detection, are in one sense beneficial to the tenant-farmer, for the destruction of the game adds to the farmer’s profit; but if the poacher be convicted and sent to gaol, then the support of the man and his family adds to the loss which the game occasions.

Many of the reservations and covenants in leases in relation to game are fit only for the copyholders of a manor four or five centuries ago. There are many farms on which the tenants are forbidden either to sow wheat or drill turnips. Mowing costs less than reaping, and the tenant has besides the advantage of an extra quantity of straw for the stock and an increase in the value of the soil from the deposition of the partridges, and therefore the sowing must not be used, nor any other instrument which cuts lower than twelve inches. Drilling turnips is now an essential operation in all good systems of husbandry; but it gives to the soil a lighter texture, and, though it reduces the value of roots per acre, it encourages the birds to run, and spoils sport. In some districts, where game is preserved with great strictness, a farmer is not allowed to sow winter turnips. To count in a land where rabbits are kept would be a waste of property. Legislation cannot produce any improvement in this state of things. It arises from the dependent condition of the great majority of the tenant-farmers; and if a law were passed which gave them the right to kill the game on their estates, he would not be inclined to raise the price of the game and other retainers of the great and small game-preservers are spies on the tenant, and in the intense competition for farm he dare not contravene the wishes of his landlord. Public money and does produce some effect on the landlord’s exercise of his power, but this is counteracted by individual cases.

The administration of the game-laws in England is in the hands of persons who are either game-preservers themselves, or who, generally speaking, are not unfavourable to the system of preserving game. The ACT has not been enforced. 132 cases were tried in 1844, before the act 1 & 2 Wm. IV. c. 52 was passed, penalties for infractions of the game-laws could be recovered before one justice; but now conviction can only take place after two justices. There are no extensions allowed to the quarter sessions, but a ceritorari is not allowed. There were 72 cases, and great obstacles were thrown in the way of obtaining a ceritorari. The expenses of appeal are heavy.

On the 28th of February, 1844, on the motion of Mr.
Bright, M.P. for Durham, a select committee was appointed to inquire into the operation of the game-laws. At the close of the session 1845, the committee concluded their inquiry, and it is to be resumed in the session of 1846. Certain members of the committee voted against printing the evidence already taken, and when Mr. Bright, with their consent, proceeded to announce the result of their evidence before the House, the House was counted out. The evidence cannot therefore be printed before 1846. The number of certificats taken out annually to kill game is about 40,000 in Great Britain, and the number of licences so issued in Ireland.

In other countries, as well as in England, game-laws have been an instrument of oppression. In France before the first Revolution there were edicts for preserving game which prohibited fowling and hunting that the young partridges should be disturbed; stoothing seed, lest it should injure the game; manuring with night-soil, lest the flavour of the partridges should be injured by feeding on the corn so produced; mowing hay, &c. before a certain time, so late as to spoil many crops, and taking away the stubble which would deprive the birds of shelter. (Arthur Young's Travels in France in 1787-88-89.) The tyranny of the manorial courts rendered it hopeless to escape from this oppressive system. The Conditions of Banks as respected wages de la classe, and for whom the seigneurs arrogated to themselves. A stringent game-law has recently been enacted in France, which is giving great offence.

GAMING. [Gamng or Gambling, P.C.] In England, in the passing of 8 & 9 Vict. c. 109, the law considered wagers in general as legal contracts, and the winner of a wager could enforce his claim in a court of law. The exceptions to this rule were, where the wager was an incitement to a breach of the peace or to immorality; where it affected the feelings & interests of third persons, or exposed them to ridicule or inconvenience; or where it was against sound policy or prohibited by statutory enactment. In cases not comprehended within the above exceptions the judges frequently declare it to be within the discretion of the courts to impose a penalty of, &c., or, if the parties considered the matter to be of a frivolous or an improper nature.

In Scotland the courts followed an opposite rule to that which prevailed in England. They held that they were instigated to try adverse rights, and not to determine silly or impertinent doubts or inquiries of persons not interested in the matters in question; and they decided that their proper functions are to enforce the rights of parties arising out of sentiments of justice, and not to pay regard to Specious Inducros.

In 1844 a select committee of the House of Commons on gaming recommended that wagering in general should be freed subject to no penalty; and they also expressed an opinion in favour of the law of England being assimilated to that of Scotland.

In the session of 1846 the act 8 & 9 Vict. c. 109 was passed, which enacts 'That all contracts or agreements, whether by parole or in writing, by way of gaming or wagering, shall be null and void; and that no suit shall be brought or maintained in any court of law or equity for recovering any sum of money or valuable thing alleged to be won upon any wager, or which shall have been deposited in the hands of any person to abide the issue of which any wager shall have been made: provided always, that this enactment shall not be deemed to apply to any subscription or contribution, or agreement to subscribe or contribute, for or toward any place, purpose, or object the income or proceeds of which are to be used for or for the benefit of, or for the use or reward of any lawful game, sport, pastime, or exercise.'

By 18 Charles II. c. 7, any person who won any sum of money by fraud, cozenage, or deceit was to forfeit treble the value won. Under 8 & 9 Vict. c. 109, cheating at play is to be punished as obtaining money under false pretences.

The act 18 Charles II. c. 7, which was designed to repress excessive gaming by restraining it to playing for ready money, is repealed by 8 & 9 Vict. c. 109.

The provisions of the statute of Anne against bets exceeding 12s. was so much a dead letter, that its existence appears to have been forgotten. In 1843 a meeting of gentlemen was brought by common informers against several noblemen and gentlemen who had violated the law by betting sums of more than 10l. on horse-races. A bill was brought in early in the session of 1844, for the relief of these persons, and was rapidly passed through its various stages. The act is 7 Vict. c. 6, and it was entitled 'An Act for the relief of persons who, during the three calendar months, and till the end of the present session of Parliament, in certain actions under the provisions of several statutes for the prevention of excessive gaming, and to prevent the consequences thereof, have been convicted by two or more committees. Before the act was passed, and to prevent the consequences of the act 7 Vict. c. 8 being allowed to expire, another act was passed (7 & 8 Vict. c. 58) which further stayed proceedings in the actions against gaming.

The act 8 & 9 Vict. c. 109 repeals those parts of 9 Anne c. 14, and 18 Geo. II. c. 34, which rendered it illegal to win or lose any sum exceeding 10l. at play or by betting; and there is a clause under which all actions and informations commenced previous to this act to recover for and against gaming are to be discontinued on payment of costs.

The act 7 Geo. II. c. 8, which was made perpetual by 10 Geo. II. c. 8, entitled 'An Act to prevent the infamous practice of stock-jobbing at the London Stock Exchange by the practice of time-bargains.' The acts 19 Geo. II. c. 37, and 14 Geo. III. c. 48, are intended to prevent transactions of the nature of gaming or wagering on policies of marine and life insurance.

The act 8 & 9 Vict. c. 109 provides that all gaming-houses, or proceedings against any common gaming-house, by enacting that in default of other evidence it shall be sufficient to prove that such house or place is kept or used for playing therein at any unlawful game, wager, or stake, unless it is proved that the negócio or some去看看 whose exclusive of the others, or that the chances of any game played therein are not alike favourable to all the players, including among the players the banker or other person by whom the game is managed, or against whom the wager is made, and the bank is kept, except when the players play with each other or bet among themselves, the place shall be deemed a common gaming-house. It is not necessary under this act to prove that any person found playing at any game was playing for any money, wager, or stake. The act also provides that the law is complied with by any household of two householders that any house is a common gaming-house; and provides, that on the report of a superintendent of metropolitan police, it shall be lawful for either of the commissioners of police to authorize the superintendent by a written order, to enter any house or room with constables, and, if necessary, to use force for the purpose of effecting such entry, whether by breaking open doors or otherwise, and to take into custody all persons who shall be found therein, and to seize and retain all books, tables and other instruments found in such house or premises, and also to seize all money and securities for money found therein. If any cards, dice, balls, counters, tables, or other instruments of gaming used in playing any unlawful game be found in any house or room which the police have entered as a suspected gaming-house, or about the person of any of those who shall be found therein, it shall be evidence, until the contrary be made to appear, that such house or room is used as a common gaming-house, and that the persons found in the room where such instruments of gaming shall have been found, were playing therein, although no playing was actually going on in the presence of those who made the entry. Before this act was passed, persons found in a gaming-house could not be searched; and proof of the life of any of them, as they might escape places out of the metropolitan police district the justices may by warrant empower constables to enter gaming-houses. Persons who have been concerned in unlawful gaming and who are evidence of the life of any other person who has had the management of a common gaming-house, may obtain a certificate from the magistrate or judge of the court, which frees them from all criminal prosecutions, penalties, &c.

The punishment which may be inflicted on gaming-house keepers under 8 & 9 Vict. c. 109, in addition to the penalties mentioned in 32 Hen. VIII. c. 9, is, a penalty not exceeding 100l., or imprisonment with or without hard labour for a term not exceeding 14 years. By 8 & 9 Vict. c. 109, public billiard and bagatelle boards are not to be kept without a licence, and the places where they are kept may be visited at any time by constables and officers of police; and such places are to be closed entirely on
Sundays, and on other days at midnight, except Saturday, when it is fixed to 9 o'clock.

On the night of the 8th of May, 1844, a simultaneous entry was made by the police into all the common gambling-houses, seventeen in number, which were then known to exist in the metropolitan police district. Gambling is also carried on in the district of police where brothers and sisters keep public-houses, and also at cigar-shops. The evidence taken before the select committees on gaming in 1844 contains a mass of information on the subject of gaming and gambling habits amongst the lower orders.

Gaming (alea) among the Romans was played with dice. The earliest enactment against it is referred to by Plautus and Cicero; but it is not certain what the penalty was. Under the later republic and the empire gaming was a common vice, but it is not known whether the little that is known of the penalties against gambling is contained in the Digest (11, tit. 5) and the code of Justinian (iii. tit. 48). The praetor in this, as in many like cases, placed the encourager of gaming under disabilities. If a man lent his house for gaming, and, while the gaming was going on there, was beaten or had anything stolen from his house, the praetor refused him all remedy. A senatusconsultum, the name and time of which are not mentioned, prohibited all playing for money in the home of the master of the house, which was fixed by the five male exercises enumerated, and, as we must infer, by the persons who joined in the exercises. If a slave, or a son in the power of his father, lost money at gaming, the father or owner of the slave might recover it. If a slave won money, there might be an action against the master, but the master against the master could not exceed the amount of the slave's peculium, that is, the property which the slave held as his own, according to Roman custom, with the permission of his master. The praetor's edict also allowed an action against parents and patres in respect to money left to children or to the patrons' freedmen, as we must understand it. Justinian made several constitutions against gaming. A man who lost money at gaming was not bound to pay it; and if he did pay, it could be recovered by him or his heirs upon the three clauses of the law's peculium, or the property which the slave held as his own, according to Roman custom, with the permission of his master. The praetor's edict also allowed an action against parents and patres in respect to money left to children or to the patrons' freedmen, as we must understand it. Justinian made several constitutions against gaming. A man who lost money at gaming was not bound to pay it; and if he did pay, it could be recovered by him or his heirs.

The following is the result of the evidence taken before the select committees on gaming in 1844. If a slave, or a son in the power of his father, lost money at gaming, the father or owner of the slave might recover it. If a slave won money, there might be a second action against the master, but the master against the master could not exceed the amount of the slave's peculium, that is, the property which the slave held as his own, according to Roman custom, with the permission of his master. The praetor's edict also allowed an action against parents and patres in respect to money left to children or to the patrons' freedmen, as we must understand it. Justinian made several constitutions against gaming. A man who lost money at gaming was not bound to pay it; and if he did pay, it could be recovered by him or his heirs.

The Code Francais allows an action for money won at games of chance and skill, when the amount is not excessive; but money paid cannot be recovered, unless on the ground of fraud. The keepers of gaming-houses, their managers or agents, are punishable with a fine (of 300 to 6000 francs), and imprisonment (two to six months), and may be deprived of most of their civil rights. A trifling fine is imposed on those who set up lotteries, or games of chance in public places; the furniture, implements, &c. are in all cases to be seized.

By the Code Francais all gaming debts, except when licensed by the state, are prohibited. Gaming debts are not the subject of action; but money paid cannot be recovered by the loser. Wagers give a right of action when the stakes are constituted in cash in the hands of any person; they are also void when the wagerer has a knowledge of the event, and concealed it. Money lent for gambling or betting purposes, or to pay gambling or betting debts, cannot be sued for. Gaming-houses keepers are punishable with fine, professed gamblers and those who keep gaming-houses are subject to imprisonment. Occasional cheating at play obliges to compensation; professed swindlers at play are punishable as for theft, and imprisoned afterwards. Money won at a drunken time or an insensible amount must be returned, and a fine paid of equal value.

In Austria no right of action is given either to winner or loser. All games of chance are prohibited, except when licensed by the state. Cheating at play is punishable with fine, professed gamblers and those who keep gaming-houses are subject to imprisonment. Playing at unlawful games, or allowing such to take place in one's house, subjects the party to a heavy fine, or in default of imprisonment.

The provisions of the Turkish civil code are similar to those of the civil code. It gives an action for money won at games of strength or skill, when not excessive in amount; but not allowing the recovery of money lost, except on the ground of fraud or minority (a provision taken from the old Frenon law).

The Bavarian code is somewhat special in its provisions; it distinguishes between games of pure skill, and mixed skill and chance on the one hand, and games of mere chance on the other. In the two former, money honestly won, and not fraudulently lost, cannot be recovered; but in the latter, money lost cannot be recovered; but with respect to fraudulent or excessive gaming, and also as to all games of mere chance, the winner may be called upon to repay his gains, and is liable, together with the loser (except as to the latter, in the case of fraud), to a penalty of varying amount. Gaming-house keepers and professed gamblers are subjected to various penalties. Distinctions are also taken as to wagerers, which are only void for fraud or immorality, but the amount of which is recoverable. The Bavarian code has been much amended at play is proved to have been the property of some other person than the player, the true owner may recover it.

Wagers also appear to be lawful in Spain, when not in themselves fraudulent, or relating to anything unlawful or immoral, as stated in Johnson's Institutes of the Civil Law of Spain, p. 242.)

Gandon, James. Of this eminent architect (who has escaped the notice of the industrious Nagler) nothing is known as to his life. It is singular, no other portrait or picture of him is known, and we can only infer from the depth of his death at the age of eighty-two, that he must have been born about 1741-2. He studied under Sir William Chambers, and was the first who obtained the gold medal for architecture at the Royal Academy. He was in the employ of the Duke of Wellington, of whose taste he was a great admirer, and imitated him, and to have predicted his future fame. He began to make himself known in his profession by undertaking a continuance of Campbell's Vitruvius Britannicus, the first volume of which, or fourth of the series, appeared in 1787, and the second in 1771. Though he had Wolfe for his coadjutor in the work, Gandon appears to have taken the chief share of the management and editorship upon himself; and in fact the name of John Wolfe would not now be known but for its association with that of Gandon, and but for a strange mistake which has contributed to him a building that appears to have been by some other architect. Though Dallaway, and others after him, say that Wolfe built Lord Shrewsbury's, at Heythrop, the Vitruvius Britannicus is constantly referred to as that of the draughtsman of the two plates of the mansion at Heythrop, as do both his and Gandon's to many other subjects whose authors are expressly mentioned. If Wolfe really built the building, the name of Gandon was not singular, and editors of the 'Vitruvius,' that fact should not have been distinctly stated in the letter-press account of that subject; besides which the building itself (destroyed by fire in 1831) by no means favours the supposition of its having been erected even in Wolfe's time, since it is in a state that savours far more of the commencement than the middle of the eighteenth century; and at any rate the taste displayed in it would hardly enitle Wolfe to the epitaph of a 'classical' architect, even were his name not attached to it. It is not as well known as the opinion of the character of the building may have been, that he was not the architect of Heythrop may further be presumed from there being merely a single plan and elevation of that building, although a section of it—which, had he been the actual architect of it, he could easily have furnished—was almost indispensable for the execution of the great external plan, in which there is more variety than usual. In fact, the 'Vitruvius' is sadly deficient in regard to sections, only a very few of the subjects being so illustrated; and although the continuation exhibits a decided improvement on the first edition, it leaves it far behind that room for further improvement: while many buildings of considerable interest are omitted, several are given which possess very little interest or merit; neither does the letter-press afford that information which it is desirable to have in a work of reference particulars, which would now be valuable. So far from being descriptive and explanatory of the respective buildings, the letter-press, which appears to have been written by Gandon
himself, and which certainly does not say much for his literary ability. But, despite this slip, what may be made out from the plates themselves is, Even as an architect Gandon does not appear to any particular advantage in the ‘Vitruvius,’ his ‘Court-hall’ at Nottingham (vol. v.) being of rather negative merit, though Dallaway calls it ‘one most correct and elegant specimen of his genius.’ Having looked at a correct specimen, the entablature would accord with Tuscan columns, just as well as or better than with Ionic ones. Gandon himself however tells us that he made five different designs for that building, and that he was obliged to pare down his ideas in connection with the vanity of his employers; yet the plan and section of the original design, which he has given along with the other plates, do not display any extraordinary talent. Still his building at Notting- ham is in many ways successful. ‘It is plain Mason the poet, and other persons of distinction, and prob- ably brought him professional employment, as he discov- ered the Vitruvius,’ after the second supplementary volume; nor has the work since been resumed by other editors. G. Richardson’s ‘New Vitruvius Britannicus’ is a mere collection of plans and elevations, for the greater part of no archi- tectural interest or merit, and unaccompanied by any letter- press; and F. P. Robinson’s work, which has a similar title, was never considered it. His name has been almost of distinct publications on the respective buildings than for a collective one.

For saying so much on the subject of the Vitruvius we may be excused, since it is with that work that Gandon’s name has always been associated. And yet his architectural talents found a field opened to them in Ire- land. On premiums being offered by advertisement for the best design for a Royal Exchange at Dublin, Gandon’s ob- tained the first, second and third prizes by John Chute, P. C. S. J. and Thomas Sandby the first and second prizes. What Gandon’s design was not known, but its merits attracted the attention of the Earl of Charlemont, Colonel Burton Conyn- han, and other admirers and patrons of art. Nor was it long before he was invited to other distant parts. It was far exceeding the Exchange both in magnitude and import- ance. The Custom-house of Dublin, a magnificent pile of 375 by 209 feet (begun in 1781 and finished 1781), is one of the noblest structures of the kind in the world—perhaps the noblest of all—and would of itself alone suffice for the fame of any architect. Dublin is also indebted to him for several others of its finest buildings—the eastern front and Corn- thian portico of the House of Lords, now the Bank of Ireland; the Chapel-of-Guns (begun by Cooke, but completed by him, with great alterations from the original design), and the King’s Inns. He also built the Court-house at Waterford, and probably many other things besides, although they have not been distinctly noticed. It is to be regretted that Gandon did not himself see the portion of the Parliament House in the same office as he had in the earlier part of his life done for those of other architects; and that he did not bequeath us such an autobiography of his professional career. But architects neither care to be autobiographers nor are they hardy ever made subjects of biography. Gandon died at Cannonbrook, near Lucan, Ireland, at the beginning of 1824.

GA’NODUS, a genus of fossil Ganoid Fishes, from the colite of Stonesfield; seven species (Egerton), referred to Chimeras by Agassiz.

GA’NOID, a grand division of fossil fishes in the classification of M. Agassiz. [Fishes, Fossil, P. C. S. J.]

GAN’US, EDWARD, was born at Berlin on the 22nd of May, 1796. He, moreover has been, the friend from so much respectability. His father was a wealthy man, noted for his sarcastic wit, and highly esteemed for his patriotism: he enjoyed the particular confidence of the Prussian state chan- cellor, the Baron (afterwards Prince) Hardenberg. After having been educated at the gymnasium called ‘des Graue Kloster’ (the Grey Cloister), in his native town, Gans entered the University of Berlin, in 1816, as a student of law. In the following year he went to Göttingen, and there, at the age of 21, he was proposed by his father for the question proposed by the faculty of law on the history and the civil and political laws of the island of Rhodes: the dis- certation which he wrote on the subject was printed at the expense of the faculty. In 1818 he left Göttingen, and went to Munich to perfect himself. In 1821 he published a book, Thibaut, the jurist, and Hegel, the philosopher, and his inter- course with these celebrated men had a lasting influence on his literary pursuits. At Heidelberg he wrote several articles for the ‘Civilistisches Archiv,’ edited by Gansler, Thibaut, and other philosophers. He was also the author of a brief barrister, ‘Untersuchung über die Judenschaft,’ in which he gave the idea of a history of the Jews and learning. He took the degree of doctor in law in 1819, in the same university, and there also published a little work ‘Uber Römisches Obligationen-Recht.’

In 1820 Gans was admitted by the university as public lecturer on law (privat docens, rather a strange name for a public lecturer), and in the same year published a work which created general sensation, namely, ‘Schoellen zum Gau.’ The first edition of Gau, by Gieschen, came only out in the year 1814, but the printing was begun as early as 1819: the printed sheets were distributed among the friends of the editor, and parts of the Institutes of Gau had already appeared, in several sheets, in the Schoell’s publication, in Germany. The first in rank among the earlier commen- tators were Navigny and Gieschen, and it was principally against their opinions that Gau took the field in his Schoells. He was rather rash in publishing his ‘Observations’ at so early a period, and on the whole the work is superficial; but it contains some profound remarks, and shows the solid knowledge which the youthful author had acquired of the his- torical part of the Roman Law. The learned public in general found his theories供大家 reference.
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the whole, the philosophical school found more adherents among practical lawyers, and the historical school among learned lawyers, scholars, and antiquarians. Gans says, in the preface to his 'Das Erbrecht', mentioned below, that the choice of the philosophers and of the pupils of the School of
weltgeschichtlicher Vorlesungen and not Jahrbiicher Das Restoration tubular System the the Restoration. It comprehends all such jurists, mostly practical lawyers, as write on law with a practical view, the labours of the other two schools being rather of a theoretical character. One of the most distinguished positive jurists is Solomon Philipp Gans, advocate of the supreme court in Berlin, who is still living, and the author of several excellent works and treatises on law, and who ought not to be confounded with his late kinsman Edward Gans. In the scientific struggle between the philosophical and the historical school Edward Gans was better enabled to take a leading part, as he had a profound knowledge of the history of the Roman Law, combined the qualities of a scholar with those of an eloquent and acute advocate, and could consequently attack his opponents with success on the very field where they thought themselves invincible. His first attack, as already said, was contained in the Scholia to Gaius. The second was 'Das Erbrecht in weltgeschichtlicher Entwicklung, Berlin, Stuttgart, and Leipzig, 4 vols. 1834—35 (The Legal Succession, its historical development, and its importance for the history of the world), by which he placed himself among the first jurists of Germany. In this splendid work the author treats on the law of succession of the most eminent nations, the most eminent statesmen, the most eminent lawyers, and among those of the Chinese, and shows how the alterations which the law has gradually undergone are combined with the history of the nations and their advance towards social and political freedom. A translation of this work would be a valuable addition to English literature; but the task is not easy, as it requires more than a superficial knowledge of the philosophy of Hegel, and the difficult art of rendering into English the technical terms of the most obscure parts of the work. Professor Gans was appointed extraordinary professor at the university of Berlin. The latter dignity is not bestowed upon Jews in Prussia, but Gans had adopted the Christian religion, at Hamburg, some time previous to his appointment. In 1826 he published 'System des Römischen Civil-Rechts' (System of the Roman Civil Law), and founded a new Review of which Berlin stood in great need, the 'Jahrbücher für wissenschaftliche Crüft' (Year Books on scientific Subjects). After the outbreak of the French Revolution, in 1830, he went to France, a country which he had already visited previously, as well as England; and his fame being already established in France, he was well received by the most eminent men, whom he preferred those who stood at the head of the great political movement. From France he went to England. The Prussian government now became suspicious, and set spies upon him, who reported every word they could catch. On his return to Berlin he began a course of lectures on modern history in the university, and his learning, eloquence, wit, and liberal principles attracted an immense crowd not only of students, who alone are entitled by law to attend the lectures delivered in the German universities, but of public functionaries, advocates, officers in the army, and others who, exasperated by his eminence, wanted to get and actually got admission. He lectured in the largest room of the university, which was not only full to accommodation, but hundreds of gentlemen were seen standing outside, in the hall, and in the great court, in spite of a very severe winter (1832—33), and all eager to learn from their friends inside the subject of the lecture, or the spirited observations of the lecturer. This was a capital opportunity for the pupils of the law courts to obtain a view of the Prussian government as a demagogue; and after some time the government compelled him to give up his lectures, on the pretext that he being a professor of law had no right to deliver lectures on political subjects. He introduced subjects connected with modern history into his lectures on law; and the Prussian government, dreading his sharp tongue as well as his principles, now commenced a system of annoyance and petty persecution against him, in which it could only be said they succeeded admirably. The number of the prisoners, which embodied his life, and undoubtedly contributed to his untimely death. In the following years Gans published

'Vorlesungen über die Geschichte der letzten fünfzig Jahre' (Lectures on the history of the last fifty years), in Raumer's 'Historisches Taschenbuch' for 1833 and 1834; 'Vermischte Schriften juristischen, historischen, staatswissenschaftlichen und philosophischen Inhalts' (Miscellaneous Works on Law, History, State Science, and Philosophy), Berlin, 1834, 2 vols. 8vo.; 'Rücksicht auf Personen und Zustände' (Retrospective view of individuals and events), Berlin, 1836; 'Grundlagen des Besitzes' (The Principles of Property), Berlin, 1837; 'Mémoire sur la législation de l'Empire germanique' (Mein Monat in Heidelbergs celebrated work on the Law of Possession among the Romans). Most of his time he devoted to a complete edition of the works of Hegel, those that were published already, and those which Hegel left partly unfinished in M. S., especially on Hegel's 'Phänomenologie', a work which he would perhaps never have seen a complete edition of Hegel, he being, according to Hegel's own words, the only man who thoroughly understood his great but obscure master. On the 1st of May, 1839, while dining with a friend, he suddenly speechless from his chair, being struck by apoplexy; after lingering a few days, he died on the 5th of the same month.

Gans was one of the most learned, most witty, and most eloquent men of Germany; distinguished as an author, and unsurpassed as a lecturer. His fame would have been still greater had he had an opportunity of displaying his talents on the political stage. No man was his equal in controversy; he could confound the most skilful of his adversaries by his sarcastic replies. Those whom he wounded deepest and spared least were men of acknowledged authority, or of high rank or birth, and among them he had his bitterest enemies. He belonged to those highly gifted Jews, his contemporaries, who have served for more than 150 years as the pupils, the poets, the jurists, and the artists of Germany, as Heine the poet, Börne the political writer, Mendelssohn the composer, Michael Beer the poet, his brother Meier Beer, commonly called Meierbeer (the composer, and many more. Gans's successor as professor of law in the university of Berlin was Dr. Stuhl, a man of unrivalled arachnological principles, and a disciple of the notorious Hailer, the author of the 'Restoration of Clothing'.

(Neuer Neuhorg der Deutschen, Allgemeine Zeitung (Supplement) of 1839, No. 132; Conversations-Lexicon der Gegenwart.)

GAOL (Transportation) to Canada

GARDE/SHIA (named after Dr. Alexander Garden of Charleston, South Carolina, a correspondent of Linnaeus), a genus of plants belonging to the natural order Cinchonaceae. It has the calyx usually ribbed, with a tubular truncate limb divided into several lobes or teeth; the corolla funnel-shaped, with an apical appendage; the anthers of the same, except that the calyx, and a contorted spreading 5-9-parted limb; the anthers 5-9 linear sessile in the throat; the stigma clavate, hild, or 2-toothed, with thick erect lobes; the sepals and petals almost as long as the corolla. The fruit is a dry, fleshy, crowned with the calyx, with a papery or bony lining, incompletely 2-5-celled; the seeds immersed in fleshy partial placentae. The species are armed or unarmed trees or shrubs, with axillary or terminal, usually solitary, white and fragrant flowers.

G. campasulata is a shrubby plant with short branches spiny at the apex, the spines solitary; the leaves lanceolate, smooth, acuminate at both ends; the flowers on short pedicels to terminal and lateral fascicles on the limb of the calyx campasulata, with a short acutely 6-toothed border; the corolla sub-campasulata, 6-lobed; the berry roundish, ovate. This plant is a shrub to 5 to 10 feet in height, and is native of the East Indies, in the forests of Chittagong. The berries of the size of a golden pippin apple, and is employed by the natives of India as a cathartic and anodyne.

G. arbores is an unarmed tree with ovate-oblong leaves, terminal, almost sessile flowers, usually arranged in threes; and conical with a filiform tubular limb of the calyx campasulata, the berry drupeous-sweet, smooth, containing a 4-5-valved shell. It is a native of the East Indies. The fruit is eaten by the natives of India. It is one of the most beautiful species of the genus, and is seen on this check.

G. floridia is a native of the Carolinas, double-flowered varieties of G. floridia and G. radicans are rare. None of these species are of much importance. The best way of getting them to bloom freely is to set them in a close frame with a gentle bottom heat in the spring.
winter they may be placed in the greenhouse. They may be increased by cuttings.

*Gardey*,
Supposes," is founded upon the 'Phrenism' of Epuripides, of which however it is an alteration rather than a translation. Three authors had part in it, Gascoigne, Francis Kinwel-marsh, and Christopher Yelverton. Gascoigne working on the sections sets on the top of it, and a short critical estimate, will be found in Collier's 'History of English Dramatic Poetry.' It is mainly curious as having been the second drama in blank verse which was composed in our language. Mr. Collier gives also an account of another drama of Gascoigne's, 'The Case of Government,' first printed in 1575, which possesses very little merit.

GASCOYNE, WILLIAM, an astronomer of the seventeenth century, who is distinguished by having been the first inventor of the microscope (about 1656). He was a man of great application, erected either of two parallel wires, or of two plates of metal, placed in the focus of the eye-glass of a telescope: the nearest edges of the plates, which were ground fine, were parallel to one another; and the plates or the wires were capable of being moved, so that the image of an object could be exactly comprehended between them: a scale served for the measurement of the angle subtended by the interval, and Gascoigne is said to have used this instrument for the purpose of measuring the diameters of the stars. The application of this became of importance, in determining the magnitudes or distances of terrestrial objects.

The few circumstances which are known concerning this ingenious person, and the manner of his death, are given under the name of GAMBILLIAN, P. C.

GASES, LIQUICATION OF. [CHEMISTRY, P. C. S.]

GASSE, STEFANO and LUIGI, twin brothers, and both architects, were born at Naples, August 8th, 1778, but were of French origin. When not above seven years of age the brothers were sent together to the care and instruction of their maternal uncle the Abate Minotti. On their education being sufficiently advanced, they made choice of architecture as their profession; and they not only obtained many privileges at the Institute of France, but were sent to complete their studies at Rome. After remaining five years at Rome, they were recalled by their parents to Naples in 1802, where they settled and practised together. The strong attachment between the two brothers was interrupted only by the death of Luigi (November 11th, 1838); and they appear to have been well suited to aid each other, no less by the difference of their talents than by the similarity of their dispositions—Luigi possessing greater fertility of ideas and readiness in design, while Stefano had more practical skill and knowledge of construction. Thus, the works executed by Stefano during the life-time of Luigi, belong to both brothers in common; and Naples owes to them many of its best modern edifices. Among the more important of them, and which were executed in the latter part of life of Luigi, are the works of which they are ascribed to Stefano in particular, are, the Astronomical Observatory; the additions to the Villa Real; the Real Edificio di San Giacomo, an immense pile of building, erected at the cost of 1,500,000 ducats, and containing the banco della salute; the Dogana, or a great customs-house; and the Dogana, or new custom-house. Besides these public works he built not a few mansions for private individuals: the Palazzo Montemiletto; that of the Duca di Terranova, the Casino Caesco at Sorrento; the Casino DuPont, and that called 'di Sofia,' in the Strada Nuova di Posilippo. He also designed the new streets Santa Lucia and Morgellina, and the entrance to the new Campo Santo or public cemetery, but he did not live to complete any of these large-scale public edifices. After the death of Stefano Gasse—for he had been complimented with the cross of the order of Francesco Primo—died at Naples, February 21st. 1840.

GASTEROMYCETES, a suborder or cohort of the natural order of Fungi. [Fungi, P. C.] It is distinguished from the higher forms of fungi [HYMENOMYCETE, P. C. S.] by the reproductive organs being included in a case of some kind or another. Many of the genera and subsections of Fungi (as the Botrytis, the Sclerotinia, the 'angsteromes', or a suborder of the 'angsteromes', and Conocyctes, have been described in the ' Penny Cyclopaedia,' so that those only which have been omitted will be mentioned here, in order that a connected view of the family, more especially as it exists in Great Britain, may be given.

The first tribe of the Gasteromycetes is Angiospermae. Of this tribe there are four sub-tribes or sections. The first, Phallidae, has a distinct receptacle at length bursting through the exsiccatum. Of this section the genus Phallus is the type: it has a stiltipe pilleform receptacle, with an entire border.

There are several species of this genus known in Great Britain, where they are called Stink-horns on account of their disgusting smell. P. impudicus, the common Stinkhorn, is 8th to 12th inches in height in summer and autumn. It grows under sticks and leaves, and frequently, when cut, may be detected by the disagreeable metallic odour which it exalts. The stem is from one to six inches in height, and the uterus is about as large as a hen's egg, containing the 'sporangia, distended with jelly and a delicate membrane surrounding the pileus. P. caninus is a rare species. It grows in woods and hedges in the south of England. From the colour of its pileus, by which it may be distinguished, it is called 'the Red Stink-horn.' The above species, Mr. Curtis, in his 'British Entomology,' has described as the species on the ground Matsch- and Stinkhorn. Mr. Curtis was not at Lowestuff in Suffolk. At first it has a scent somewhat like that of violets, but it becomes very offensive when dried.

The second section is Tuberculae. [TUBERCULACE, P. C.] The third section, Nidulariacea, has a receptacle filled with free or cestically pedicellate sporangia. The type of this section is Nidularia, or Bird's-nest Poza. There are three species of this genus found in Great Britain. The most common is N. compacta, which has a soft, protruding dung, sticks, &c. They are pretty little fungi, resembling birds' nests, not only in their shape, but also in their sporangia, which lie at the bottom of the receptacle like little eggs.

The fourth section, Carpoboli, have a solitary sporangium protruding from the receptacle. The genera belonging to it are Carpobolus, Spharobolus, Thelebolus, Pilobolus, Astreocoma, 

A species of the last named, A. ubiquitaria, is found on wood, stones, and other things, after rain, appearing like scattered meal. The Rev. M. J. Berkeley, says, however, that he is convinced that it is an insect origin. Spharobolus stelligus, is found on rotten wood and sticks, in the autumn. In its early state it is covered by a fine woolly or cottony web which is very fugacious. When the young plants have pushed through this web, they have the appearance of master-seeds. Each plant consists of an outer and an inner membrane. At the time of the opening of the outer membrane, the inner one, which is then concave and with its mouth up-permost, projects the ball of spores which it contains, like a bomb from a mortar, to a distance of several inches. The cracking noise occasioned by this phenomenon gives rise to a great deal of talk. This species is 'unsat-isfactorily,' says Dr. Greville, 'the most wonderfully constructed plant which it has fallen to my lot to describe. That so great a degree of force should exist in a body not larger than a pin's head is astonishing. The force exerted in defiance of considerable resistance, seems to surpass the power of anything to account for it satisfactorily.'

The tribe Pyrenomycetes is frequently regarded as a sub-order or cohort. [Fungi, P. C.] It consists of genera of the eyecup, such as some of other species of Phallus and Sclerotinia and the genus of the Ovatoidea, of which the genera of the latter name are also included in the order. One of the principal genera is Sclerotinia, and the species of this genus are found on the decay-leaves of other plants, and vary with the species of the plant on which they grow. The genera in which the greatest number of species have been described by British botanists are Gyp- pora, Phoma, Dothis, Astero, Rhytisma, Phacidium, Hysterium, and Lepidotus.

The third tribe is Trichodermia [TRICHODERMACE, P. C.], the fifth, Trichoderma [TRICHODERMACE, P. C.].

The genus of the Allium, the wild leek, is scarcely distinct from the nucleus, and the sporia immersed in pulp free or included in peridio. The genera in this tribe are not numerous. Racodium, the Mouse-skin Bysan, is placed here by some authors; but if, in Eysenm. [BYSSACAE, P. C. S.]

The most extensive genus is Erysiphe, the species of which produce various forms of mildew. It has a fleshy peridium opening at the collapsing apex, subgelatinous within; the sporia is included in the sporia, with a mouth; the sporia is immersed in pulp of the peridio. E. pannosa, the Worse Mildew, is found on the leaves of the various species of rose. It is easily known by its shining yellow sporia, which are very different from any other genus. On this account it is referred by Eysenm to Eurotium.

E. communis is an extremely common fungus, and is found on various kinds of herbaceous plants. It is not improbable that the various forms of Erysiphe, which have been described according to the species of plant on which they
grow, have a common origin. The same may be said of the forms of *Urtica, Ectedinum*, and *Puccinia*. [Mildew, P. C.; 
Uredo, P. C.]

The suborder *Hypomycesia* of Berkeley and others includes many of the genera that are referred by Fries to the fourth order, *Coniothyriaceae*.* The first tribe, *Cephalothyrii*, includes most of the fungi of the mycorrhizal or mycorrhizal. The species of the

two first are not numerous or common. *Ceratium hydrophorum* is not uncommon on rotten wood.

The tribes *Mucorii*, *Donatella*, and *Mucidelle* consist of various species. Up to this time the biology, biology, and genetics of the species of *Fusarium* are found in decaying fruits and vegetables. *V. Martius has described one under the name of *V. Solani*, which attacks the tubers of the potato, and produces a kind of rot. This occurred epidemically among potatoes in Germany in 1829, and at the present moment (October, 1845) a similar epidemic has attacked the potato crop of Great Britain. That the fungus is the cause of the disease may however be doubted, and it is probable that the fungus is only the result of a diseased state of the plant.

The tribe *Sporidiales* includes those fungi whose sporidia are produced beneath the epidermis of plants, and which in many instances appear to be rather diseases of the tissues than independent existences. The first sub-section or tribe is *Tabucullarini* [Turbellaria, P. C.]. The second tribe, *Sordaria*, consists of sporidia glued together into one plants, without any covering, under the cuticle of plants, at length bursting forth together with the gelatinous or free. The genera of this tribe are *Neurospora*, *Septoria*, *Sordaria*, *Didymosporum* and *Melanocarpia*. The third tribe, *Sporidiales*, have their sporidia chined together into floccel. The genera are *Aemata*, *Tubula*, and *Sporidiales*.

The fourth tribe, *Hyphomycetes*, includes those species of fungi which form unarmored the cuticle of living vegetables. They are said by Fries to have "proper vegetation, their sporidia arising from an anamorphosis of the cells of living vegetables." To this definition Berkeley objects, and regards the species as distinct plants. The principal genera are *Puccinia*, *Ectedinum*, and *Uredo*. [Mildew, P. C.]

(Smith, English Flora, vol. v, part i.; Burnett, Outlines of Botany: Lindley, Natural System.)

GASTROBRANCHUS. [M itch e, P. C. S.]

Il. *S. Solaro* called *Il. Solaro* from the occupation of his father, was born at Cremona about 1495. He is one of the most distinguished of Correggio's pupils and imitators of his admirable works by him in Paris, Plinas, and Cremona. The Miracle of the Leaves in the refectory of the Padre Louiz from Cremona, painted in 1551, is a masterpiece, as is also the Ascension of Christ in the church of San Sigismondo. He died in 1575. Il Solaro is claimed by other cities, but Cremona appears to have the best title to him.

(Zeits, Notizie Istorie dei Pittori, &c. Cremones; Lenzi, Storia Pittorica, &c.)

GAUDEAN, JOHN, was born in 1605 at Mayland in Essex, and was of that parish. His school-education was received at Eton, and he afterwards received his education at St. John's College, Cambridge, and took his degree in arts in the ordinary course. About 1628 he removed to Oxford, and became a tutor in Wadham College; and at a later period he took the degrees of bachelor and doctor in divinity. In 1630 he was appointed chaplain to the Earl of Warwick, through whose patronage he received two ecclesiastical preferments, a rectory in Evershawe, and a vicarage in the county of Cambridge. In the earlier part of his history he was said to have been at some pains to make his name known in Oxford, and he inclined strongly to the popular side; and a sermon which he preached before the House of Commons, in 1640, was regarded by a public present of a silver tankard. Next year the parish of the village was therefore appropriated to the living of a clerk, and the Vicar of Shotting in Essex; to which however the cautious doctor thought it right to have his title confirmed by Archbishop Land, then a prisoner in the Tower. After the breaking out of the civil war, Gauden submitted to the Presbyterian government, but with a

hesitation which was suspicious, and which appears to have been punished by his exclusion from the Westminster Assembly of Divines after he had been named a member of that board. He gave up the use of the liturgy in the service of the church, but not till the last moment when it was possible to preserve it: and he subscribed the covenant, but not till he had written a note saying he regarded it as a measure of

ferments, but gradually approached nearer to the royalist church-party, and contracted with some members of it relations which, by his own account, led to important conse-

quences. Upon monarch's Restoration, Dr. Gauden was appointed chaplain to Charles II.; and before the close of the same year he was created bishop of Exeter, whence in 1664 he was translated to the see of Worcester. Shortly afterwards, on the 20th of September in that year, he died, of a disease which, by his own account, was not till he had been obliged to put up with the bishopric of Worcester in place of the more valuable one of Winchester, which he had very eagerly solicited.

In the course of this solicitation the assent was made which gives interest to Bishop Gauden's history and character. He alleged that he was the real and sole author of the famous work called 'Elkon Baslikie, the Portraiture of his Sacred Majesty in his Solitudes and Sufferings,' which, purporting to contain memorials and accounts of King Charles I. in his captivity, had been published in 1648, a few days after his decapitation, and had excited a very lively sympathy towards the supposed author. The bishop's claim, urged primarily in letters to Sir Charles Desborough, afterwards bishop of Winchester, did not at once become the subject of open discussion; but the controversy was commenced in 1692, by an assertion of Gauden's authorship, published by a clergyman who had resided in his family. The curious question thus raised has been discussed by Mr. Hallam and by other writers of

Gauden was acknowledged the author of a large number of sermons and tracts, chiefly bearing upon questions of ecclesiastical polity. A list of these, containing nineteen or twenty pieces, is given in the article under his name in the 'Biografia Britannica.'

GEARING, or GEERING, in machinery, is term somewhat indifferently applied to a train of toothed wheels, or other similar contrivance, for transmitting motion. Couplings [Coupling, P. C. S., 493] may in some cases be considered a kind of gearing; and the expression 'to throw machinery into or out of gear' is commonly applied to the act of engaging or disengaging gearing. The subject of gearing generally is treated of under WHEELS, and WHEELS, TEETH OF, P. C., pp. 310, 318, where the principal varieties of toothed wheels are described. We may here notice two ingenious contrivances for multiply-

matory motion in a train of gearing, with greater rapidity than by any ordinary arrangement of wheels and pinions. The first of these was invented simultaneously by Mr. Dyer, in America, and by Messrs. M'Dougall, of Ferry-Bridge, in Scotland, and was described by Mr. H. Burnett, who obtained an English patent for it. The object of this invention, according to Hebert's account of it in the 'Engineer's and Mechanic's Encyclopedia,' vol. i. pp. 621, 622, is to obtain a great difference in the relative velocities of the wheel and pinion, by a contrivance which in some respects resembles what is called a worm-wheel, or a wheel driven by an endless screw, while it is free from the objections attending the ordinary form of such an apparatus, which are usually stated in the following form: 'If *W* forms a tangent, or nearly so, to the periphery of the wheel, the axis of the screw being at right angles with that of the wheel. The force applied by the screw in turning the wheel passes through the center of gravity of the latter, and is not of its radius; and the communication of motion is attained by much rubbing friction, and by considerable strain or longitudinal pressure upon the pivot or resisting point of the screw. Owing to these disadvantages the screw is rarely, if
ever, driven by the wheel, so that the use of the apparatus is limited to the conversion of a quick into a slow motion. In the improved gearing, of which Hebert gives illustrative cuts, the axis of the spiral or endless screw lies parallel to that of the wheel, and its spiral is perpendicular to the radius, while the rubbing is converted into simple rolling friction. The resistance is thus so greatly diminished that the screw may be driven with facility by the wheel, so that the technology employed tends to convert a slow into a quick motion, as well as, like the common endless screw, for converting quick motion into slow. The simplicity of this kind of gearing constitutes one very important advantage, for as by its use every tooth of the wheel produces a complete revolution of the screw or endless pinion, as many teeth as may be used to produce the same effect as, in ordinary gearing, would be produced by a wheel of a hundred teeth working into a pinion of ten leaves.

The other apparatus referred to is the contrivance of Mr. W. Franks, to whom the Society of Arts awarded their large silver medal in 1833. In it the periphery of the wheel is cut with two sets of teeth, alternating with one another, so that the wheel may be described as resembling two thin wheels, cut precisely similar, and mounted upon the same axis in such a way that the teeth of one shall be opposite to the intervals of the other. Into this wheel works a pinion of peculiar shape, having four teeth or leaves, two of which work in each tooth on the wheel and two in the other set. By this curious arrangement a complete revolution of the pinion is effected by the passage of only two teeth of the wheel; or rather, by the passage of a portion of the periphery of the wheel equal to two teeth; although, owing to the disposition of the duplicate great wheels, every one of the teeth, or rather, each set, are called into action to produce the revolution.

Cuts of the apparatus are given in the forty-ninth volume of the Society's 'Transactions,' part ii. p. 116.

GEE, JOSUA, an eminent London merchant of the earlier part of the eighteenth century, but we have not been able to discover any particulars of his personal history. He was one of the authors of the work called 'The British Merchant,' originally published in numbers twice a week in 1700, and collected and published as a volume in 1721, and again in 1743. It was set up in opposition to the commercial treaty with France which was proposed by ministers after the peace of Utrecht, and to Defoe's three week paper, entitled 'Mercant, or Commerce Retrieved,' in which the treaty was defended. 'The British Merchant' contains perhaps the most complete exposition that has been given of what is called the Mercantile or Balance of Trade theory; but, independently of their systematic notions, many of the facts, principles, and illustrations of the writers, and the truthful and valuable descriptions of their publication forms a record of the state of many branches of our commerce at the period when it appeared. (See a full account of it in the 'Pictorial History of England,' vol. iv. pp. 209-219.) To the request of the editor, Mr. Charles King, that 'Mr. Joshua Gee, merchant, was a very great assistant, and laboured with much industry in these papers.' Gee however is best known by his separate work, entitled 'The Trade and Navigation of Great Britain considered,' which originally appeared at London in 8vo. in 1729 or 1730 (for copies of the first edition seem to have sometimes one, sometimes the other of these dates). It was reprinted at London in 8vo. in 1731, and in 12mo. in 1738; and there is a Glasgow edition of 1760, called on the title-page the sixth, and another in 12mo. of 1767, professing to contain 'many interesting Notes and Additions, by a Merchant.' Mr. M'Culloch, in his 'Literature of Political Economy' (1849), makes a sixth edition to have appeared at Glasgow in 1753; but this must be a mistake. The advertisement prefixed to the Glasgow edition of 1768 speaks of the book as having for many years been very scarce. Gee himself, in an address 'To the Reader,' states that his treatise had wheel and the novel printed in the direction of his own design of publication, and only that a few copies might be put into the hands of the ministers of state and other great men. But he adds, 'After I had delivered a few of them, I.unsuskipped them to the great persons, that a discourse upon trade would be very acceptable to every opportunity of demonstrating his care and affection for his people; and that it would also be acceptable to the queen and prince.' He thereupon sent copies to these royal persons, and when it got abroad, 'Discourse,' he was informed that if he did not permit it to be published, it would fall into the hands of such as might print it and alter the sense; so he determined to publish it himself. In a 'Preface,' which follows, he further attributes the origin of the work to his having been desired by some persons of distinction in the late reign to give them his thoughts on naval and military subjects. The work is divided into thirty-four chapters, and, besides the general principles of trade, discusses the particular commerce carried on by England with every part of the world. The two main propositions were: first, there is no advantage that the surest way for a nation to increase in riches is to prevent the importation of such foreign commodities as may be raised at home; and 'That this kingdom is capable of raising within itself and its colonies materials for employing all our poor in manufactures, and to make them all of home produce, laid such an embargo upon our neighbours who refuse the admission of ours.' In his advertisement Gee informs us that the poverty and necessity in which he had seen the poor in several parts of the kingdom had touched him very sensibly, and he had spent a great deal of time from the service of his family 'to find out methods for promoting so public a blessing as turning the employment we give the poor of foreign nations to our own.' His scheme however is merely to put down begging in the streets, and to employ the poor in workshops. On the whole, the book, though it was formerly popular, is not one of any remarkable ability or value, except as giving a clear account in small space of what the trade of the country then was.

GELL, PHILIP, was a younger son of Philip Gell, Esq., of Hopton, in the county of Derby. The original family name was Eyre, which had been changed by his grandfather to Gell, after his mother, who was a member of the family of the Gells of Hopton, Barons. Sir William Gell, who was the father of Philip Gell, was an army officer, and in 1760, he had received his degree of B.A. in 1798, and of M.A. in 1804. He was for some time a Fellow of Emmanuel College. He is stated in the account to which we are indebted for the particulars of his biography, to have received a knighthood, in May 1803, on his return from a mission to the Ionian Islands; but what was the nature of this mission, if it ever took place, we do not know, and he certainly was not knighted at so early a date. He had already spent much of his time abroad, as a naval officer, and also as a public servant. On his return to England in 1814, she appointed him one of her chambermen. He attended the princess in various parts of Italy, especially at Naples and Rome; as appears from the evidence he gave at the bar of the House of Lords in the course of the proceedings taken against her after she became queen and had returned to England in 1820. After this Gell returned to Italy, and he resided mostly at Naples till his death, which took place there on the 4th of February, 1866. He had also spent several months in the States of the Romish Church. He had long suffered severely from gout and rheumatism; and for some years before his death he had nearly altogether lost the use of his limbs.

Gell was the author in 1804, when he published his work entitled 'The Topography of Troy and its Vicinity, illustrated and explained by Drawings and Descriptions,' folio. This was followed by 'The Geography and Antiquities of Thasus,' 4to., 1808; 'The Itinerary of Greece, with a Commentary on Pausanias and Strabo,' in 4to., 1821; 'Pompeiana, or Geographia upon the Topography, Edifices, and Ornaments of Pompeii' (in conjunction with J. P. Gandy, Esq.), 2 vols. 8vo., 1817-19; 'Attica,' folio, 1817; 'Narrative of a Journey in the Morea,' 8vo., 1823 (the journey having been performed in 1804); 'The Geography of Rome and its Vicinity,' 2 vols. 8vo., 1824 (an important work in reference to the cities antiently existing in the Campagna di Roma; 'Rome and its Environs' (a map), 1834. Gell was a good draftsman, and he has the merit of having left a very correct and valuable description of antiquity. Some of his works are hurried performances; but they have all a certain value as being the results of actual observation. The one that brought the author most into notice was 'Pompeiana;' of this a continuation, or second series, in 2 vols. 8vo., was published in 1848. (Notice in Gentleman's Magazine for June, 1836, p. 665, and Gell's Works.)

GENERAL ISSUE. [FLANDERING, P. C.]

THE MONT, a mountain of the Alpine range [ALPS, P. C.], which gives name to one of the principal col or passes communicating between France and Piedmont. It is
in that part of the Alpine range known to the Romans as Alpes Cottiae (the Cottian Alps), and still frequently called by that name, or its equivalents in the various languages of modern Europe. The peak of Mont Genèvre is on the S. side of the pass, and rises to the height of 5892 metres, or 11,777 feet, above the level of the sea. The springs which are commonly regarded as the sources of the Dora (an affluent of the Po) and of the Durance are on the sides of Mont Genèvre. The pass forms the principal communication between which we must now descend to the northward, and, consulting several advantages over Mont Cenis, the next pass to the northward, it is less convenient for travellers coming from Paris and Lyon, as it involves the necessity of traversing and ascending the lofty and rugged mountain of the Larrieu, the summit of which is 2991 metres, or 6588 feet above the level of the sea), by which the traveller crosses a branch of the Alps between Grenoble and Briançon. A third pass, that of the Col de Serrès, on the Sardinian side, increases the difficulties of the passage by the pass of Mont Genèvre. The road from the south of France passes through Gap and Embrou to Briançon, and is practicable for carriages; that from Grenoble to Briançon (by Vizille, Bourg d'Oisans [Bouvois, P. C.], the wild and sombre valley of the Romanche, the Col de Lautaret, and the valley of the Gissane) is practicable only for foot-passengers or mules.

From Briançon the road runs for a league through the narrow gorge which affords a passage to the Durance, to the hamlet of La Vache (Vachet, and the valley of Genèvre; here it crosses the Clarée, which, though considered only an affluent of the Durance, ought, from its greater length and volume of water, to be regarded as the main stream. The ascent from the pass to the summit has been described, through a forest of firs, pines, and tamarisks, through a movement of the air; it has been destroyed; it has numerous steep ascents and sharp turns, and offers to the traveller looking back a fine view of Briançon [Briançons, P. C.], with its numerous forts, picturesquely situated, and lofty mountains. The summit of the pass is the lowest of all the passes of the Alps except the Col de Tende, being 1974 metres, or 6472 feet, above the level of the sea, according to Malte-Brun: Brockedon states, 5850 feet, and, being but a mile and a half long, it is a plain, and two miles long, extending E. and W., and sheltered by the mountains on either side. It is cultivated, and the cultivation extends up the slope on each side to an elevation of perhaps 80 or 86 metres (180 to 240 feet) above the plain. The surrounding heights are crowned with larch-forests. Barley, oats, and rye are grown on this plain; and though the cold renders the amount of the harvest very precarious, the crop rarely fails entirely. The gardens are mostly produced from the roots of the puce; Cenis, as the spring is earlier: the zoology of the district adjacent to the pass is also indicative of its warmer temperature: wolves are more numerous, but the chamois is not so common. Bears are also more numerous than near the pass of the Col de Serrès-Sardines, where they are only afforded by the pine-woods. In the plain at the summit of the pass is a hamlet called Bourg Mont Genèvre, about eight miles from Briançon. There was here an hospice for the accommodation of travellers, founded 1340, by Humbert, Lord of Briançon; it stood in the midst of the village, but has long decayed into decay. Napoleon, designed, in 1807, to restore it, and to place it in the hands of the Trappist monks, but the design was never fulfilled, though the following inscription was prepared for it by the members of the institute:

NAPOLÉONIS AQU. PROVIDENTIA
HORITIO GENEBRENSI
CARTANIA REGIA PERSERONITATE
OFFICIA TRAPPENSIS XEEREORDA
INSTITVIT
ANNO MDCCLVII.

From the summit of the pass, the eye, and under the lee of the wind, winds down the steep side of the mountain five or six miles to Cesanne, at its foot on the Sardinian side. Where the slope is considerable and the soil soft, the road is secured by pine-trees embedded in the roadway at right angles to its direction, firmly propped and wedged with earth, and secured at their outer extremity by a strong railing. The road commands a fine view of the Col de Serrès, distant about ten or twelve miles from Cesanne. Two roads lead from Cesanne to Turin: one by the Col de Serrès, the picturesque and almost impregnable fort of Fenestrelles, used as a state prison, and the town of Pignerol; the other by Estilles and Susa, where it unites with the road from Grenoble and Chambery [CHAMBERRY, P. C.] over Mont Cenis.

The pass of Mont Genèvre was known to the antients. The Caturiges occupied the country on the west or French side of the pass, the Cottianes on the east or Italian or Montenotte side. That Belisarius, the reputed leader of the Gauls in their early occupation of northern Italy, crossed the Alps by this passage, is stated by Livy (v. 34), whom in this respect he quotes as an authority in violation of the established tradition. The same writer (xii. 82-83), and Strabo (lib. iv. p. 209, ed. Causer.; p. 319, ed. Janson, Amstel. 1707) make this the passage by which Hannibal crossed the Alps; but this is very disputable [HANNIBAL, P. L.]. The favour of his name has been given to the Little St. Bernard, or Alpis Graia of the antients. The prevalent opinion among the Romans, according to Livy, was in favour of the Alpi Pennina, or Great St. Bernard. Caesar certainly fought his way across Mont Genèvre in his rapid march with five legions to arrest the migration of the Helvetii. (Caes. De Bell. Gall., i. 10.)

In the time of Livy the pass was known by the name of the Saltus Taursinus (Liv. v. 34); in the time of the earlier Roman Emperors it was usually designated Alpis Cotta, or Alpis Cottiae, or Alpis Cottia, and less frequently Alpis Cottiae, or Alpis Cottiae, or Alpis Cottiae, which is probably applicable to the adjacent parts of the Alpine range. During the continuance of the Western Empire it was one of the main communications between Italy and Gaul. The name Alpis Cottiae, or Alpis Cottiae, is the term in Tacitus, and is ascribed to any derived from Cottius, an Alpine chieftain, who, with his mountain fastnesses maintained his independence after the subjugation of the rest of Gaul; and who, having made peace with Augustus Caesar, continued the taxes imposed on him in Albanum, for the benefit of the province. (August. Marc. x. 10.) Vestiges of Roman works in the pass may still be traced, and columns and inscriptions have been dug up at the Bourg Mont Genèvre. In the middle ages the Latin name of the mountain and pass was Mons Ienus; this name and the modern designation are evidently connected. During the middle ages and down to the present century the Col was passable only by mules and persons on foot. Towards the close of the last century, a conflict took place between the French and the Austrian troops within the summit of the pass. In 1802, at the suggestion of J. C. F. Ladoucette, Préfet of the department of Hautes Alpes, and with the sanction of Napoleon, the present road was made by the inhabitants of Briançon and the neighbouring communities, as this made the garrison of Briançon. This magnificent road from Briançon to Cesanne is thirty feet wide, and is well kept up on the French side of the frontier. It was called by order of Napoleon 'Route d'Empire' or l'Alpina, in 1804, for seven feet high, in honour of the emperor, was raised in 1807, with four inscriptions: one in Latin, one in Spanish, one in Italian, and one in French, on tablets of black Como marble. The inscriptions were destroyed by the Austrians during the war of 1815; the road was resumed this way in 1815, but the obelisk itself was allowed to remain.

(Vayss de Villiers, Itinéraire Descriptif de la France; Ladoucette, Histoire, Antiquités, &c. des Hautes Alpes; Brockedon, France, cap. by the Am.)

GENISTA (the Latin Genista), a genus of plants belonging to the natural order Leguminosae. The calyx is 2-lobed; the upper lip bifid, the lower tripart. It has a subulate ascending style; a terminal, oblique, introrse stigma. The sepals have yellow florets; Woad, of the same genus, is a chief dyes. The Plantago Genista, or Whin, the Gen of the Celts, and the Gênêt of the French, was the badge of a long race of English kings, hence called Plantagenet. Upwards of eighty species are included in the genus, and of these a few are important uses. They are found principally in the south of Europe, and some few are natives of Great Britain.

G. pilosa has a smooth procumbent stem, and obovate, lanceolate, obtuse leaves; ovate, blunt stipules. The pedicels are long, the leaf stalk hairy. It is a native of the south of France, and is also found in Suffolk and Cornwall in England, in sandy places.

G. tinctoria, Dyer's-wool, or Woad, has a decumbent stem, with erect branches, without thorns; lanceolate leaves, hairy at the edges; minute subulate stipules; racemose flowers; and glabrous corolla and pods. The branches are from one to two feet high, glabrous and downy above. This plant is a native of Europe, and is found in pastures, fields, and thickets in England. The flowers yield a yellow colour, which is much used for dying wool.

When cows are allowed to feed on this...
plant their milk becomes bitter and disagreeable, and the unpleasant taste of cheese and butter is often attributable to this cause. G. victoriae has also a medicinal reputation. The seeds are used as purgative, and the ashes are also said to be a valuable diuretic.

G. anglica, Needle-Whin, has a spinous ascending stem, leafless below; unarmed, glabrous, branching leaves; ovate-lanceolate leaves; and glabrous stems and corolla. It is a native of France and Denmark, and is found in Britain on moor boggy commons.

G. acanthocarpa has trifoliate leaves, nearly sessile; linear, complicated, silky leaflets; stiff and spinose branches. The flowers are purplish, and disposed on the branches in a kind of interrupted spike. It is a native of the Levant in exposed places, and in the island of Melos. This plant appears to be the μέλανα βίτα of Hippocrates, σιδερίου of Theophrastus, and the δευτέρων of Dioscorides.

G. cartilago has lanceolate villous leaves; branched, stiff spines; terminal racemes, somewhat capitate. It is a native of Spain and the south of France. Fras states that this species is the ‘genista’ of Roman writers (Virgil, George ii. 434; Flacc, xii. 9, 12. 22, 24. 9; Columella, 4, 31).

G. purpurea is an erect branched shrub with very few leaves and axillary solitary flowers on short pedicels. It is a native of France, on hills, especially in the Cevennes, where it is used by the villagers as a cathartic.

G. sanguinea, Red-Whin; short, leafless branches; very few linear oblong leaves, clothed with a depressed pubescence; and lateral few-flowered racemes. It is a native of Spain, Portugal, Barbary, and Egypt. On the shores of Spain it is found to be very useful as a manure, otherwise it is not of much use, and by driving a fruitful fragrant blossoms it converts a barren waste into a lovely garden. The goats feed on the leaves and young branches, of which they are particularly fond. The Spaniards call both the plant and the districts over which they grow Rastamas, from the Arabic word Rastam. The species of this genus thrive well in a mixture of loam, peat, and sand, and young cuttings will easily strike in a potful of sand with a bell glass over them, which must be taken off and wiped occasionally, lest the nursery moisture.

(Don, Gardner's Dictionary; Bebbington, Manual of British Botany; Flora, Synopsis Plantarum Flora Classicæ; Burnett, Outlines of Botany.)

GEOPHILA (from γή, the earth, and φιλ, love), a genus of plants belonging to the natural order Cimicaceæ. It has the limb of the calyx 5-parted with linear spreading segments; the corolla tubular, with a pilose throat and 5 rather recurved lobes, with 5 anthers inclosed; the stigma bifid, the beards ovoid, angular, crowned by the calyx, 2-celled, 2-seeded.

The species are creeping herbaceous plants with stalked cordate leaves, like those of a violet; the stipules are solitary, undivided; the flowers sub-sessile, embellished, surrounded by bracts shorter than the calyx. G. reniformis has the petals hairy above; reniform oblong leaves with the lobes at the base approximate; the bracts linear; the pedicules 4-6-flowered, shorter than the leaves. It is native to the marshy places in the hotter parts of America, as Havana, Jamaica, Puerto Rico, Brazil, and the basin of the Orinoco. The root of this plant is emetic, and may be used with advantage as a substitute for ipecacuanha. There are several species of this genus, all of which were formerly referred to the genus Psychiatra.

(Don, Gardner's Dictionary; Lindley, Flora Medica.)

GEORGE, ST., is one of the Azores or Western Islands. It lies between 27° 50' and 28° 20' W. long, and 38° 30' and 38° 45' N. lat., between the islands of Terceira and Pico. It is a long, narrow island, extending in a west-north-west and east-south-east direction about thirty-five miles, with a breadth of about five miles. This would give an area of 175 square miles; but probably it does not exceed 160 square miles, or about ten square miles, according to Rattray. The island appears to be entirely composed of volcanic rocks. They rise with an abrupt mural ascent along the northern shores, and this part of the island is almost uninhabited. But the southern coast is in general little elevated and uncultivated; and there occur many tracts of ground which are cultivated with great care. Along the middle of the island runs a more elevated tract, rising in some parts to more than 2000 feet, with an almost level top where it is intersected by many lavic eruptions. For though this island does not contain what may be properly called a volcano, it is subject to volcanic eruptions, accompa-

ned with scoriae, ashes, pumice-stone, and volcanic sand, which cover extensive tracts of ground. The last and perhaps most violent of these eruptions happened in 1808. The island is extremely high, and the temperature varies only between 50° and 75°, no severe cold is ever experienced in winter, nor is the heat of summer ever intense. Though rains are frequent, the air is not moist, which is ascribed to the absorption of humidity by the volcanic nature of the soil. The island was inhabited by the Dutch, like the Azores, and it is remarkable for the incessant gales and gales to which it is subject throughout the year. Many attribute this circumstance to the volcanic nature of the group, but it probably arises from the temperature of the sea at large and that of the Gulf stream, which approaches near the most western of the Azores.

St. George yields all the productions of the Azores, and most of them of superior quality. Its wines, especially that of Castelhenes, are superior to all others; they are exported to Fayal, and sold at Horta under the appellation of Faro wines. Grain is not much cultivated, except Indian corn, of which sufficient is grown for the consumption of the inhabitants. The vegetables are of few kinds, among which the potato, sweet potato, and yams are most abundant; the yams are superior to those of any of the Azores, and almost equal to West Indian, both in size and flavour. In modern times the inhabitants have paid much attention to the cultivation of roots, and particularly of onions, which have been the greatest success. The higher grounds of the island afford excellent pasture for cattle; and butter and cheese, both of which are celebrated, are sent in large quantities to Horta.

St. George is one of the largest islets, and the least is stated to be as good as English beef, except for fatness.

St. George constitutes a portion of the department of Angra. The capital is Ponte de las Velas, a city of about four thousand inhabitants, situated on the shores of a large open bay, and walled in on the sea-side; on the opposite side it is bordered by high mountains. Further east are the two small towns of Ureilina and Calhetas. The year in which this island was discovered is not known. It was probably an extension of in 1500, by Guillaume van derega, in 1490, and colonized by an expedition of Flemings and Portuguese. The population is stated to amount to more than twenty thousand inhabitants. As the island has no safe harbour, it receives the foreign goods which it consumes from Angra or Fayal, to which places it sends its produce.

(Ashe, History of the Azores; Von Buch, Physikalische Beschreibung der Kamerarischen Inseln; Boid, Description of the Azores.)

GEORGE OF DENMARK, PRINCE, has a place in English history as the husband of one of our queens, and as having resided many years in England and held a high public office. He was born 21st April, 1635, and was the youngest of the three sons of Frederick II., king of Denmark, and grandson of Frederick's successor, Christian V. His mother was Sophia Amelia, daughter of George, duke of Lüneburg. He made his first visit to England, after a short tour in France, in July, 1663, when he was introduced at court, and was in London only a few days. At the battle of Landen, fought between the Danes and the Swedes, 14th December, 1676, Prince George is stated to have distinguished himself by his bravery; and the rescue of the king his brother, after he had been taken prisoner by the enemy, is attributed mainly to him. The Princess Mary of York having been married to the Prince of Orange in 1677, the duke her father is said to have pressed his brother the king to leave him the disposal of his other daughter Anne; but Charles thought it not advisable to comply in this instance with the national wish, and to have her also married to a Protestant. Anne's first suitor was the Prince of Hanover (afterwards her successor, George L.), who came over to pay his addresses to her in 1681, but had scarcely been long in England when her father, who had negociated a marriage for him with the daughter of the Duke of Zell. Some time afterwards overtures were made in behalf of his brother by the king of Denmark, and Prince George having come over, he and Anne were married on the 28th of July, 1683. The marriage,' says Burnet, 'did not at all please the nation; for we knew that the proposition came from France. So it was apprehended that both courts reckoned the anticipated volcanic eruptions, and the King of England would fall at the inspiration. For this apprehension, however, there never seems to have been the least ground.
On the accession of his father-in-law as James II., Prince George was made a privy councilor; and he was not understood ever to have made any opposition to the measures of the court till the last moment. The truth however appears to be that he had some regret himself at his elevation. He had been told that he had tried him drunk and sober, and, he added with an oath, there was nothing in him. Nobody seems to have thought it worth while at this time even to try to make a tool of him.

When the Revolution came, he is understood to have acted and spoken as a Prince and in measure for his brother. Prince George however continued with the king till the night of the 24th of November (1688), when, being at Andover, on his leaving table after having supped with James by his majesty’s invitation, he rode off in company with the Duke of Ormond, Lord Drumlanrig, and Mr. Boyle, and joined William at Sherborne Castle; having left behind him a letter to his father-in-law, in which he attributed what he had done to zeal for the Protestant religion. ‘What?’ said James, when he was told of his flight, ‘Exit if possible gone too!’ This it seems, was the prince’s common phrase on all occasions; and it had been in great requisition during some previous days, when reports of one desertion after another were continually coming in.

The acceptance of the crown by William, Prince George was naturalized by act of parliament, and immediately before the coronation of the new king and queen, in April, 1689, he was created an English peer by the titles of Baron of Ormond (1) and all along the line of the peerage.

He accompanied the king to Ireland in 1690, and was present at the battle of the Boyne. He used to attend and vote in the House of Lords both in the reign of William and in that of Anne, and he was even made occasionally to vote against the court in the former reign. His name stands added to the protest made against the rejection of the Place Bill of 1689, which had passed the Commons, and the defeat of which was only effected in the Upper House by the great majority of 275 votes. ‘It was agreed’, said Lord Clarendon, that they would get him to vote against his own convictions; as, for instance, in that of the bill against Occasional Conformity brought in by the Tory ministry in the first year of Queen Anne, when about to divide in favour of which he is reported to have said to Lord Wharton, the leader of the opposition to the measure, ‘My heart is vis old’ Indeed he was only an occasional conformist himself, being in the habit of attending the Lutheran service in a chapel of his own, although he submitted to the arrangement according to the forms of the Church of England when it became necessary, to do so on his being appointed to office.

On the accession of Anne, while the actual command of the army was left in the hands of Marlborough, Prince George’s professional service was limited to sea and land; and he was also made lord high admiral, but with the novelty of a council to assist or act along with him. The legality of this arrangement, Burnet tells us, was at first much questioned; but the respect paid to the queen prevented the matter from being brought forward in parliament, so that the objections never went beyond a secret murmur. The queen also sent a message to the Commons desiring them to make some suitable provision for her husband in case he should take a decided part in the affairs of state; but in that case have an income of 100,000l.

He was, says Burnet, ‘many years older than the queen, and was troubled with an asthma, that every year had its effects on his health; it had brought him into great danger this winter; yet the queen thought it became her to provide for all events.’ Great opposition however was made in the Lords to a clause in the act exempting the prince from being comprehended in an incapacity created by the act settling the succession on the House of Orange. At last, however, it was passed, although naturalized, should hold any employment under the crown after that family came to the throne. The clause was opposed on two grounds: first, as improperly inserted in a money bill (which the Commons have always maintained cannot be rejected) and secondly, as giving a false meaning to the incapacity in the act of succession, which it was contended was never designed to apply to persons who had been already naturalized. But the queen pressed the clause, ‘with the greatest earnestness,’ says Burnet, ‘she had yet showed in anything whatever: she thought it became her as a good wife to have the act passed; in which she might be the more earnest, because it was not thought advisable to move for an act that should take Prince George into a coshorts of the regal dignity.’

The principle of the king’s and queen’s policy was that the majority was not glorious. Under date of the following year, 1703, we find Burnet already stating that at sea, ‘things were ill designed and worse executed.’ the making Prince George our high Admiral was a fearful blunder, yet he got a share of the greatness, very happy to the nation; men of bad designs imposed on him, he understood those matters very little, and they sheltered themselves under his name, to which a great submission was paid.’ In 1706, in 1704, and again in 1707, the loudest complaints were brought forward in parliament both against the proceedings of the lord high admiral’s council and the conduct of affairs at sea. Under date of the last-mentioned year Burnet writes:—‘Great losses were made, and all was imputed to the weakness, or to a worse disposition, in some who had great credit with the prince, and were believed to govern that whole matter; for, as they were entirely possessed of the prince’s confidence, so, when the prince’s council was divided in their opinions, the decision was left to the prince, who understood that whole business of the war as it was determined by others.’ In fact as Marlborough, now a duke, governed the army in his own name, he governed the navy also through his brother, Admiral George Churchill, who always maintained the earliest advice for peace, but was compelled to have sometimes complained of his insignificance or want of influence; but his dissatisfaction evaporated in the quietest way. Lord Dartmouth has some curious notices of him in his splendid notes to Burnet’s history. In one place he says:—‘His behaviour at the Revolution rather imprudently has been found out that his interposing was a prejudice in obtaining favours at court.’ Dartmouth goes on to state that all foreign princes had him in very low esteem; and he mentions some strange surmises made abroad as to the causes of his want of influence, which were certainly alleged and imagined. After thirty years living in England, this note concludes, ‘he died of eating and drinking, without any man’s thinking himself obliged to him; but I have been told that he would sometimes do it to be obnoxious of a court of opinions; but burnet speaks thus of him:— ’Own Times,’ i. 643. See also note on ii. 489.) Burnet says in one place (‘Own Times,’ ii. 515) that the prince had been bred to the sea; but we apprehend this to be a mistake.

His death took place at Kensington Palace on the 28th of December, 1708, says ‘Own Times,’ and he was interred in Westminster Abbey, with the ceremony due to a prince.‘Curing the whole course of her marriage, an extraordinary tender and affectionate wife; and in all her illness, which lasted some years, she would never leave his bed, but sat up sometimes half the night in the bed by him, with such care and concern, that she was looked on very deservedly as a pattern in this respect.’ In drawing the prince’s character, beside giving him a mild and gentle temper, and making him free from all vice, Burnet says that he had made a good provision and knew much money; ‘if he could well express, for he spoke acquired languages ill and ungracefully.’ His little capacity for business, however, was made still less by his indolence or love of ease, which appears really to have been strengthened by his strength of character. Anne bore him no fewer than nineteen children, of whom only five lived to be baptized, and even of these two died on the day on which they were born. A daughter Mary, born 2 June, 1685, lived till 9 Feb. 1767; another, born 10 May, 1686, died 2 Feb. 1687; only a son, William, born 24 July, 1689, and soon after created duke of Gloucester (though the patent never passed the great seal), and in 1696 elected and in- marked as a Knight of the Garter; and another, born 30 July, 1700. He was a boy of great promise, and a copious account of him is given by Burnet, who was his preceptor. There are portraits both of Prince George and of the Duke of Gloucester at Kensington Palace. Prince George was a Knight of the Garter, but the date of his election is not recorded in any of the accounts we have consulted.
GERANINIUM (from γερανίον, crane; the long beak which terminates the capsules resembles the bill of a crane), a genus of plants, the leaves of which have a smooth, rather glaucous appearance. It has 3 petals and 5 sepals, 10 monadelphous stamens alternately larger and with glands at their base. There are 79 species of this genus enumerated, of which 13 are British; of these only two are applied to any useful or medicinal purpose.

G. Robertianum has 2-flowered peduncles, obovate, entire or slightly emarginate petals; very long glabrous claws; transversely wrinkled downy capsules, smooth seeds, tartaric acid, and is a useful plant in the garden. This plant has small bright crimson flowers, and is found on waste ground, walls, and banks in Great Britain, in Chile, and Brazil. The whole herb has a strong disagreeable smell, which is said to be a preventive against hags. A decoction of the plant is recommended as likely to give relief in certain cases. It contains tannin and exerts an astrigent action on the system, and is given to cattle in some diseases.

G. maculatum, Spotted Crane's-hill, has a rather angular stem covered with retrograde pubescence; 3-5 parted leaves with deeply-toothed lobes; obovate entire petals; the filaments of the stamens hardly effused at the base. This species is a native of North America, from Canada to North Carolina. The flowers are of a pale lilac colour. On account of the sequence of the flowers, the plant is known in some parts of North America as Alum-root, and is employed successfully as a remedy in dysentery among children, a disease very prevalent in the parts of the country where it grows. The immature fruit is used in cases of sore-throat and the tannin of the seeds, &c. Dr. Bigelow discovered the presence of large proportions of tannin and gall acid in this plant. The quantity of tannin appears to be greater than that of any other constituent.

G. tuberosum, a plant growing in the south of Europe, particularly in Italy and Silesia, is the Spotted Dianthus (iii. 121), and the Geranium tertium of Pliny (xxvi. 11).

The hardy perennial kinds of geranium are very beautiful plants, and well adapted for ornamental cultivation. They will thrive in any common garden soil with ordinary care. (Don, Gardener's Dictionary; Bahhington, Manual of British Botany; Flora, Synopsis Plantarum Flora Classica.)

GERARD, FRANCOIS, BABON, one of the most distinguished painters of France, was born of a French father and Italian mother at Rome in 1770. He went early to Paris, and was first placed with the sculptor Pajou, and finally with David, as he found painting better suited to his taste than sculpture. Gerard's first work of note was the blind Belisarius carrying his dying guide in his arms, painted in 1785; it is now in the Leuchtenberg gallery at Munich, and is well known in prints. The next work which attracted notice was Psyche receiving the first kiss from Cupid, which, though executed in his early youth, is a work, in the style of Bolivars: its delicate execution and academical drawing are nearly its only merits; the figures are motionless and lifeless. Cupid and Psyche look like tinted statues; the words of Cupid are as follows (see Dryden, i. 27): 'I love thee, Psyche--that her tincts were not blood, but a resemblance of blood--would not apply well to this picture. These however are not the works of the mature artist, and they were followed by many admirable pictures in history, poetry, and portrait.

Some of Gerard's works are among the best and largest oil paintings in existence. His entrance of Henry IV. into Paris, his masterpiece, painted in 1817, is, in more than one sensation, a work: it is thirty by fifteen, and is almost one huge mass of life and character; the drawing is correct, vigorous, and varied, the colouring good, and it is a perfect school of costume for the period; it has been praised by Tochien. The portrait of Louis XVII. was done for Louis XVi. as a substitute for the Battle of Austerlitz, painted by Gerard in 1810, and it procured him his title of Baron. The Battle of Austerlitz, and the Coronation of Charles X., painted in 1827, are of the same vast proportions and the same treatment, as these they are as a subject. The Battle of Austerlitz is, like many other of the large paintings of Napoleon's battles, little more than a display of military uniforms, though it is superior to the majority of the works of Gerard, and is of good quality. Of the other, there is something of the spirit of it by Godfrey. The Henry IV. and the Battle of Austerlitz are at Versailles. The Coronation of Charles X. was nearly destroyed in the revolution of 1830: but had it been entirely so, Gerard would probably have rather gained than lost in reputation; a robe picture is now ever a poor subject for any painter, but particularly for a history painter.

Of Gerard's small pictures, the best is perhaps Thetis bearing the armour of Achilles, painted in 1822, and purchased by Prince Pozzo di Borgo. The composition and drawing are extremely beautiful; the whole is in the highest degree admirable. Gerard had also an engraving from this picture, such works as the Henry IV. and the Thetis display rare powers for the same painter; and when we consider that he was constantly engaged in portrait painting, in which he was unsurpassed, we must agree with the title of the reputation of one of the greatest painters of modern times is well deserved. A list of Gerard's portraits would almost amount to a list of the most illustrious personages of his age: Pierre Adam has caused a collection of eighty full-length portraits after him, seven inches and a half by five inches, each a full-length portrait.

Collection des Portraits Historiques de M. le Baron Gerard, premier peintre du Roi, gravés à l'eau-forte par M. Pierre Adam, précédée d'une Notice sur le Portrait Historique.

Gérard died Jan. 11, 1837: he was a member of the Institute of France; a chevalier of the orders of St. Michel and the Légion d'Honneur; and member of the academies of Munich, Berlin, Copenhagen, Turin, Milan, and Rome.

There are many notices of Gerard in the French and German collections of literature; a large and comprehensive work on Gerard was published in 1878; and a number of biographies of Gerard have been published in different countries.

GERBER D'OULLIVY, SIR BALTHASAR, a miniature painter and architect, born at Antwerp about 1591. He came young to England and was a retainer of the Duke of Buckingham. He gave his name to a delicately drawn and brilliant style of miniature. He was employed in the treaty of marriage between Prince Charles and the Infanta Maria, though acting ostensibly only as a painter. He was employed also in Flanders at the close of the War of the Spanish Succession. He was created a baronet by King Charles II. to replace a private treaty with Spain, the same treaty in which Rubens was commissioned on the part of the Infanta, and about which he came to England. In 1628 he was knighted by Charles at Hampton Court; he was naturalised in England in 1631, and died in 1677 at Hampstead-Marshall, the seat of Lord Craves, which was built by Gerber himself.

Gerber was the author of several curious works which are noticed at considerable length by Walpole. One, entitled "Les Etoffes perméables des meubles d'Apollon," &c., he terms "an ignorant, servile rhapsody, containing little argument, many lies, and some curious facts, if the author is to be believed. No. 3348 of the Harleian MSS. is entitled--Sir Balthasar Gerber, his admirations and disputes with his three daughters, retired into the English nunnery at Paris, 1646." One of these daughters was maid of honour to the princess Conde, and passed for her mistress when the princess made her escape from Chantilly, when the princess was imprisoned by the Duke of Bourbon, Gerber assisted the young lady as a little girl, by Rubens, in the collection of Lord Spencer: there are also two pictures of Gerber's family attributed to Vandyck; one belonging, in Walpole's time, to the Prince of Wales, and now in the Duke of Devonshire's; the other by Andrey, is a portrait of a young girl in one piece with Dobson the painter and Sir Charles Cotterel, painted by Dobson, is in Northumberland House; there is one also in the same collection a miniature of the Duke of Buckingham on horseback, dated 1616, by Gerber himself. In the Penys Library at Cambridge there is a manuscript collection of robes, &c., embellished and illuminated by Gerber. Gerber appears to have been a courtier, and to have had a lively care for his own interests. He kept a book of accounts, and after his death in 1681, he was in favour also with Charles II.: he returned with him to England and designed the triumphal arches which were erected for his reception. He was master of the ceremonies to the Duke of Marlborough, and in 1699 was granted a pension of 600l. a year at his own house, at a supper, which must have cost at least a thousand pounds, says a contemporary. Gerber states in one of his works that Charles had promised him the office of surveyor-general of works, after the death of Inigo Jones.

W. E. W. (On an executed establishment of the German Silver. [Copper, P. C., p. 504.]

GERMEN. [Pisto, F. C.]

GESCHNITZ, FRIEDRICH HEINRICH WILHELM, was born at Nordhausen, on the 3rd of February, 1786. He was educated in the gymnasium of his native place, and afterwards in the universities of Helmstedt and Göttingen. After the completion of his studies, he was for a short time employed as...
GIB 649

GIL

GIBSON, a genius of fossil Echinidae, from the mountain limestone. (Phillips.)

GILL, JOHN, D.D., an eminent dissenting divine of the Baptist persuasion, was born at Kettering, in Northamptonshire, on the 23rd of November, (Old Style,) 1697. His parents, though in humble life, gave him a superior education in the grammar-school of his native town, until the enforcing of a rule which required attendance upon episcopal worship occasioned his withdrawal, in common with other children of dissenters. He continued his studies in private, and attained considerable proficiency in the Greek, Latin, and Hebrew languages. About the age of twenty he began to preach at Higham Ferrars among the denomination to which both he and his parents belonged, and in 1719 he removed to London, to which he brought the charge of a small congregation. In 1726 he was removed to Hoxton, Southwark, but removed in 1757 to a new chapel in Carter Lane, near London Bridge, over which he presided until his death, on the 14th of October, 1771, a period of more than half a century. In the first complete edition of his works, said to have been equal to 10,000 folio pages, many were of a controversial character and of temporary interest. That by which he is best known is his 'Exposition of the Bible,' published at various times in distinct portions. The 'Exposition of the Song of Solomon' appeared in a folio edition in 1728, and was republished with corrections and additions in 1751 and 1757. In this work Gill replies to Whiston's endeavours to prove the 'Song of Solomon' to be a spurious Ossianic poem. The 'Exposition of the New Testament,' published in three folio volumes, in 1746, 1747, and 1748, in which last year the degree of D.D. was conferred upon the author from Marischal College, Aberdeen. The Old Testament was completed at various times in six folio volumes, and a second edition of the whole was published shortly before his death. A third complete edition of the 'Exposition' was published in 1809 and 1810, in nine large quarto volumes, with a very copious memoir of the life and writings of Dr. Gill, from the advertisement prefixed to the above mentioned edition. Other works we may mention 'The Prophecies of the Old Testament respecting the Messiah considered, and proved to be literally fulfilled in Jesus,' published in 1728, in answer to Collins's 'Scheme of Literal Prophecy considered;' a 'Treatise on the Doctrine of the Resurrection,' published in 1730; and a work to check a then growing tendency to Sabellianism among the Baptists; the 'Cause of God and Truth,' in four volumes, octavo, published in 1735 and following years, being a defence of Christianity against Armenian sentiments, in which Gill displayed a strong inclination to Supralaparianism; a 'Disseration concerning the Antiquities of the Hebrew Language, Letters, Vowel-points, and Accents,' 1707, octavo; and a 'Body of Doctrinal Divinity,' two volumes quarto, 1760, and 'Body of Doctrinal Divinity,' two volumes quarto, 1760, which were republished together in 1795 in three volumes, large octavo, as 'A Complete Body of Doctrinal and Practical Divinity,' with a portrait of Dr. Gill. This edition, as well as the smaller ones, was largely composed of additions, and in following years the work was considerably enlarged by several ministers, as 'a work which enters into, fully explains, and ably defends the whole system of evangelical truth; a work in which the opinions of the ancient fathers and churches on all the principles, doctrines, and duties of Christianity are examined, and the opinions of the most celebrated philosophers who have been the opponents of Divine revelation.'

GILLENIA, a genus of plants belonging to the natural order Rosaceae, described by Linnaeus, consists of a single species, the campanulate 5-cleft calyx, 5 linear lanceolate petals, 10-20 stamens, very short, inclosed in the tube, 5 carpels almost united into a five-celled capsule, and 2 seeds in each cell. There are only two species of this genus.

G. trifolata has several stems from the same root, a foot or

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two in height, alternate trifoliate leaves, the flowers, which are few in number, forming a sort of panicle. It is a native of North America, and is grown in many gardens. The root is medicative, and possesses properties similar to those of 

G. stellatula. It must however be administered in larger doses, and is not so certain in its effects. Some authors attribute a tonic property to it, when taken in the parent plant form, but neither the pompous verbosity of its narrative nor the 

general dulness of its dissertative portions is likely to recover for it the popularity of which newer views have now robbed it. The translations of Dr. Gillies, however meritorious (as they include a translation of the only authentic copy of the History of Alexander, where at the very least paraphrase, and in many places reprehensibly unfaithful. Those from the orators are the least faulty; and for Iocrate the translator's style, elabo-

rate, and occasionally thoroughly monstrous, has been interpolated on the whole ill calculated. But to Aristotle's works his 

mode of treatment does great injustice. His desire of popular-

izing his author has made him depart almost always from his manner of expression; and the same motive, aided not unfrequently either by mistake as to his nomenclature or by the wish to evade a difficulty in the text, has made him often misrepresent even the matter which the philosopher gave him. Indeed this description of their faults is hardly full or severe enough. It must be added, that the translation is not always 

which he can scarcely be said to have translated at all, so much do his professors translations abound in inaccuracies, in omissions, in unauthorised interpolations. Their demerits are exposed, bitterly yet not unjustly, in Thomas Taylor's Accurate Translation of the Works of Plato, which Dr. Gillies' version of the Rhetoric is not so bad in the more 

popular portions; but here also the more abstract portions are very faulty. Two examples may be referred to, which 

together throw utter confusion over those parts of the Rheto-

ric that treat the theory of argumentation. He not only 

falls into the common mistake of holding the Enthymene to be 

with Aristotle, as in more recent writers, a name for a 

syllogism with one premise suppressed, instead of sig-

nifying a syllogism in matter contingent. Dr. Gillies 

interprets this erroneous gloss, and thus causes perplexity 

where a literal translation would have caused none. Again, 

in rendering the difficult passages where Aristotle proposes a 

classification of the kinds of matter, while the English 

enthusiasts (passages probably interpreted rightly by Majoragius and in 

substance interpreted in the same way by Dr. Whately), he 

does not even preserve the philosopher's cardinal distinction 

between the enthymemes from signs and the enthymeme from 

likeliness, as arguments of two distinct classes, but slurs 

over the difficulty by a vague and unmeaning asblution.

GILRAY, JAMES, the celebrated caricaturist, was born 

about the middle of the last century. He was originally 

a writing engraver, and is said to have been a master of 

his trade. He had an acute perception of character, a 

strong sense of the ludicrous, and at the same time a 

great ability for drawing, and a practical skill in engraving. 

His great faculty was the burlesque; his works, however, 

not unfrequently going beyond burlesque, destroyed the 

abused conventions which were often the subject of his ridicule; 

but his pencil was more frequently directed against political 

abuses; the doings and enactments of the Tory ministries and 

the events of the great war were his favourite themes. His 

first political satire was published in 1782, and in allusion to 

Fox and Lord Rodney's victory. The last of his caricatures 

appeared in 1809: it represented 'a harper's shop in 

swine-time,' and was from a design by H. W. Bombury, who 

was an excellent miniaturist, was also engraved by 

Gillray. This last plate was executed at intervals between 

fits of mental aberration, which terminated shortly afterwards 

in a total suspension of the intellectual faculties, in which 

state he remained until his death on the 1st of June, 1815. 

His works appeared simultaneously in London and 

Abroad, and were reprinted in sets, genuine, and spurious or copies. An 'Illustrative Description,' with a complete set of his genuine works in 304 sheets, was published by McLean, London, in 1830. 

It is a curious fact that the illustrations of his caricatures, 

which are so far in the province of the gross and absurd; he also frequently 

took great personal liberties. George III. and Pitt are two of 

his best characters; Napoleon he has entirely missed; he 

probably had a difficulty in meeting with his portrait; he is 

now only represented by the profile. Gillray's caricatures, 

however, to be thoroughly understand, require a familiarity 

with the party history of the time; they are mostly mere 

works of the day, and Gillray himself was little more than 

G. stellatula, D. Lindley, Flora Medica. GILLIES, JOHN, L.L.D., was born on the 18th of January, 1747, at Brechin, in the Scottish county of Forfar. He belonged to a respectable and enterprising family. One of his younger brothers became eminent as a lawyer, and died not long ago, after having been for many years a judge of the Supreme Court in Scotland. Dr. Gillies was educated at the University of Glasgow, where, before he was of age, he taught the classes of the Greek professor, then old and infirm. Soon after his appointment he was engaged in the duties of 

occupying himself in literary labour. But before settling 

there he paid a visit to the Continent; and on his return he 

was engaged by the Earl of Hopetoun as travelling tutor to his 

second son. This young man, while under his care, died 

at Chelsea. His tutor then, instead of returning to 

him was re-

warded by an annuity for life from his father. 

In 1778 Dr. Gillies published his translation of Lysias and 

Iocrate. He had by that time received his degree as Doctor 

of Laws; and to this, in later life, he added other literary 

honours, being a member of several societies in our own 

country, and a corresponding member of the French Institute and the 

Royal Society of Göttingen. He next went abroad again with 

two other sons of the Earl of Hopetoun, one of them the 

earl, the other Sir Alexander Hope, who was governor of Chelsea 

Hospital. Returning to England about 1784, Dr. Gillies 

published, 1786, the first part of his 'History of Ancient 

Greece.' In 1798 he was appointed to succeed Dr. Robert-

son, the Historiographer Royal for Scotland, a sinecure 

post with a salary of two hundred pounds a year. In 1794 he 

married. Enjoying a moderate competency, he prosecuted 

his studies with leisure; and his subsequent writings appeared 

at long intervals. During his latest years he was very infirm, 

though labouring under no disease, and had retired altogether 

from general society. In 1830 he settled at Clapham, near 

London, where he spent the remainder of his quiet old age, 

and died on the 16th of February, 1830, of mere decay, 

having just entered his nineteenth year.

Of his publications may be mentioned: 1. The Orations of 

Lysias and Iocrates, translated from the Greek, with some 

account of their Lives; and a Discourse on the History, 

Manners, and Character of the Greeks, from the conclusion of 

the Persian War to the Battle of Salamis, by the 

Greek. 2. The History of Ancient Greece, its Colonies and Con-

quests, (afterwards entitled Part the First); 3. from the earliest 

accounts all the Division of the Macedonian Empire in the 

East; including the History of Literature, Philosophy, and 

the Fine Arts, 1786, 2 vols. 4to. This work had reached 

the sixth edition in 1830, 4 vols. 8vo. There is a German 

translation of it, Geschichte von Algrieschland, 11 vols. 

12mo., Vienna, 1836. 3. View of the Reign of Frederick II. 

Paralleled with the Reign of Philip II. of Macedon, 1789, 8vo. 

4. Aristotle's Ethics and Politics, comprising his Practical 

Philosophy, translated from the Greek; Illustrated by 

Introduction and Notes, the Critical History of his Life, and a 

New Analysis of his Speculative works, 1797, 2 vols. 4to. 

The Supplement to the Analysis of Aristotle's Speculative 

Works, containing an account of the Interpreters and 

Corruptors of Aristotle's Philosophy, in connection with 

the Times in which they respectively flourished, were 

reprinted in 4 vols. 8vo. as The History of Ancie at Greece, 

its Colonies and Conquests, Part the Second, 1820. 6. A 

new Translation of Aristotle's Rhetoric, with an Introduction 

and Appendix explaining its relation to his Exact Philosophy, 

and vindicating that Philosophy by proofs that all departures 

from it are monstrous.

The First Part of the 'History of Greece' appeared in 

the same year with the first volume of Mitford's work, and, 

if inferior to it, is yet superior to anything of the sort which 

had hitherto appeared in English. It is by no means 

superior, but neither the pompous verbosity of its narrative nor 

the general dulness of its dissertative portions is likely to recover 

for it the popularity of which newer views have now robbed it. 

The translations of Dr. Gillies, however meritorious 

(passage, passages probably interpreted rightly by Majoragius and in 

substance interpreted in the same way by Dr. Whately), he 

does not even preserve the philosopher's cardinal distinction 

between the enthymemes from signs and the enthymeme from 

likeliness, as arguments of two distinct classes, but slurs 

over the difficulty by a vague and unmeaning asblution.
caricaturist, unlike Hogarth, a true satirist, whose works are for all time.

GIN, or GYN, a machine employed instead of a crane, chiefly by artillerymen, for the hoisting of long guns having bases of I., &c. on their carriages. It consists of three round poles from twelve to fifteen feet long, and five inches in diameter at the lower extremity, tapering to about three inches and a half at the top. The extremity of each pole is made of an iron bolt passing through straps, or by a rope passed several times round each, united together at their upper extremities in such a manner that they may be turned about their place of union; and when the machine is set up, the feet of the poles are planted in the ground, or nine feet from each other. The feet of two of the poles are kept at that distance by means of a rope or an iron bar, which may be temporarily placed in a horizontal position near their lower ends; and between them, at the point at which the ground, is a wooden roller, or windlass, which, by means of handspokes, may be turned on its axis, the pivots entering into holes sunk in iron cheeks attached to the poles. The third pole, commonly called a 'prow-pole,' has a greater extent of movement than the others about the upper extremity, so that all three poles, previously to being set up, may lie on the ground: when set up, two blocks with their fall, or rope, are employed in raising or lowering the gun, the upper block being (Irish) on the same principle as a rope, to the piece of ordnance: the rope from the upper block passes over the windlass before mentioned.

Two poles fastened together at the top, and set up like the sides of the letter A, the whole being kept steady by means of another pole, and 'wickets' driven into the ground, are also employed for raising or lowering artillery, by means of two blocks with their rope, the extremity of the latter usually passing round the cylinder of a windlass, capstan, or crank. This apparatus is called a crane.

GINKELL, GODART DE, FIRST EARL OF ATHOLNE, was a native of Holland, and the head of a family of great antiquity among the nobility of that country, who descend from a long, his predecessors, and others which may be read in the peerages, and was a general of cavalry. He came to England at the time of the Revolution of 1688, either with the Prince of Orange or immediately after. While two Scotch regiments, in the beginning of March, 1689, declared for King James and marched from Aghingdon, where he was quartered, for Scotland, General Ginkell was sent after them with a body of horse, and soon overtook and reduced them. In 1690 he accompanied King William to Flanders; and, commanding a part of Dutch forces at the battle of the Boyne (1st July), when the king returned to England, the conduct of the war was left in the hands of Ginkell; and he succeeded in effecting the reduction of the country before the end of the following year. The year 1691 is the most memorable (the 7th of April) in the life of Athlone; for on that day the Earl of Aghrim was taken by storm on the 1st of July; on the 12th of the same month he gained the battle of Aghrim [P. C., vol. i., 208]; and on the 3rd of October an end was put to the war by the surrender of Limerick. On the 3rd of November Ginkell returned to Dublin, and was banqueted by the corporation; he then came over to England, where, on the 4th of January, 1693, the Commons ordered seven of their members to attend him with the thanks of the House. He set sail from London, and was received with great ceremony at the port of Ireland, with the titles of Earl of Athlone and Baron of Aghrim. The next week he was entertained at Merchant Tailors' Hall by the lord mayor and corporation of London. The following year the king, after the House of Commons had sent up an address requesting that a recompense might be given to him suitable to his services, made him a grant of the forfeited estates of the Earl of Limerick, amounting to 36,480 acres, which was confirmed by an act of the Irish parliament, and he was made a peer of Ireland with the title of Viscount Ginkell. In 1699 an English act was passed appointing a commission to inquire into the considerations upon which this and other similar grants had been made in Ireland; in the next session by the Bill was carried the grant to Ginkell, and he was not authorized to hear and determine upon all claims relating to them; and one of the acts of this board appears to have been the resumption or validation of the grant made to the Earl of Athlone. Barnett's account however is not very clear: he says, in many instances, that the act of 1699, under which the Earl had sold his estate to those who thought they purchased it under an unquestionable title; yet all that was laid aside, no regard being had to it; so that this estate was thrown into the heap ("Own Times," ii. 280). Afterwards, in 1747, when the board of trustees having been extremely unpopular, attempts were made to obtain its suppression, he says, 'One motion was carried, not without difficulty, in favour of those who had purchased under the Earl's grants, and the Commons were to be prevailed upon that they should be admitted to purchase with an abatement of two years' value of the estates; the Earl of Athlone, whose case was very singular, as was formerly set out, having sold the grant to men who had purchased under a secure title, they had purchased under a secure title, a special clause was introduced in the bill, but the party had studied so far to infame the nation against the Dutch, that in this the votes were equal, and, the Speaker's (Harley's) vote being to turn the matter, he gave it against the purchasers.' (Ibid., iii. 280.) From this account it would appear that, supposing this vote of the House of Commons to have been conclusive, as appears to be assumed, it was not the Earl of Athlone, but the persons to whom he had sold the lands from whom they were now taken back. The latter, indeed, might possibly have their remedy against the earl as having purchased under what had proved to be a bad title. The account in the common peerages is, that the grant was reversed by parliament (it is not said whether the English or the Irish parliament), it having been resolved that it had been confirmed by the Irish parliament, and that the value of the estates was appropriated to the payment of the public debts. This is manifestly quite a loose and hundring statement. It is added, that therewpon the family retired to the grand estates of the house of Ginkell at Westton, in Staffordshire; and it says Sharp's 'Genealogical Peerage,' 'we are not informed.'

The Earl of Athlone, however, continued his military services to the end of the reign of King William. He shared in William's defeat at Laon, 29th July, 1698; and he commanded the Dutch horse in Flanders in 1695 and 1696. He also commanded the Dutch forces serving under Marlborough in the war with France which broke out in 1702, after the accession of Queen Anne. But this post he did not retain long, for on 17th February, 1703, the Peers state that the first Earl of Athlone married Ursula-Phillippa de Rassefeldt, and had by her two sons, of whom the eldest succeeded to the title. It afterwards, however, fell to the son of the second, who succeeded as the fifth earl in 1747; and his descendants inherited the title to the death of the last lord, without issue, in 1844, when it became extinct. He was the ninth earl. It is remarkable that, with the exception of the first earl, if he ever took a seat in parliament, in a parliamentary manner, and as such, the family continued to reside in Holland; but Frederick Christian Renaud, the sixth earl, came over here on the French invasion of that country in 1796, and took his seat in the Irish House of Lords.

GIOCONDO, FRA GIOVANNI, an Italian architect of Verona (of the fifteenth century), celebrated for his almost universal acquirements, was a great Greek and Latin scholar, a theologian, philosopher, and engineer, and was skilled in perspective and in decoration, especially in inlaid wood-work. He is mentioned in the highest terms by many contemporary writers, and particularly by his countryman Julius Caesar Scaliger, who was his pupil in the Greek and Latin languages. He served the Empress Margaret of Bavaria in Germany, in France, and Leo X. at Rome: he built the Ponte della Pietra at Verona, that of Notre Dame at Paris, and succeeded Bramante as architect of St. Peter's, the foundations of which he had begun. Vasari mentions other of his architectural works; he also says that he built two bridges over the Seine. He turned a great portion of the waters of the Brenna from the Venetian lagoon, directing them to Brontolo, many miles to the south of Venice, by which means the island of Murano was formed. He improved the harbours and inlets of mud brought down from the Alps by the Brenna; this Vasari terms Giocondo's greatest work, and a signal service for Venice: the same or a similar channel still exists, and is known as the Brezina. As a hydrographer, Giocondo's services Vasari mentions a great collection of ancient inscriptions which he copied in Rome and presented to Lorenzo de' Medici: he also first discovered several of the letters of the younger Pliny in an old library at Paris; and published an illustrated edition of Vitruvius at Venice in 1511.

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In the continuation of St. Peter's, Giocondo was appointed concurrently with Giuliano da San Gallo and Raphael, and the latter speaks of Giocondo in the following terms in a letter (published by Richardson, and inserted in recent Lives of Raphael) to his uncle, dated July 1614. He (the pope) has given me a companion, a very learned old friar, who is upwards of eighty years of age; and as the pope sees that he cannot live long, and as he has the reputation of great knowledge, but also of having given him to understand, as he would have him, and discover any great secret he may have in architecture, and thus perfect himself in the art. He is called Fra Giocondo. According to this, if Raphael was a correct judge of age, or had ascertained the fact of Giocondo's age, it must have been three years earlier than the date given by Vasari. Singularly enough, though not with unusual inconsistency, Vasari, in mentioning Giocondo incidentally in the Life of Raphael, says that he was born 1512, aged eighteen, at Giocondo's own life, which follows soon afterwards, he says, 'He died at length very old; but it is not known exactly when or where.' It is not known with certainty to what religious order he belonged, or he is supposed to have been a Franciscan. He was still living in 1531.

(Vasari, Vite de' Pittori, &c.; Dal Pozzo, Vite de' Pittori, &c. Veronesi; Milizia, Operete; Quatremere de Quincy, Dictionnaire d'Architecture, &c.)

In 1682, the archduke Ferdinand, Duke of Parma, having shortly relocated to Madrid, gave Giordano Gaetano, one of the few good architects in Madrid, the task of painting what had been produced by his predecessor, the architect of the city, May 14th, 1718. Greatly to the dissatisfaction of his parents, who intended him for the law as the most honourable profession, and the most likely to lead to distinction, Giordano reconciled himself to his fate in architecture. His strong wish, and he was accordingly placed under Martino Buonocore, an architect of considerable reputation, but of little talent. The pupil was not long in finding out the mediocrity of his master, and commenced a secret, but still vigorous self-instruction on the best Neapolitan edifices, those by Foscolo and Domenico Fontana, and the writings of Vitruvius and Palladio. He further extended his studies not only to mathematics, but to antiquities and history in their connection with art. A work that has been published in the old family of the Marchese Albergati (another celebrated dramatist), for his 'Sospetto Funesto' was supposed by them to allude very undisguisedly to an unfortunate domestic affair, and the suspicious circumstances attending the sudden death of one marquis's second wife, and to which several persons were also involved, for his name do appear to have been ever published. To all of those which he did publish he prefixed a separate preface, which self-commentaries possess a value and interest of their own, which he also mentions in his letter to the Duke of Parma.

In 1695, he was living in Padua, but he had full employment at Naples, and on government works in Calabria Ultra, where he was for some time engaged in superintending the work of the iron mines in the Valli di Canne, he had not many opportunities of signalizing himself as an architect. The principal buildings of architectural note by him at Naples are the two palaces of Campolieto and Coecina, and the Chiesa dello Spirito Santo; for though great public improvements, the two new streets, that of Monte Oliovo and the one called De' Pellegrini, do not properly come under the head of architectural works. Still, he had, as he even executed less in the practice of his profession, he would possess a claim to notice which is shared comparatively very few in it, for he published an excellent work on architecture in 1726, although he did not carry on his work of building; he only published his work on engraving, and took the very great expense for engravings which it would have been imposed on him.

In 1755 his services were rewarded by his being appointed the chief architect of the city of Naples, on the death of a great man, who was his only successor, and of whom he was the ablest imitator. Less than a month after being appointed, he was driven from the city by the attacks of an innumerable crowd, who were drunk and mischievous. Soon afterwards a disorder of his eyes, brought on by excessive study, terminated in total blindness. In that condition he for a time was forced to live in the small house of his birth; while he could not have been able to feel the weight of any thing which was happening in the city. In 1768 he was taken to Rome, where he died, and was buried in the family vault of his old patron, the Duke of Parma.

Giraud, Count Giovanni, one of the best and most popular writers of Italian comedy, was born at Rome, October 24th, 1776, and is of a noble and wealthy family that had been originally of French extraction. Of his first studies and his associations for the drama and every thing connected with the theatre, he himself has given an amusing account in the general preface to his comedies. When he was but the age of sixteen, the death of his father, Count Francesco, was a circumstance so distressing to him that he determined to frequent the theatres without restraint. Even before that time he had been exposed to attempt dialogues and scenes in imitation of Goldoni, Chiari, and other dramatists, but he was not till some years afterwards that he composed his first regular piece, 'I Gelsi per Equivoico,' for which he was at Paris in 1799. He afterwards set his ambition on the stage, which had been rather damped by the discouraging remarks of the manager to whom it had been first offered; and in the same year, 1799, he produced his 'L'Apo seli Imbarazzo' (The Tutor in a Scare), which is universally allowed the over his masterpiece, and one of the happiest specimens of modern Italian comedy. In 1812, he went to Paris with his elder brother Pietro, and he again visited France in 1815, after the restoration of the Bourbons, and also came over for a short time to England. On his return to Italy he published (1816) his 'Teatro Domestico,' and produced some fresh pieces for the stage, and was but soon after seized with a strange fancy for entering the French districts, spectacles and other schemes, which, besides diverting him from the serious and improved drama, falsified himself, failed so completely, that he was at length reduced to comparative poverty. His disappointments greatly affected both his health and his mind; he fell into a melancholy and desponding spirit, and last carried off by a severe nervous attack in the spring of 1834.

Giraud possesses more of comic power than is displayed by any of his contemporaries; he exhibits more of incident, observation, and stage collect; and if his dialogue seldom rises above the level of ordinariness, his wit and his plays have a currency and value which are always equal to the exigencies of his subject. His dialogue is not calculated to please by vividness, and is free from that drawing flatness which is one great defect of modern Italian comedy. Some of his pieces were founded upon real circumstances, and in one case upon real events; he is said to have advised a certain family of the Marchese Albergati (another celebrated dramatist), for his 'Sospetto Funesto' was supposed by them to allude very undisguisedly to an unfortunate domestic affair, and the suspicious circumstances attending the sudden death of one marquis's second wife, and to which several persons were also involved. As a work of art, it is now somewhat old, but it has been the subject of many other works by Giraud and others. The work is entitled 'La Commedia dell'Arte,' and appeared in 1792. The title-page is inscribed with the words 'Oda alla Convenzione,' and the dedication is addressed to the Duke of Parma. The work is divided into five parts, each of which is divided into a number of scenes. The first part is entitled 'La Commedia dell'Arte,' and contains the story of the origin of the art of pantomime, and the development of the art of the theater. The second part is entitled 'La Commedia dell'Arte,' and contains the story of the origin of the art of pantomime, and the development of the art of the theater. The third part is entitled 'La Commedia dell'Arte,' and contains the story of the origin of the art of pantomime, and the development of the art of the theater. The fourth part is entitled 'La Commedia dell'Arte,' and contains the story of the origin of the art of pantomime, and the development of the art of the theater. The fifth part is entitled 'La Commedia dell'Arte,' and contains the story of the origin of the art of pantomime, and the development of the art of the theater. The work is illustrated with a number of engravings, and is printed in a fine style. The dedication is addressed to the Duke of Parma, and the work is dedicated to the Duke of Parma.
Most of the best works of Girodet have been well engraved, as well as a vast number of designs for publishers. A collection of literary works, also by him, was published in 1829, under the title 'Les Œuvres posthumes, Poétiques et Didactiques, de Girodet Tricoirm,' in 2 vols. 8vo., containing also a Life and Correspondence of the author.

Girodet was a member of the Academy of Painting and of the Institute of France; a knight of the order of St. Michael, and officer of the Legion of Honour: he died December 9, 1824. A Sale of his effects was made after his death, when some of his drawings were purchased by foreign collectors.

GIRVAN, a market and post town andburgh of barony on the coast, in the district of Carrick, in Ayrshire, about 26 miles south-south-west from Ayr, and about 54 miles south-west from Glasgow. Girvan extends about nine miles along the shore, and on the average about four miles inland, having thus an area of about thirty-six square miles, or about 23,000 statute acres; it is traversed by a range of hills having an average elevation of 900 feet, but rising in one place to 1200 feet, and is watered by the Girvan Water and one or two other small streams. The parish contains a considerable quantity of good arable land in the lower ground, yielding, according to an estimate made in 1834, 8669l. in four years under small crops, and 18,000 bolls of potatoes. There are about 800 or 900 head of cattle, chiefly cows for the dairy, and about 2100 sheep. There is a considerable salmon-fishery at the mouth of the Girvan; and the hay of Girvan affords a valuable market to the south of the Clyde. The coal in the parish consists of about 1800 acres under the surface, and produces annually about 4000 loads. The parish contains a school for about 400 children, and a weaving-shop for about 20 workmen, but with an average of only 100 names to the inch. The district is poor, and consists chiefly of moor and rough pasture.

The town is beautifully situated, and commands a fine view of the sea, with the peninsula of Cantyre, the islands of Arran and Bute, and other islands, Ailsa Craig, and the coast of Ireland in the distance. It is an ill-built mean-looking place, and consists in great part of small houses, one story high, containing a weaving-shop and a room to live in, the latter sometimes tenanted by several families. The population consists chiefly of hand-loom weavers and their families; a number of them are Irish immigrants, attached in condition, untidy and dirty in their habits, and destitute of that forethought and independence of character which mark the native population.

There is a parish church, a Seccession meeting-house, a small Methodist meeting-house, used in the week as a school-room, and a small school-room, used as a Roman Catholic chapel. The population of the parish at the different enumerations in the present century was as follows: 1801, 2260; 1811, 3097; 1821, 4490; 1831, 6340; 1841, 7424; number of men, 9700; women, 8700; males, 4762; females, 3762 females, 1842 of them under twenty. The number of houses in 1841 was 1099, namely, 1069 inhabited, 26 uninhabited, and 4 building. Only about one-tenth of the population is agricultural. There are two branch banks; and although the profits appear to be considerable, it is thought that a good harbour might be formed at a moderate expense. There is a parish school, a subscription school for teaching the children of the poor to read at 1d. per week, and many private schools, both in the town and in the rural part of the parish. There is a small subscription library, a library belonging to the Agricultural Society of the district, two circulating libraries, and a number of benefit societies and a savings-bank. Girvan was erected into a burgh of barony, 1833, and formed a burgh of the first class, its fair and bailie court being held weekly for debts not exceeding 21l.

(Ne\ New Statistical Account of Scotland; Gazetteer of Scotland, published by Fullarton & Co., Glasgow, 1842; Population 1841, 18,432.)

GLACIER. Attention has been of late so strongly drawn to the mechanical theory of glacier movements and the possible geological effects of such movements, that it appears necessary to add a few lines to the notice of glaciers, and their effect on the structure of land and sea. The valley has been defined as the channel formed by the descent of the vast masses of frozen snow down the valleys of the Alps and other mountainous regions has been explained, or attempted to be explained, are essentially two, and are known as the original and the modified theories. The former theory, that glaciers are masses detached from the Alps by the force of gravity; and secondly, the later notion of Charpentier, that the ice masses were pushed down the valleys by an internal expansion caused by congelation of water in their internal cavities. Each of these original notions takes at least two forms. Sauvageau's hypothesis, indeed, appears in three modifications of importance.

1 A. The view of Mr. R. Mallet, communicated to the Geological Society of Dublin, recognises the descent of the glacier by gravity, but adds the hydraulic pressure of water below the constant state of and forward; and it is impossible to deny this speculation the merit of removing some considerable difficulty in the reception of the general hypothesis of Sauvageau.

1 B. The view of Professor J. Forbes, who, besides noticing peculiar structures (the blue bands) in the glacier ice, and measuring the velocity of glacier movements in different parts of the valley, and in the central and lateral parts of the 'ice current' (if we may so speak), has proved the bending of glaciers under the pressure of their own weight; and, last, by means of artificial preparations, imitated some of the peculiar glacial structures. His view is, that glaciers descend the valleys in consequence of so much mutual yielding and adjustment (plasticity) of their parts as to entitle them to be regarded as macous of semisolid masses, flowing slowly under the influence of gravity.

1 C. Mr. Hopkins, recurring to the original notion of Sauvageau, maintains the mechanical probability of the glaciers sliding down the valleys, and the consequent plastic yielding of the glaciers, in the latter view, will be regarded as flexible, but none of these things interfere with the essential condition of this hypothesis, viz., the sliding of the whole ice-mass on its bed. This sliding is in a great measure due to the perpetual slow fusion of the lower surface of the ice, with which the gradual distillation of water into the atmosphere is said to be united, and which Mr. Forbes has made experiments on the sliding of ice; from which it results, that even at angles of inclination from the horizon much below 1°, the movement of the ice masses on a rough surface is subject to no force of friction, was very discernible, and found to follow a simple law proportioned to the sine of the angle of inclination.

2 A. The second branch of the hypothesis alluded to, originating with Charpentier, has further ramified into two forms. Charpentier thought the congelation of water in many fissures of the glacier must necessarily, at certain portions of its forward in the direction of least resistance. But as the glacier is sliding by day and by night, in summer and in winter, sliding unequal in different parts, and in different directions, it is seen that order of inequality as fits to the hypothesis; and as there is no assignable reason (in this hypothesis) for the formation of new fissures, and the continuation of the process, this whole speculation (the dilation hypothesis) has been abandoned.

2 B. Another view has been given of this hypothesis by this eminent explorer of the Alpine glaciers, describing their onward movement to congelation of water, not in the cavities of Charpentier, but in minute capillary fissures and spaces among the granular constituent masses of the glacier. With such a power of expansion, altogether independent of gravity, M. Agassiz esteemed it possible to allow the movement of glaciers, even across level countries, and thus to account for many geological phenomena difficult to be otherwise explained, as erratic blocks, and other diluvial phenomena. Mr. Hopkins, however, conclusively shown that the means supposed no such power of onward movement can be exercised. Mr. Forbes has proved the actual phenomena of glaciers to be inconsistent with the hypothesis of congelation as a cause and with the effects ascribed to it by Agassiz. It is clear from all experiments and mechanical reasonings, that gravity causes the descent of glaciers; but there remain some further researches to be made into the true internal cause of the movement of glaciers, before we can regard the inquiry as complete.

The geological interest attaching to a correct theory of glacier movements is considerable. The recent investigations of Agassiz and others into the history of the glaciers of the Alps, &c., and their former greater extension, have rendered it very probable that this enormous ice-power has been actively at work in early geological periods in situations where now no fields of ice ever occur. Observations of effects such as glaciers are known to produce or
GLASS surfaces which traverse; smooth and rounded rocks—grooved surfaces—stratification parallel to the grooves.—appear to require the existence and movement of glaciers down some of the valleys which intersect the Snowdonian, the Cambrian, and the Palæozoic systems. The effect of the glaciers is the transport of detritus on the surface of the ice till it melts, or, in the case of the glacier meeting the sea, breaks off in an iceberg to be drifted by oceanic currents. It is believed by Agassiz that in this way single blocks of granite from the Jura, opposite the valleys of the Alps, have been deposited there by glaciers, not drifted by water-currents, and this speculation he has applied to far greater areas and more difficult cases, such as the accumulation of erratic blocks, gravel mounds, and diluvial areas, especially those regions like those which margin the antient tertiary Bay of Dublin, or abound in the central plains of England.

From so great an extension of this speculation, founded as it is on an erroneous hypothesis of glacial action, and which, will be more adequately reviewed at a later period. But the reply is easy. The evidence of warm climates in northern zones relied on by geologists applies to far earlier periods; and in respect of this comparatively late period, a reduction of temperature to the extent required for the production of glaciers, and the mounting of mountainous islands is perfectly possible by a mere change of the disposition of land and water—since in fact the temperature of the British Islands is now in excess above the mean of their latitude by 3°, 10°, and more, and this excess is merely due to oceanic currents and other conditions which vary with the distribution of land and water.


GLASS, JOHN, founder of the sect of Glaucasites in Scotland, was born on 21st September, 1636, at Auchtermuchty, a parish in the county of Fifo, of which his father was clergyman. He studied at St. Andrews and Edinburgh, and in 1719 was ordained minister of the parish of Tealing near Dundee. He became a popular preacher, and his sermons, extending to two or three hours in length, were attended by crowds of the most constant part of the country. He exhibited his disposition to differ with the other members of the church of Scotland, by attacking the principles of the Solemn League and Covenant, and other public declarations intimately connected with both of those acts, and for which he was deposed by the church courts on 12th of April, 1728. His position being re-considered by the Genera Assembly of 1730, it would appear that they declared that he was entitled to retain his status as an ecclesiastical person, but not to hold a benefice, as he refused to comply with the necessary tests. He bad in the mean time removed to Dundee, where a few bearers gathered round him, and, gradually accumulating, formed a considerable sect. It is not easy from any known announcement to determine to classify these sectarians; they have a mystical appearance, and relate to a spiritual union which binds the members into one body as a church, without its being represented by an outward ecclesiastical polity. The Glaucasites are generally respectable people, and their founder lived an unaproved life. He died in 1739.

(Chambers, Biog. Dict. of eminent Scotsmen.)

GLASS PAINTING is practised as follows:—The design being first drawn on paper, the glass is laid thereon, and the glass or glass with a white or brown composed of a very fusible glass, coloured with a mixture of oxides, ground extremely fine in oil of tar or spike. The parts intended to be yellow, orange, or red are then coated, either on one or both sides, according to the tint required, with a mixture of the colour of the ingredient to be touched up with the red oxide, which is obtained by subjecting sulphate of iron to a red heat. The glass is then exposed to a red heat, or, as it is termed, fired, in which process the painting-colour is fused, and adheres permanently to the glass. The mixture of silver and antimony stains the glass, but does not melt, so that the oxide of iron, which is in the state of dry powder, may be brushed off, leaving the glass coloured, but as transparent as before. The other colours, composed, as for enamel [Examin, P. C.], of a very fusible glass coloured stained, and the glass is again fired. In most cases the glass is fired before any distance of each colour, as some colours require more heat than others.

In subjects which are too large to be executed in one piece, the joynings are carefully arranged to run in the outline; and a similar process is repeated on the new parts, until the whole is completed. In painting the glass, the colours applied remain on the surface of the glass, and interfere with its transparency. In staining glass, the colour sinks into a very thin layer, but leaves it as transparent as before: the only colours which can at present be stained are yellow, orange, and red.

There is a kind of ornamental window-glass called matted wrought, in which the glass is stained in a fine position, either white or tinted, previously reduced to an impalpable powder. This composition is then removed from certain parts of the glass, according to the required pattern, and, after firing, produces on the glass a dull ground with a bright pattern. The demand for ornamental glass having increased lately, several persons have attempted, some by stencilling, others by the application of machinery, to produce it at a cheap rate; and matted work can now be obtained at one-fourth of the price that would have been charged a few years since.

There is also another method of ornamental glass, rather appropriately termed embossing, which also consists of a bright figure on a dull ground. The parts intended to be dull are left white, and the general field is composed of an various mixture of glass poured on, which etches the glass to a certain depth. After the acid and varnish are washed off, the glass is ground by rubbing with another piece of glass and fine emery. This process removes the original surfe of the glass, and proceeds the dull ground; and the design, having been bENDED by the action of the acid, is untouched in the grinding process, and left bright.

GLACIUM (from glaucus, 'sea-green, or glassy'; in allusion to the colour of the plant and its habitation by the sea-side), a genus of plants belonging to the natural order Papaveraceae. It has two sepals, four petals, and indefinite stamens; elongated 2-valved capsules, a bilaminated stigma, and ovate reniform seeds. The species are evergreen glaucous bimniial or annual herbs, abounding in a copper-coloured acid juice, said to be poisonous and to occasion madness. The flowers are yellow or crimson, and the English name of the genus, Horn Poppy, originates in the horn-like shape of the petals.

G. lutum, Yellow-horned Poppy, has a smooth stem and a tubercular scabrous pod. The flowers are large, and of a golden-yellow colour. It is found on the sandy sea-shores of Great Britain and Ireland, and is common in the neighbourhood of the ruins of Theophrastus (Hist. Plant., 9, 13).

G. phaenicum is regarded by DC Candolle as a variety of G. corticalium. It is a native of the south of Europe, and is occasionally found on the coast of England. It is however considered by Babington to be a doubtful native. The flowers are crimson, and have an elegant appearance. Don enumerates six species of Glaucium, none of which however are applied to any useful purposes. The species of horn-poppy thrive well in any common garden soil, and may be easily raised from seeds, which ripen in about 3 months.


GLAUX, a genus of plants belonging to the natural order Ranunculaceae. It has a bell-shaped calyx, 5-parted, coloured, and without any corolla, by which peculiarity it is distinguished from all other plants of the same order. There are 5 stamens inserted at the base of the calyx; the capsules are few-seeded, opening with 5 valves. There is but one species of this genus.

Glaux maritima, the Black Saltwort, has a succulent stem, opposite oval glabrous leaves, yellowish saffy pink flowers with obtuse segments. It grows on the sea-shore and salt-marshes, and is a native of Great Britain.

(Babington, Manual of British Botany.)

CLEANING. The practice of cleaning in corn-fields what the reapers of the harvest leave behind is vulgarly supposed to be a legal custom which the 'owner or occupier of the field has no right to prohibit, and that the poor who enter a field for this purpose are not guilty of trespass; but the only authority in support of this view is an extra-judicial
dictum of Lord Hale. Blackstone, in his 'Commentaries,' book III. c. 12, remarks that this human provision seems borrowed from the Hebrew law (Gen. xix. 9, and xii. 22, 23), and presently adopts Lord Hale's opinion. The question has, however, twice been tried in the Court of Common Pleas. In the first case the defendant pleaded that he being a poor, necessitous, and indigent person, entered the plaintiff's fields laden with the second the defendant's plea was the same, with the addition that he was an inhabitant legally settled within the parish. Mr. Justice Gould gave a judgment in favour of gleanage; but the other three judges clearly decided that the claim had no foundation in law, and that the plaintiff was entitled to the whole of the gain of his property, and was productive of vagrancy and many mischievous consequences.' (H. Bl. Rep. 61, quoted in Christian's ed. Blackett, Com., vol. iii. p. 218.)

The general custom in England is to allow the poor to glean after the harvest is carried, but more generally perhaps not until afterwards. Persons who are not actually necessitous sometimes avail themselves of permission to glean, and by commencing their labours as soon as it is daylight, they gain as much as they would have done from the wages which they would have earned if they had been employed by the farmer to secure the crop. In this case the privilege is abused, and the community not benefited. In some districts the farmers meet together and establish rules for regulating the practice of gleanage. They find that by not allowing persons to glean, and by confining themselves, and likewise of confining the privileges to the necessitous poor of the neighbourhood. The following are rules which were agreed upon at a meeting of farmers in Hertfordshire, 1742: 'No person shall be allowed to glean in any field, until the day after the corn shall have been cut and the field cleared; 2. That no person be allowed to enter the fields for the purpose of gleanage until after eight o'clock in the morning, or to remain therein after six o'clock in the evening; 3. That no able-bodied labourer above sixteen years of age and under sixty shall be allowed to glean in any of the fields situated within the parishes above named; 4. That any person or persons found breaking the rules laid down in the foregoing resolutions shall be held guilty of trespass, and proceed accordingly. In some cases the only restriction is as to the hours when gleaning is allowed; and this is a very proper one, inasmuch as the absence of any rule gleaners have been known to commence before three o'clock in the morning, that is, before daylight, and while the crop was still in the field.

The following table is from a paper prepared by Dr. Kay Shuttleworth, on the earnings of agricultural labourers in Norfolk and Suffolk (Journal of the Statistical Society of London, vol. vi. p. 283). The table shows the value of corn aged by 888 families:

<table>
<thead>
<tr>
<th>Number of Children</th>
<th>Average Value of Corn</th>
<th>Average Amount of Corn</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>£0 17 10</td>
<td>£3 3 0</td>
</tr>
<tr>
<td>1</td>
<td>£0 17 10</td>
<td>£3 3 0</td>
</tr>
<tr>
<td>2</td>
<td>£0 17 4</td>
<td>£3 0 6</td>
</tr>
<tr>
<td>3</td>
<td>£0 17 2</td>
<td>£3 0 0</td>
</tr>
<tr>
<td>4</td>
<td>£0 17 1</td>
<td>£3 0 0</td>
</tr>
<tr>
<td>5</td>
<td>£0 17 0</td>
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</tr>
<tr>
<td>6</td>
<td>£0 17 0</td>
<td>£3 0 0</td>
</tr>
<tr>
<td>7</td>
<td>£0 17 0</td>
<td>£3 0 0</td>
</tr>
<tr>
<td>8</td>
<td>£0 17 0</td>
<td>£3 0 0</td>
</tr>
</tbody>
</table>

The total value of gleanings of the 888 families was 423L. 12s., and the average for each family £1 7s. 10d., which was one-fifth of the average harvest wages of each of the same number of families.

GLEDITSCHIA, a genus of plants named in honour of Gottlieb Gleditsch, a professor at Berlin, and author of a work on the sexual system of Linneas entitled 'Consideratio cipitosea Siegesbecki' in Linnaeus systems plantarum sexuale at methodum botanice.' (Buchholz, 423.) He was a good botanist, and contributed a valuable paper on the reproductive organs of the Fungi to the Transactions of the Berlin Academy in 1748. This genus belongs to the natural order Leguminosae and the suborder Cassieae. The flowers are small, the calyx is not distinct, and the petals are connected together at the base into a cupule. The petals are equal in number to the sepals; two of them are connected into a carina. The leaves are abruptly pinnate and bipinnate or both, and the flowers have a greenish colour, and are disposed in spikes.

G. tricanthos, the Three-horned Acacia or Honey Locust, is a large tree, native of the Carolinas and Virginia, and attaining a height of from 50 to 60 feet. When the tree is young, the trunk and branches are covered with small prickles, which become hard as it increases in age, and form a formidable defence. The foliage is of a light shining green, and is particularly elegant. In the neighbourhood of London the leaves do not assume the golden yellow till early in the autumn. The seeds are covered with a sweet pulp, which, when infused and fermented, forms an intoxicating liquor which was used by the American Indians.

G. manropolom, the One-seeded Gleditschla, is a native of the United States, and hollow wood. It attains a height of from 60 to 80 feet, and much resembles the former species. When none of the seeds ripen it is impossible to distinguish them. There are 8 species of Gleditschla common and widespread, belonging to the small, unopened, unisexual flowers. As ornamental trees they are much esteemed, both on account of their elegant foliage and the varied and picturesque forms assumed by the tree, together with the singular appearance of the spines. They require a deep rich soil in a situation not exposed to the high winds.

(Loudon, Encyclopedia of Trees and Shrubs; Don, Gardener's Dictionary.)

GLEEMAN'S SONG. [SAXON LANGUAGE AND LITERATURE, p. 213.]

GLYCERIA (from glykys, sweet) is a genus of plants belonging to the natural order of Gramaceae and the tribe Fuscicnaceae. It has unequal acute subterminal glumes, the outer paleas with 5-7 strong, prominent, distinct and solid ribs, and the inner, with a slender margin, being glandular, like a lid, and the styles terminal. The species are handsome grasses with long stems, and mostly inhabit watery places. There are two species found in Great Britain, G. aquatica and G. fluviatilis. They contain a large quantity of mucilaginous matter, but are coarse grasses.

(Baillie, Manual of British Botany.)

GLYCERIN. [CHEMISTRY, P. C. S.]

GLYCINE. [Wirtz, P. C.]

GLYPHIS, a genus of fossil Placoid fishes, from the London clay.

GLYPTOCÆPHALUS, a genus of fossil Cycloid fishes, from the London clay. (Aristotle.)

GLYPTOSTEUS, a genus of fossil Ganoid fishes, from the red sandstone of Elgin and Caithness (Aristotle); two British species.

GLYPHOGRAPHY. [Electro-Metallurgy, P. C. S.]

GNAPHALIUM (from gynaëxion, which signifies the wool which the fuller cuts off in fulling the cloth), a genus of plants belonging to the natural order Compositae, to the suborder Coryphinae, the tribe Senecionideae, the subtribe Gnaphalini, the division Helichrysea. It has the ray florets piliferous, the centre with both stamens and pistils, and each of them bearing a pappus of several white flat, naked; the involucre hemispherical, imbricated, and more or less equaling the florets, but not mixed with them. The corolla of the outer florets is often obsolete. The species of this genus have a soft pubescent foliage with dry flowers, which possess for a long time a particular odour. Two particularly species of Helichrysea and Xeranthemum, are called 'everlasting's' or 'immortal' flowers. The species are numerous. Five are British. Of these G. silauscum is the most common, growing in wet and sandy places. G. tenui-albus, G. sylvaticum, G. supinum, and G. pulchrum are all rare plants. Several of the species of the old genus Gnaphalium are referred to new genera as Antennaria and Filago. G. dioicum is Antennaria dioica of Gertner. It grows on mountain heaths in Great Britain, and is commonly called cotton-weed, and by the older herbalists pess cast. Its flowers were admitted into the older pharmaceuticals under the name of Flores histiodal cast. They are astringent, and were employed in the cure of hooping-cough, phthisis, and hemoptysis. G. avarniana (Helichrysea casuarina) has been employed as a remedy in dyspepsia. G. Steachus of Linneas, Goldlock's, the Helichrysea Steachtus, is mentioned by Theophrastus (Hist. Pl. 9, 21). The flowers of this plant were formerly much used in medicine, but are seldom employed at the present day.

(Dalbington, Outlines of Botany; Fras, Synopsis Plant. Fl. Classica.)

GNETACEAE, a natural order of plants belonging to the small class of Gymnospermae. The species consist of small trees or shrubs very much branched, the amentes often both opposite or clustered branches, and thickened separable articulations. The leaves are opposite, entire, with pinnate veins, sometimes very minute and scale-shaped. The ligneous tissue of the wood is marked with circular disks. The flowers are monocious or dioecious; the stamens are contained in a 1-leaved calyx; the ovary is perforated at the apex, contain-
ing in a single cavity a solitary erect oval; the ovule pointed by a style-like process, formed from the membrane of the nucleus; there is no trace of a style or stigma.

This small order of plants has been formed by Blume, whose memoir in the ' Annales des Sciences Naturelles' contains the description and discussions with which the writer is connected with the latter: and, on the other hand, it tends towards Casuarinaceae, plants of a higher degree of organization; since Gnetaceae is beyond all doubt an instance of a much inferior solution characterized by its different nakedness. From both these orders Gnetaceae differ in the greatest perfection of their sexual organs, especially of their stamens; and at the same time their ovules are not absolutely naked, but covered with a pericarpial integument pierced at the summit. In the male flowers the perianth is tubular; at first quite closed up, in the manner of certain Artocephacese, but eventually it is ruptured by the rising of the stamens. There is no trace of a perianth of this sort in the neighbouring orders; but in Conifera a totally different organization of anther occurs, that part not opening, as in Gnetaceae, by transverse pores of the apex, but always at the side, and generally longitudinally.

The species of this family are natives of the temperate parts of Europe, Asia, and South America. Gnetum is an inhabitant of the hottest parts of India and Guiana.

Some of the species of Gnetum are used as food. The seeds of G. nigrum are eaten in Abyssinia, and are roasted, but the bitterness has caused them to be deserted by the Gobies. The inside of the fruit of G. urens is lined with stinging hairs; the seeds are, however, eaten; the stem exudes a transparent gum, and when cut across yields a large quantity of transparent water, which is drunk.

GOMPHUS, a genus of Acanthocephalous oceeous fishes, belonging to the family Gobiidae. All the species have two dental fins, scaly bodies, and a disk beneath the throat formed by the united ventral fins. By means of this disk they have the power of attaching themselves to rocks. Several species of Goby are met with on the British coast. The largest is the Gobius niger of Linnaeus, which attains the length of six inches, and ranges from Cornwall to the Orkneys. Mr. Couch has inquired into the habits of the black Goby, and finds that when it has seized its prey it carries it off alive in its mouth to its resting-place, which is among rocks. The other British Gobies, G. bipunctatus, G. minutus, G. gracili, and G. wigueti, are mostly inhabitants of sandy ground. On the Continent of Europe, the commonest species of Gobies is G. larva found in deep water, even to a depth of fifty fathoms. The deep-water species are distinct from those frequenting the coast-line.

The species of Gobius are very tenacious of life, and are capable, like their neighbours, the Billiards, of living some time out of water. The most remarkable fact connected with the history of these fishes is their nidification. That the Goby built a nest was known to the ancient Greeks. This nest they construct in spring, of seaweed, &c., and in it the female deposits her eggs, whilst the male watches over them until they are hatched. The nest of the Goby is very well built, and has of late been observed on our own coasts. True Gobies are not found in the southern hemispheres as well as in those of the northern.

GOES, HUGO VANDER, a celebrated old Flemish painter and pupil of John Van Eyck. He was a native of Bruges according to Van Mander, but of Antwerp according to Vasari, who calls him Hugo d'Anversa. He spent some time in Italy, and, after his return to the Netherlands appears to have settled in Ghent. He conducted the festival which was held at Ghent in the anniversary of Charles the Bold as Count of Flanders, on July 14, 1462, and 1478 he painted decorations for the solemn jubilee and his work, according to the town archives, frequently employed by the authorities of Ghent down to the year 1480. The cause of his residing in Ghent is conjectured to be a supposed marriage with a beauti- ful daughter of Jacob Weytens, in an apartment of whose house Vander Goes painted in oil a celebrated picture of David and Abigail, in which he introduced the portrait of the daughter with whom he was in love, beautifully painted: it has been celebrated in verse by Luca de Heere, but has, since perished. Vander Goes seems to have survived his supposed wife, for, probably about 1480, he entered the Augustinian convent of Roodendael in the wood of Sognieris near Brussels, in which he became a canon; he was buried there, and the following inscription was written over his tomb.

"Peter Hugo Van der Goes humanae hic quiescit. Dolet ads, sem similibi stult modo sancit." (Svorintus, Monastismi Separiales, &c.,)

There are many extant works attributed to Vander Goes, but few with certainty. The Museum of Berlin has eight; there are four at Munich, and several at Vienna, and in the Netherlands. Passavant thinks that the two large pictures of James IV. of Scotland and his queen, with the portrait of Sir Thomas Brunton, and the portrait of different French and German sovereigns (Nos. 510) are by Vander Goes, because they are similar to the pictures at Berlin; but they are much more likely to have been painted by Mabuse, to whom they are attributed, and who was in this country in the reign of Henry VII., James's father-in-law: James also was not married until 1503, when Vander Goes had probably been dead some time.

One of Vander Goes's masterpieces is the Crucifixion between the two thieves, in the church of St. James at Bruges, which, to preserve it during the iconoclastic rage in the sixteenth century (1566), was coated with black and inscribed with the ten commandments: it was afterwards cleaned, and still remains.

Vander Goes excelled in painting women, but he appears to have been unequal in his execution. His best works are conspicuous for the beauties of the Van Eyck and old Flemish school—colour and careful execution, with its prim postures and meagre forms.

GOLD-BEATERS' SKIN. The ornamentation of the delicate membrane known by the name of 'gold-beater's skin' forms part of an exceedingly dirty and disgraceful class of manufactures called by the French 'boyauderie,' from the word 'boya,,' intestine. The strings for violins, harps, and guitars (Carot, P. C. S.), gold-beaters' skin, and some other valuable articles of a membranous character, are made from the intestines of animals—not (except in a few cases) from the whole thickness of the intestine, but from a very thin membrane which covers it either on the interior or the exterior. This class of employment is more largely carried on at Paris than elsewhere; and the boyaudiers mostly congregate in one spot.

It is from the large intestine of the ox that gold-beaters' skin is prepared. This intestine is composed of three coats or portions, an outer or serous, a middle muscular, and an inner mucous. The middle muscular coat, and the mucous membrane on the outside, and the muscular membrane between them. The peritoneal membrane is the one required for the purpose; and this used formerly to be loosed from the other two, the peritoneal being the path of the putrid fermentation to cease; but this process occasioned such a fetid odour in the neighbourhood of the boyaudiers at Paris, that a prize was offered to the discoverer of any new method whereby this separation could be effected in a less offensive manner. The result was the discovery of a process in which the intestines, after being washed out, are cut open along the peritoneal membrane, the latter is then removed in fine strips, which are subjected to a process of boiling and on the addition of an alkaline to the water in which it is boiled. The skin is then dried in a warm oven, and dried and softened with steam. When ready for use, it is said to have a soft, velvety, elastic, and warm feel to the touch.

In the first place, the intestine is freed from all grossiness by soaking, scraping, and washing; it is then turned inside out, and put into a tub. The tub contains a strong alkaline liquor, which soaks through the skin and softens everything. The liquor is then removed, and at the expiration of that time the mucous membrane has become so far loosened as to be easily removed. The alkaline liquor employed, called ' eau-de-Javelle,' removes all trace of fetid odour. The peritoneal membrane is afterwards carefully removed, and stretched out to dry. It is next steeped in a weak solution of potash, and carefully scraped. After this it is stretched out on a frame, with that surface underneath which had adhered to the muscular membrane; another membrane, paper, is placed on the contrary side, which is too air dried, and the two are easily made to unite firmly together. The membrane is then moistened successively with different liquids, of which one is a solution of alum, one a solution of tannin, and another a layer of white of egg. Beating, drying, and finally washing is repeated, to the amount of seven or eight times, until the skin is well formed; and a skin, which was once an offensive fetid odour, is transformed into a fine, clean, tough, light, delicate, and beautiful material, which is susceptible to any operation, according to the taste of the workman, and appears to have a peculiar charm in proportion to its delicacy.
The process whereby gold is brought to the state of very fine leaves, for use in various kinds of gilding. The remarkable ductility of gold—a quality possessed by very few, if any, other known substances—is here taken advantage of to the fullest extent, as a means of limiting the quantity of this costly material required in gilding. So far the attenuation carried, that a hundred square inches of nearly pure gold can be purchased for about sixpence.

It is by a combined process of rolling and hammering that the attenuation of the gold is produced. The metal is melted in a small crucible by the heat of a wind furnace; and is cast into ingots moulds of four feet high, and about three-quarters of an inch in width, and weighing two ounces: a little borax is used to facilitate the melting of the gold, and the ingot-mould is greased on the inside to prevent the gold from sticking. When the wax, which was formerly removed from the mould, is immersed in hot ashes, whereby the gold is both annealed and freed from grease. When gold is ready to undergo the process of reduction in thickness, and proportionate extension in length and breadth. Formerly, in France, where feet of land were of greater value than in Great Britain, the gold was reduced in thickness by the use of a hammering or fainting, or 'laminating' mill. In England this forging is dispensed with, and the reduction of the gold to the state of a ribbon is effected by means of the mill. This mill consists of two rollers made of polished steel, perfectly cylindrical in form, and adjusted with very great nicety; it must so act as to reduce the gold equally in every part.

The rolling is carried on until the ingot of two ounces is spread out to a surface of 960 square inches, with a thickness of rather more than one-sixth of an inch.

This thin ribbon of gold is then consigned to the hands of the gold-beater. The hammer does not take place on the gold itself; but thin membranes are interposed between the hammer and the gold. These membranes are of three kinds: first, made of very fine and smooth calf-skin vellum; and another set made of the gold-beaters' skin described in the last article. The riband of gold is cut up into small pieces, each measuring exactly an inch square; and a hundred and fifty pieces of it are sewn together with an equal number of leaves of vellum, about four inches square; each piece of gold being placed on the middle of a leaf of vellum. This packet of vellum-leaves is drawn a parchment case, open at both ends; and by means of this case the gold is dispensed, with the hope of its being carried about in this manner, so that the vellum and gold are enclosed tightly on all sides. The entire packet thus prepared is beaten. This beating is effected on a smooth block of marble, strongly imbedded beneath, and bounded on three sides by a raised ledge of oak wood; the front edge is open, and has a leather flap attached to it, which serves as a kind of apron for catching fragments of gold that may fall off in the subsequent operations. The hammers employed are very ponderous, weighing about six cwt., flat, for hard work; and ten pounds respectively; the heavier is used first, and the others are brought into use as the gold becomes thinner.

The packet of vellum and gold is laid on the stone, and the workman beats, with regular and heavy blows, on the middle of the stone, at the upper side; and the hammer is a spring of steel, with a flat end, which enables the hammer to rise easily after each blow; otherwise the work would be too laborious for any man continuously. The beater turns the packet over from time to time, to equalise the action upon the leaves; and he occasionally bends the packet to and fro, to destroy any slight adhesion between the gold and the vellum: he also opens the packet at intervals, to see how the operation is proceeding.

The beating is continued until each little inch-square piece of gold has become nearly to the same size as the leaves; and in order that the whole of the hundred and fifty pieces may be equally acted on, the packet is occasionally opened, and the inner pieces placed near the outside, to receive more action from the hammer.

When this degree of attenuation has been attained, the use of the vellum-leaves ceases, and that of the gold-beaters' skin commences. The packet is opened, and each piece of gold, being taken out and placed on a kind of cushion, is cut into four pieces with a knife.

The pieces of gold, now increased in number from a hundred and fifty to six hundred, are interleaved with an equal number of pieces of the prepared gold-beaters' skin. The packet thus prepared is enclosed in parchment, and beaten in the same way as before, but with a lighter hammer. Each piece of gold becomes by degrees expanded, until they attain nearly the size of the skin-leaves. The packet is again opened, and the leaves of gold are again cut into four, and the quarters are again interleaved with gold-beaters' skin. The cutting is, in this second instance, effected by the smooth edge of a strip of cane, since the thin gold would be liable to adhere to a steel knife. As the pieces of gold, now 2400 in number, would be too numerous to be beaten in one packet, they are divided into 500 equal numbers, and each half-packet interleaved with gold-beaters' skin, enveloped in parchment, and beaten, in the same way as before. A third time these leaves expand nearly to the size of the skin-leaves; and by this expansion the gold becomes of the size of the finest leaves. By the three beatings and the two quarternings, the gold is expanded to an area about 190 times greater than it presented when in the form of a ribbon. The attenuation may be rendered more intelligible by stating that 1000 square inches of gold, of one pound weight, would result nearly as surprising as anything presented in the mechanical arts. Gold can be beaten to a much greater degree of thinness than that ordinarily; but the waste occasioned by the breakage of the leaves off, the knocking of the hammer and labour required, more than counterbalances the advantages.

When the last beating is finished, the packet is opened, and the thin leaves of gold removed one by one. The gold-beater makes use of a delicate pair of long pincers, made of white wood, and takes up the fragile leaves of gold one by one. Each leaf is laid down on a cushion, and blown out after letters. VOL. I.—4 P.
by the breath of the workmen: if any of these have been broken or injured in the beating, they are thrown aside, to be remelted for future use; but otherwise each leaf has the ragged edges cut from it, so as to bring it to the size of about three inches and a quarter square. Small books are prepared, each book containing twenty-six leaves of paper about four inches wide and four inches high. These are ruled on the left hand with black or red chalk, to prevent the adhesion of the gold; and twenty-five leaves of gold are placed in each book. In this form the leaf-gold is sold.

The French adopt the same general mode of proceeding as the English gold-beaters, but vary it slightly in detail. The laminated ribbon is cut into pieces an inch and a half long by an inch wide, and about 1-24th of an inch thick. Twenty-five of these are laid one on another on a smooth slab of steel, and there are several layers of lead. Fifty inches long, these expanded leaves are made up into a packet, with two leaves of vellum between each. This packet is enclosed in a sheath, and is beaten with a hammer in the same way as in England. Indeed the hammering is thorough, and the use first of vellum and then of gold-beaters' skin, are the same in most of their features as those already described; but the French gold requires more hammering on account of the greater weight and size of the pieces at the commencement of the process.

Two other metals, silver and copper, have sufficient ductility to be brought into the state of thin leaves by hammering; and both are used to a limited extent in this state in the arts. But these metals would fracture long before such a degree of thinness could be attained as in the case of gold; and it is the smaller value of the metal renders it less important to economise material in this way: consequently leaf silver and copper are thicker than leaf-gold.

GOLDING, F. W., was born in London, of a good family, at some time in the early part of the sixteenth century. In 1564 he was living in the house of secretary Cecil, in the Strand; and his dedications show him to have been patronised also by the Earls of Leicester and Essex, Lord Cobham, Sir Christopher Hatton, and other persons during his time. His earliest known work was printed in 1562. After the death of Sir Philip Sidney, which took place in 1584, he completed Sir Philip's translation of Philippe de Mornay's French treatise On the True Religion. He was a Catholic, and he must have been alive till 1587, when that translation was published, or perhaps for two or three years longer. The dates of his published writings extend over the whole of the period thus marked out. They amount to about thirty; of which however, besides some copies of verses, one only is original, a religious 'Discourse upon the Earthquake' of 1586. The rest of them are translations, chiefly from the Latin, but some from the French. Several are theological or ecclesiastical works, of Calvin, Chrysostom, Bishop Grosseis, and others; two or three are histories, of which whose settling porturies were his translations from the Latin classics. These embraced, in succession, prose versions of Justin, Cesar, Seneca, Pompiumus Mela, and Solinus, and a spirited and not unworthy translation of Ovid's Metamorphoses into a fourteen- syllable verse. Four books of the Ovid were published in 1685, and the complete work in 1767. Golding deserves to be commemorated, on account of the great influence which he and other translators of the classics exercised upon the dawning poetry of England.

GOMER-CHAMBER. [CHAMBERS P. C.]

GOMERA, one of the Canary islands, is situated between 28° 1' 30" and 28° 13' N. lat., and between 17° 48' and 18° 4' W. meridian, at a distance of twenty miles from the western shores of Tenerife. In shape it resembles a cylinder, of which the base is nearly twenty miles long, and the other sides fifteen miles. Mac Gregor assigns it an area of 168 square miles, so that it is only a little larger than the smallest of the English counties, Rutlandshire (149 square miles). The surface is extremely mountainous and uneven. It presents a continual succession of narrow gles, or barrancos, and narrow ridges, which terminate on the shores with high and steep cliffs. It is not known to what elevation the highest summits rise above the sea, but it is certain that these sometimes preserve the snow which falls on them for several days would lead us to suppose that they must exceed 6000 feet. The elevation of its mountains must be the cause that they are the best places for growing the olive. The roof of the island is the roof of the world, and beans of the same quality. The general surface of the island is not always covered with wood. The soil is stated to be of excellent quality, but only one-ninth is under cultivation, and even this small proportion is badly worked, which is attributed to the desire want of enclosures. The climate is not so hot as that of the other Canaries, but in all those places which are built in the narrow barrancos it is unhealthy for want of ventilation. The productions are the same as those of Tenerife (P. C. vol. xxiv. p. 204), to which island it exports wine, brandy, orchils, silk, and dry fruits. The population amounts to about 1000, and is composed of Spanish dwellers. The principal place is San Sebastian, inhabited by about 1000 individuals. In this town Christopher Columbus was settled for some time before he sailed to America, and it is here that from 1479 to 1480 he received some information of the existence of the New World, from an Andalusian captain, Alonso Sanchez de Guehla, who had been cast-award by a gale and returned to Gomera. The port of San Sebastian, called Puerto de la Gomera, is said to be the best in the Canary group, and it is the principal place which forms the Spanish colony of Gomera, as it was named by Bethencourt in 1406, at present the private property of the Marquis of Belida and Saint Juan, and has the title of a county.

(See Canarian Insulae nach ihren gegenwartigen Zu- stande, von Mac Gregor.)

GONDAB, the capital of Abyssinia, is in 12° 36' N. and 37° 32' E. long., not far from the northern border of the plain which reaches from the northern shores of Lake Tana to the table-land of Waghe, and is at a distance of two miles that direction. From the base of the table-land several low ridges run southward into the plain, and at the extremity of one of them the town is built, between two small rivers, the Angerab on the east, and the Gaha on the west. A road runs from Gondar to the sea, which for some distance is alluvial, and then, as it appears, was entirely filled up with buildings and gardens, but the larger portion at present consists of ruins or tracts overgrown with canes. The inhabited portion does not consist of one continuous mass of buildings, but in isolated groups of buildings, lying at some distance from one another. The largest of these groups lies on the western side, and is only inhabited by Mohammedans; hence it is called Islamabad, and not far from it is Etapeghedehce. These head quarters are no longer inhabited by the Negroes. One of them, called Felashabah, is inhabited only by Jews.

Over this space and mostly among the ruins a great number of churches are dispersed. It is stated that there are fifty. The buildings are in form and arrangement very different from our churches. They have the form of a cylinder surrounded by a corridor. In the midst of the buildings is a space in the form of a cube, surrounded by a wall. The centre of this space is occupied by a kind of throne of wood, which is represented the tabernacle. A conical roof of straw covers the whole building. Many large doors lead from the corridor to the body of the church, and three smaller ones from the body of the church to the cubic enclosure. There are numerous paintings on the doors, walls, and beams, but the hand of the artist has no great value in these paintings. The churches are surrounded by avenues of large trees.

The houses have the shape of a cylinder, and a conical roof of straw. A gate leads from the street into a spacious court-yard, surrounded by a wall, in the midst of which there is a large salon; at its other extremity is an alcove, which occupies the back portion of the building. The salon has five doors. One opens, as already observed, into the large court-yard between the house and the street. Two doors, placed at the right and left of the principal entrance, lead to the two olong rooms which enclose the salon on either side, and from which two other doors lead to two smaller court-yards. Two other doors of smaller dimensions are near the alcove. One of them leads to a small room, in the midst of which is a table with a deposit; and by the other the master of the house, who always sleeps in the alcove, can get without being observed into the adjacent room, and into one of the smaller court-yards. When the house has two stories, the upper one is adorned in the manner and inhabited, the lower being only used as stables. One of the lateral rooms serves as a kitchen. The smaller court-yards are separated from one another by walls, and they communicate with the larger court-yard only by the salon. The houses are low, and have neither chimneys, nor bell-shaped roofs, and they are cemented with a loamy earth.

To the north of the town stands the palace of the emperor, or Negus, which was built by Busskard in the seventeenth cen- tury. It is situated on a rocky hill; it has two stories, and contains a large court-yard and several large buildings, now in ruins, except one of moderate size, in which the present emperor resides.
The number of houses, according to Rüppel's estimate, does
not exceed 1000, and the population does not exceed
6500. The continual internal wars, which in the last sixty
years have ravaged the whole surrounding country,
have greatly diminished the population. With the exception
of the numerous clergy, all the inhabitants are engaged in
commerce. As almost every month the regular communication
between these parts and the world is interrupted by the
invasion of an enemy or the turmoils of its inhabitants,
all kinds of goods are subject to sudden and great changes
in price, and this has induced every person to enter into specula-
cation. Besides, Gondar is situated on the only well-fre-
quented road which leads to the south interior of Africa, and all goods brought from Europe, Asia,
and Egypt to be consumed in those parts pass through the
hands of merchants established in Gondar. Very few articles
are made in this town; those of iron are the most important,
but nearly all the iron imported is sold in order to get
the iron is imported from the province of Gojam, which lies
south of Lake Tana. Several families are engaged in tanning,
and those who make shields of leather furnish an article dis-
tinguished by beauty and of good quality. Earthenware is made
in large quantities; but this branch of industry is confined to
the Jews. The workmen in silver are not distinguished by
skill or taste. The copying of books is still carried on to a
great extent, and is generally done with neatness and even
beauty. The same cannot be said of the manufacture of
textiles. (Bruce's Travels to discover the Sources of the Nile;
Rüppel, Reise in Abyssinien.)

GOGONIATHUS, a genus of fossil Cylindroid fishes, from
Gosson, London, 1850.

GONOPOHORUS (Agassiz), a genus of fossil Echidna, from
the green sand. (Moria's Catalogue.)

GOOD AND CHATTLES. (Chattele, P. C.)

GOODYERA, a genus of plants belonging to the natural
order Orchideae, and the tribe Limodoreae. It has a ringent
periapt; the lips Ontire, included, saccate at the base; the
stigma rostellated, subcaduate; the rostellum erect, bipeltate,
with a large squarish appendage between its slender segments.
One species of this genus, rich in Maximilians, is found in
Scotland. It has a stem 6 to 8 inches high. With the radical
leaves it is ovate, stalked, reticulated, and the whole upper
part of the plant covered with minute stalked glands. It is
found principally in fir-forests.

(Babington, Manual.)

GOOSEBERRY. [Rieze, P. C.]

GORCUM, or GORINCHEM, is a small town in the
province of South Holland, in 51° 50' N. lat., and 4° 58' E.
long. It is situated on the right bank of the Merw, at its
confluence with the Dommel. On this bank is a degree
of Gorcum is a fortified town, and offered some resistance in
the invasion of Holland by the Prussians in 1797. The French,
on their retreat in the spring of 1814, left a garrison in it, which
soon surrendered, and the town was restored to the French.
The population is now about 7000 inhabitants: they have no manufactures worth
speaking of, except tobacco-pipe heads. The trade is chiefly in
corn and in salmon, of which they have considerable fisheries.
The house is still shown in which Grossetus took refuge after
his escape from the Castle of Loecvestier, in which he
was imprisoned.

(Stein, Lexicon; Hasel, Handbuch; Cannabich, Lehr-
buch; Stein, Geogr. Lehrbuch, by Hörselmann.)

GORDON, ROBERT, was born in Aberdeen- 
shire about the year 1580. He studied first at Aberdeen,
and afterwards at Paris. On his father's death in 1600 he returned to Scot-
land, and succeeded to his ancestral estate of Straloch. At
this time the vast collection of maps, and corresponding letter-
presses geographical and historical, which, with the
Blais of Amsterdam, was in progress. The Dutch editors
had been put in possession of some geographic drafts of
the various provinces of Scotland, drawn by Timothy Pont, an
eminent geographer. These drafts, which are now preserved
in the British Library, are minute and curious, and
very valuable as throwing light on the state of the country
and the condition of property in Scotland at the time
when they were executed. Pont had died in the execution of his
task before the task was, minute and apparently accurate, but
fragmentary and totally destitute of arrangement. The
editors of the Atlas applied to King Charles, and solicited his
patronage of the portion of the work applicable to Scotland,
and his appointment of a person qualified to complete the
work. It was placed by royal authority in Gordon's hands,
and projected by

in 1641. The part of Blaik's Atlas commonly called "Thea-

trum Scotiae," was finished by Gordon in 1648, and forms one
of the fourteen volumes of that work. It contains forty-nine
minute and highly finished maps of the various provinces of
Scotland, according to Pont, along with extensive descriptive
results of extensive and accurate research. The result of
the knowledge and labour bestowed on this work was to give
a greater prominence to Scotland in this general geographical
system, which had hitherto been entirely devoted to
England.

Gordon's labours were considered as of so much value by
that a special act of parliament was he exempted from the
quarreling of soldiers and other public burdens, and as he
assisted from connecting himself with either side, he
was relieved from the labours of the press. He
was the only person in which the country was then distracted. Gordon died in
1661. The geographical papers which he had originally pre-
pared were still more extensive than the work published by
Blaise. There were a large mass of them among the MSS. in
the Advocates' Library, in the printed catalogues of which the
titles will be found, and some portions of them have been
lately printed by the book-clubs. Gordon had collected ma-
terials for a history of his own adventurous time. His
son, James Gordon, clergyman of Ruthvenkemo, who seems to have
assisted him in his geographical labours, put these materials in
a narrative form, and the 'History of Scots Affairs,' thus pre-
pared, was printed in 1841, in three volumes, 4to, for the
Spalding Club.

GOSSELE, Biographical Dictionary of Eminent Scotsmen :
Introduction to History of Scots Affairs from 1587 to 1861,
by James Gordon, Parson of Ruthvenkemo (Works referred to.)

GORSE. [Our. P. C.]

GOSSON, RICHARD, a native of Kent, was born in
1544. In 1572 he was entered at Christchurch, Oxford, where
he took his bachelor's degree, and then removed to London.
He was there a family tutor, and wrote three plays—a tragedy
called 'Catiline's Conspiracies,' a comedy called 'Captain
Mario,' and 'Praise at Writing,' a moral romance. These
plays were never printed, and would now be quite unknown but for
the remorseful mention which the author himself afterwards
made of them. He was but twenty-five years old when he
published his 'Life and Death of a Gentleman,' in 1581; and
second in order of time, of the Puritanical tracts inveighing
against stage-playing. This was 'The Schoole of Abuse, containing
a pleasant inveigh against Poets, Pipers, Plaisers, Leaters,
and such like Caterpillers of a Commonwealth,' 1579, 1587.
This pamphlet, more scurrilous than either pleasant or logical,
was reprinted by the Shakespeare Society, in 1841. It
was followed in the same year by Gossom's miscellaneous
volume, called 'The Epemerides of Philo,' (reprinted in
1686), one part of which, 'A Short Apology of the Schoole of
Abuse,' is of importance. The other part is an Epistle
directed against Thomas Lodge's 'Reply to Stephen Gossom
touching Plays.' Both of these works of Gossom were de-
dicated to Sir Philip Sidney, who, according to Spenser,
sentenced the writer to the gallow in 1581, with
civil and convenient post. This, with violent personal abuse of Lodge, in his 'Plays
confuted in Five Actions,' published in 1581 or 1582,
dedicated to Sir Francis Walsingham. Another work of
Gossom is the 'Pleasant Quippes for Upstart Newfangled
Gentlewomen,' printed in 1593, and again in 1596; a ver-
sified composition containing some hard satirical bits, but no
poetry. His only other known effusions are verses prefixed
to three works of his day, and a sermon called 'The Trumpet
of War,' which was printed in 1598. Gossom had then taken
orders, and was parson of Great Wiborough in Essex. In
1600 he was instituted to the rectory of St. Botolph, Bishops-
gate; and it is a curious fact that there exists a letter of his
dated in 1616, in which, with expressions of respect, he re-
commends, to Edward Albery the printer, the laying of a
waste job for admission to Dulwich Hospital. Gossom held the rectory of
Saint Botolph at his death, which took place in his parish
on the 13th of February, 1593, when he was sixty-nine
years old.

GOUJON, JEAN, a celebrated French sculptor of the
sixteenth century, called sometimes the Correggio of
sculptors, from the softness and delicate roundness of his execution,
especially in baso-relievo, in which he was excellent; he is
so fine to the touch that sometimes he could not raise
from his hands the smallest grain of clay. Many of his works have perished, but two of the best still remain:
the cast of the Nièvrè of the Fontaine des Innocents, and
the four colossal Caryatides in the Louvre, in the 'Salle des Caractyes,' at Gourdon, near from
that of Honni I. Goujon was also an architect; he
was architect to the king, and was appointed, conjointly with
Fiero Lescoat, to superintend the building of the Louvre. He was employed also in other works by Henri II., and he made portraits of several distinguished persons, including the Duchess of Valentinois, the Duke and Duchess of Poictiers (the Duchess of Valentinois), now in the Louvre, in the Salle d'Angoulême. The figure, which is reclining and resting at a stag, has been extravagantly praised; but it is neither well proportioned, nor does it possess the same repose of appearance as the other of the same sex: it is long, and wants undulation of life; this peculiarity might-be supposed to belong to the individual, were not the landscape of the Fontaine des Innocents conspicuous for the same defects, which shows that they are defects of manner. The accessory parts of his work are elaborately executed. Goujon was a Hugenot, and fell a victim to the massacre of St. Bartholomew, in 1572; he was shot while on a scaffolding, working upon some bas-reliefs at the Louvre. The heads of these bas-reliefs have been highly engraved and published in large octavo, by A. Reveil, Oeuvres de Jean Goujon, gravé au trait d'après ses Statues, &c., Paris, 1829. (D'Argenville, Vies des fameux Architectes et Sculpteurs, &c.; Dandré Bardon; Wattelet; Reveil et Duhamel, &c.)

GOYEN, JAN VAN, a celebrated Dutch painter, born at Leyden in 1596. He studied under several masters, and lastly under E. Vanderverde; and is distinguished for busy and busy execution, and occasional fine pieces; seven of his figures were painted by Jan Steen. His pictures are good in all respects saving colour, in which they are cold, green, and dark—owing no doubt chiefly to the effect of time upon an injudicious choice of colours, or, as some conclude, the use of old Tournay varnish. He was a model artist and did in his execution, and once wagered, as related by Hoogstraeten (Académie des Schilderkunst), with two other painters, N. Knippenberg and J. Parcellies, to paint the best picture in a single day: the works of all three were good, but the judges awarded the prize to Parcellies. He died at the Hague, according to Houbraken, in 1656. There are a few etchings by him. (Houbraken, Grootte Schouburgh, &c.)

GOZZOLI, BENZOZZO, a celebrated old Italian painter, born at Florence in 1420, according to Vasari, who calls him simply Benozzo in his first edition, but 1406, according to Camicia. He was the pupil of Fra Giovanni da Fiesole, whose works, as well as those of Masaccio, he studied imitatively, but he failed completely in attaining Masaccio's style of design. Many of Benozzo's frescoes still exist in a tolerable state of preservation, more or less. Those in the Campo Santo at Pisa are considered the best. He painted here a large number of altarpieces, covering a side of the building; he commenced in 1469, and finished them in 1485, and for each picture about ten ducats (66 lire); he was to paint by agreement three pictures in a year. Supposed to have been employed for the tomb of Roland, which it probably would have been if he had painted three pictures every year, we have a great painter fully employed in the middle of the fifteenth century, for a salary of less than thirty ducats, or about 18l. sterling per annum. This sum was worth in England at the same time, about twenty oxen [Austen, William, P.C.S.]; and if we compare with it the value of twenty oxen in the present day, we shall arrive perhaps at a fair estimate of the value of an eminent painter's time at that period: which will be upwards of 500l.: a sufficient income, if for the spring and summer months only. Benozzo was, however, paid at a higher rate at Orvieto, in 1447, when he received seven ducats per month; but this must have been merely during the spring and summer months, when fresco painting is much employed. Benozzo painted also in Florence, at Rome, at Volterra, and at San Gimignano, but he settled and died at Pisa, in what year is not exactly known. Vasari was misled by the inscription on his tomb in the Campo Santo, which is not the date of Benozzo's death, but the date of the year in which Pisa presented him with the tomb during the progress of the paintings. The inscription was evidently placed during Benozzo's life-time; it is as follows:—His tumulus est hic. Benozzo in his will determined that a bust of himself should be placed in the film Pianorum donavit humanitas miccclxxxviii. He probably died in 1485.

(Vasari, Vite de' Pittori, &c., and the notes of Sehorn's German Translation; Ciampi, Notizie stilate della Signora Pietà Unione della Compagnia del Campo Santo di Pisa; Rumohr, Italienische Forschungen.)

GRA CILLARIA. [See-Weed, P. C.]

GRA DE NTS. [Railway, P. C., p. 250.]

GRAHAM, JOHN, Viscount Duness, commonly called Cuan, born 1649, and son of Sir William Graham, Lord Duness, and his father Sir William Graham, of whom he was the second son. He was probably born about the year 1649 or 1650. He is said to have studied at St. Andrews, and to have made some proficiency in the mathematicks; but leaning was not a lore in which he chiefly delighted. When he was about 16 years of age he endeavoured to raise his character from that of the ordinary soldier of fortune, and to endow him with a higher tone of feeling, cannot help comparing his letters to those of a shambler- merchant, for he was not possessed of the slightest idea of poor, intrepid, and accustomed to that superiority over their neighbours which suits a man at once for command in a half-disciplined army—had by these qualities held commissions during the Thirty Years' war, without being very fastidious of his rank and pay. Yet, it is said, that one lord Graham was evidently brought up to this trade. He entered first the French and then the Dutch service, obtaining in the latter considerable distinction. Being however refused the command of a regiment, he returned to Scotland in 1677. He obtained a captain's commission in one of the troops of horse employed in enforcing obedience to the penal laws against nonconformists in Scotland. Among many cruel instruments, he became conspicuous by his barbarity, and obtained an unenviable reputation. He was deeply convulsed when, in the year 1677, a rich and handsome body of Covenanters having announced that they were to hold a solemn preaching on 1st June, 1679, Graham, on his way to disperse them, was met by an advanced body of eight of their most active enemy leaders, who, with Graham in a piece of ground called Drumclispe, discharged his troops, and compelled him to fly for his life. At the subsequent battle of Bothwell Bridge his extenuating counsels were fortunately counteracted by the milder genius of Monmouth, the commander of the expedition. In 1688 he was raised to the peerage by the title Viscount Dundee and Lord Graham of Claverhouse. While the Convention Parliament was sitting in Scotland arranging the Revolution settlement, he put himself at the head of some Highland and Irish troops, with whom, on the 17th of June, 1689, he successfully defended the pass of Killernukan against MacKay until he was killed by a random shot.

(Douglass's Peerage of Scotland; Laing, History of Scotland; and other historical works.)

GRAHAM, ROBERT, the third son of Dr. Robert Graham, afterwards Mair of Leckie, was born at Stirling on the 3rd of December, 1786. He followed his father's profession, and in the early part of his life practised medicine at Edinburgh, where he was employed as an assistant to Sir James Smith, chairman of the College and chair of botany in the University of Glasgow, and lectured on this subject were read by the professor of anatomy in the summer season. On the government establishing a separate body for the medical profession in 1788, Dr. Graham was elected among the first members. He was in 1821 the chair of botany becoming vacant in the University of Edinburgh. Dr. Graham was the successful candidate for the office. He was also appointed physician to the Infirmary, and conservator of the botanic garden of Edinburgh. To the latter office he speedily devoted much attention, and, making excursions with his pupils to some distant part of the country. He thus examined, during successive summers, the foras of several important districts of Scotland, England, Wales, and Ireland. The knowledge, which he thus obtained, induced him to prepare material for a Floras of Great Britain, which however he did not live to publish. His published works consist chiefly of descriptions of new or rare plants which flowered in the botanic gardens of Edinburgh. These, as well as his other botanical productions, were published in the 'Edinburgh New Philosophical Magazine,' 'Curtis's Botanical Magazine,' and 'Hooker's Companion to the Botanical Magazine.'

Although Dr. Graham was a strong and powerful man, his health gave way some years before his death, and he eventually died on the 7th of August, 1845, of an encopeloidal tumour which occupied the back part of the thorax and pressed
upon the great vessels of the heart. He was a frank kind-hearted man, and few men have left behind them a larger circle of affectionate friends to lament his death.

(London and Edinburgh Journal of Medical Science.)

Graham, Sir Thomas. [Lynneo, Lord, P. C.]

Graham, Maria. [Calcott, Sir Augustus, P. C, S.]

Granatee, a natural order of plants separated by David Don from Myrtaceae (Myrtacee, P. C.), and containing the genera Podocarpus, and Podocarpus. [Don, T.]

It differs from Myrtaceae in the leaves being destitute of gland, and in being without the intramarginal vein, as also in the nature of its fruit, its pulpy seeds, and convoluted coat of the seed. [Don, T.]

Granger, Rev. James. So little is known of the personal history of Granger, that even the date of his birth appears to be unrecorded. He studied at Christ Church, Oxford, and was presented to the vicarage of Shiplake, in Oxfordshire, where, according to the dedication of the book which brought him into notice, he had the 'good fortune to retire early to independence, obscurity, and content.' This work, which must have occupied many years of preparatory labour, and been embodied in a letter from Granger to Egbert the Great to the Revolution; consisting of characters disposed in different classes, and adapted to a methodical Catalogue of engraved British Heads; intended as an Essay towards reducing our Biography to system, and a help to the Knobr at the end of the eighteenth century. This edition was in two volumes, each forming two parts, so that it is often described as in four volumes. Some copies of this edition were printed upon one side of the paper only, to leave room for manuscript notes, or for the insertion of illustrations. In 1778 a second edition appeared, in two volumes, 8vo., in 1775. The third, published in 1779, is evidently from the same type as the second, and seems to have been adapted to a larger number of persons.

'Literary Anecdotes,' vol. v. p. 267, there was another (which however is erroneously called the third) edition in 1804, which we have not seen, but which is mentioned in the 'Gentleman's Magazine' for October, 1805, as in preparation.

'Some Extracts from the Correspondence of the late Sir William Musgrave.'

Addison and Garside, 1779, 8vo., in 1775. The third, published in 1779, is evidently from the same type as the second, and seems to have been adapted to a larger number of persons.

On the publication of a Memoir of a celebrated engraver, he immediately addressed a letter to some one, or advice, or a gentleman's place, &c., and my protégées have turned out so well, that I have constant applications for such persons.' She published 'Memoirs of an American Lady,' in 1808; and 'Essays on the Superintendents of the Hibernian and Scotch; in 1811. She died on 7th November, 1888.

(Memoir and Correspondence of Mrs. Grant of Laggan, 3 vols.)

Graphis. [Leverworth, P. C. S.]

Graphite. [Plumbago, P. C.]

Graptolepis, a genus of fossil Ganoid fishes, from the carboniferous system of Carlucio. (Agassiz.)

Gravelot, Hubert Françoise d’Amville, a designer and painter, was born at Paris in 1690. He was the brother of D’Amville, the eminent geographer. When about thirty years of age, Gravelot commenced the study of painting under Restout, but he eventually adopted designing, and established himself as an engraver. His first engravings were about the year 1792, and found considerable employment: he returned however to Paris in 1745, and obtained considerable reputation there, chiefly as a designer. His principal works are—the drawings for the monuments of kings for Versailles, from the engravings to Sir Thomas Hanner’s edition of Shakspeare, after his own and Hayman’s designs; also those for Theobald’s ‘Shaksper’ from his own designs; a large print of Kirkstall Abbey, and many ornamental designs, executed for England. He engraved a print of the pont de Boisjumeau’s Racine; for the great edition of the works of Voltaire by Panckoucke, and for editions of the ‘Contes Moraux’ of Marmontel, and of the works of Boccaccio, and of Ariosto. He died in 1773.

(De Fontenel, Dictionnaire des artistes; Vertue, Catalogue of Engravers.)

Green, Valentine, a celebrated English mezzotint engraver, was born in Warwickshire in 1739. After serving his time with a local engraver he went to London in 1765, and turned his attention to scraping in mezzotint. He acquired a great reputation by his many prints after West, especially two large plates published a few years after his arrival in London, of the Return of Regulus to Carthage, and the Battle of Hohenlinden. He also engraved a few copies for West’s most celebrated pictures now at Hampton Court, and originally painted for George III. The Stoning of St. Stephen after West is one of Green’s masterpieces. He engraved also many of the pictures of the Düsseldorf Gallery, for which he
was granted an exclusive privilege by the Elector of Bavaria in 1768, who afterwards conferred on him the title of Hof Kupferstecher (court engraver). He executed also several great plates after Rubens, including the Descent from the Cross at Antwerp, and other masterpieces. He engraved in all upwards of 200 figures, as well as the plates of some engravings of the Royal Academy in 1774: he died in 1813, aged 74.

(Bryan, Biographical Dictionary of Painters and Engravers, vol. 1, p. 102)

Greene, Robert, was a native of Ipswich. The date of his birth was probably a few years later than 1650. He was educated at St. John's College, Cambridge, where, in 1678, he took his bachelor's degree, and his master's in 1683. But in October 1678 and 1683 he travelled on the Continent, visiting Italy and Spain; and it has been asserted, on the evidence of coinciding probabilities, that there was a certain young gentleman of that name, and his residence there is known. He died in 1694, aged 34.

Greene's dramatic works, with all his other compositions in verse, have been published by Mr. Dyce, 2 vols. 12mo, first printed in 1831. In those volumes Mr. Dyce has given a full account of Greene's Life, with copious specimens of his prose works, and a list of them which is complete, almost so. The list embraces thirty-four pieces, which are undoubtedly his. Their matter is of the very various kind, and they are replete with original spirits and humorous sketches; society of chiefy, chiefly in its disreputable walks; and miscellaneous essays: in his moments of remorse he wrote warnings to debauched youth, and ample but exaggerated and romantic confessions of his own follies. Pieces like this had been appended to the following: Late: or, a Powder of Experience sent to all Youthfull Gentlemen to root out Infectious Follies,' 1590; 'Greene's Mourning Garment, given him by Repentance at the Funeral of his only love,' 1592, and 'A Satyr against a Mill with a Million of Repentance,' 1592, which was published soon after his death by his friend and fellow-labourer Henry Chettle, and has been reprinted by Sir Egerton Brydges, 1813. One of his novels, 'Pandosto, the Triumph of Time,' otherwise called 'The Historie of Dorastus and Pseudis,' is the original of 'The Winter's Tale.' It was first printed in 1588, had reached a twelfth edition in 1735, and is reprinted by Mr. Collier in his 'Shakespeare's Library,' 1840. Greene's works were both prose and verse: 'the Harleian Miscellany.' All the prose works are interspersed with pieces in verse, which are by far the best parts of them. The style is their weak point: it is deformed by a close copying of Lilli's worst affectations; and although, in many places, we can detect the influence of the descriptions, and sometimes touching passages of narrative, yet nowhere in the tedious and perplexed mass do we find any reason for saying more of Greene's prose compositions, than that they are indifferent works written by a man of genius.

Gregorio, Rosa/Rio, born in 1763; he studied at Palermo, became a priest, and was made a canon of the cathedral of that city. He made himself known by his historical works, and was appointed especially to illustrate the history of his native country. In 1789 he was appointed Professor of Law in the University of Palermo. He was one of the first to suspect the imposture of the Maltese adventurer Vella, who had forged a pretended Arabic diplomatic code of the period of the Saracen domination in Sicily, and had succeeded in deceiving some men of learning, among others the Prelate Airoldi, who for a time patronized him. Gregorio having a strong suspicion of the imposture, applied himself to the study of Arabic, in order to be able to sift the whole matter; and the result was that he became convinced, and convinced others, of Vella's fraud, which was afterwards clearly exposed by the learned Hager, of Vienna, in a journey which he made to Sicily in 1794. He was the first to give an account of the following: 'Fundgruben der Orients.' In 1790 Gregorio published a collection of Arabic historical works and documents concerning the history of Sicily: 'Religiones Arabicae qua ad Historiam Sicilyae et Seculam spectant amplissima Collectione,' 1 vol., folio, which is dedicated to King Ferdinand. It contains, 1, Novisi's 'History of Sicily'; 2, an anonymous 'Chronicle of Sicily,' from a MS. in the Library of the University of Cambridge; 3, Sheebodin's 'History of Sicily'; 4, Extracts from Abulfeda's Annals which relate to the History of Sicily; 5, Al Khatibi's 'Chronological Series of the Dynasties of the Aglabides and Fatimides who ruled over Sicily'; 6, 'Historical Parallels of the Rulers of Sicily during the Saracenic Period'; 7, 'A Description of Sicily from the earliest times to the present'; 8, 'Several Histories in the Cafe Fargues, found in Sicily'; 9, 'A Dissertation on the Calendar used in Sicily under the Arabs'; 10, 'A Sketch of the Geography of Sicily during the same period'; 11, 'Biographical Notices of Arabian Writers, natives of Sicily.' The Arabic text of the historical works and documents is given with a Latin version, to which are appended copious notes by Gregorio. Some of the historical works had been previously published by Caruso, in his Bibliotheca Historica Regum Aquitaniae, but in that work the perfect and incorruptible text to Caruso, and of knowledge of Arabic. Having thus illustrated the Saracen period, Gregorio undertook to illustrate also that of the Arabo-Norman dynasty in Sicily, thus affording a connection to Caruso's work above mentioned, which ends at the death of the Vasa gliars; 12, 'Bibliotheca Scriptorum qui Rea in Sicilia gestarunt et Aragonum Imperio retulere, Eam ut Accessionem ad Historiam Bibliothecam Carusii Instructi, adornavit, atque edidit Rosarium Gregorii, 8, Panormitana Ecclesiasticus et
Dr. Hutton, he was appointed a mathematical master in the Royal Military Academy. In this situation he rose through the various gradations of office, and on the resignation of Dr. Hutton he filled the professor's chair with the highest reputation. He continued to study the subject with the same intense application to study, to resign it in June, 1836. The following is a list of his published works:—1793, Lessons, Astronomical and Philosophical, 1 vol.; 1801, Treatise on Astronomy, 1 vol.; 1805, New and Improved Astronomical Almanac; 1806, Treatise on Mechanics, 5 vols.; 1807, Translation of Huy's Natural Philosophy, 2 vols.; 1808, Pantologia, of which he was the general editor, and the contributor of about one-half; 12 vols.; 1810, Third volume of Hutton's Mathematical and Philosophical Papers, contributed about one-half; he afterwards edited an edition of the whole three volumes of the Course; also, Letters on the Evidence of Christianity, 2 vols.; 1815, Treats on the Trigonometrical Survey; 1816, Plane and Spherical Trigonometry, 1 vol.; also, Dissertation on Weights and Measures; 1817, Account of his Pendulum Experiments and Astronomical Observations made at Shetland: this appeared in the Philosophical Magazine; 1818, appointed editor of the Ladies' Diary, and general superintendent of the Stationers' Company's Almanacs; 1826, Mathematics for Practical Men, 1 vol.; 1839, Address to the Gentlemen Cadets of the Royal Military Academy, on resigning the chair of Mathematics; 1840, Hints to Mathematical Teachers, 1 vol.; and Tables to be used with the Nautical Almanac.

Soon after the publication of his excellent treatise on Mechanics, the University of Aberdeen conferred on him the title of L.L.D., but the work by which Dr. Gregory is best remembered is his Gentlemen's Diaries. This was an extensive sale. Dr. Gregory had the honour of being a member of almost all the learned societies in Great Britain and the continent, and was one of the twelve gentlemen who founded the Royal Astronomical Society, of which he was for some time the secretary. Gentlemen's Diaries brought him into communication with young students who were devout of distinguishing themselves in the exact sciences, and the period of his superintendence of those valuable works will be long remembered as that in which every meritorious author found a friend in the editor.

In 1828 Dr. Gregory was employed at Woolwich in making experiments to determine the velocity of sound. For this purpose he caused mortars, guns, and muskets to be fired at various distances from the observer; and his conclusion was that the velocity of sound, when not affected by the wind, is 1100 feet per second, when the temperature of the air is expressed by 35° (Fahr.), a result which agrees nearly with the results of experiments made at the same time on the continent.

Dr. Gregory's pleasing manners were completely in accordance with what might have been expected from the precepts of Christian virtue and the benevolence of feeling, and he was a man of unbounded charity. As a Christian, he was moral and devout, and as a scholar he merited and obtained the consideration of the first mathematicians of the day; his great zeal in his vocation, his parental kindness, his earnest and impressive admonitions, his entertaining, improving, and philosophical conversation, and his ever-readiness to assist, will be gratefully remembered by many. He took a warm interest in the cultivation of mathematics, said to be his dying wish; and his indefatigable perseverance, nearly the whole of his valuable life.

He died on Tuesday the 2nd of February, 1841, universally regretted by all who knew him, at his residence on Woolwich Common, in the 67th year of his age.

GRENADIERS are the tallest and strongest men of a battalion; they are embodied in one company, which is disposed at the head of the battalion when in column, and on the right flank when in line.

François, 1662, to 1667, four men, appointed during a siege to throw grenades into the covered way of a fortress, and to take the lead in an assault, were distributed in each company of that which was called the king's regiment (infantry); and three years afterwards these men were increased into a company:—one man in the regiment in the French service had a company or two companies of grenadiers, and the regiment of guards had three: they considered it a company of cavalry designated horse-grenadiers.
whose duty it was to repair roads previously to a march of the horse-guards and troops.

It is probable that men under the denomination of grenadiers formed part of an English army soon after the introduction of that class of soldiers into the French service; for, from a list of the commissioned officers of the army in 1684, it is apparent that three regiments of said grenadiers were attached to the three regiments of horse-guards; a corps of grenadiers was also attached to each of the three regiments of horse-guards; in 1693 these were formed into a troop, and in 1702 another troop was added. The English foot-grenadiers were at first probably employed in duties similar to those performed by the aforementioned regiment of grenadiers in the French service; for, in a work on the English military discipline (1886), they are said to be provided with muskets, swords, pouches to carry grenades, and hatches: with these last the grenadiers of the French army cut down obstacles in order to enable the troops to rush on the enemy.

The men in the first of the three regiments of foot-guards are now designated ‘Grenadier Guards,’ and the Scots Greys constitute a regiment of horse-grenadiers; in both of these regiments a high-born-skin cap is worn: but the men forming the grenadier companies of regiments of the line wear the same kind of caps, and, except slight peculiarities in the ornamentation of the brim and hat, they are clothed and armed like other infantry soldiers.

GREUZE, JEAN BAPTISTE, a celebrated French painter, was born at Tours in Burgundy in 1726. He was first instructed by London at Lyon; he studied also in the Royal Academy in Paris, under Jan Griffier, and in the Academy in London. Greuze’s pictures are illustrations of the affection or domestic duties, their observance or violation: he painted but one historical piece—Severus reprimanding his son Caracalla; portraits he painted frequently. Greuze is unique in the French school, and he is sometimes termed the Lachaussee of Painting, and also less appropriately, the French Hogarth. He was fond of exciting and pathetic scenes; the following are some of his most celebrated pictures:—a Father explaining the Bible to his Family; the Blind Man cheated; the Good Mother; the Paralytic Father; the Unnatural Father; the Village Bride; the Huntsman’s Return; the Broken Fitcher; the Little Girl and the Dog, ‘La Petite Fille au Chien’ by some considered his best picture; the Enfant au Capucin; la Dame de Charité; le Gâteau des Reis; la Fille Honteuse; la Bonne Education; la Paix du Ménage; la Prière à l’Amour; le Fils Punि, &c. &c., all of which have been engraved, and many by J. J. Flapirt and the elder Mannet; la Petite Fille au Chien, has been engraved by Ch. Porpotai.

Greze was long an associate or agréé of the French academy of painting, but as he was placed in the class of genre (du genre bas) painters, when he was elected a member, he was not allowed to sit in the gallery of that academy. He died March 21, 1805. In some early catalogues of the Louvre Gallery his birth and death are erroneously given as in 1794 and 1807 respectively; errors which are repeated in the notices of Greuze’s works in Waagen’s ‘Kunstwerke,’ &c. in Paris, but they have been corrected in later editions of the catalogue.

There are six pictures by Greuze in the Louvre—the Broken Fitcher; two companion pieces representing the departure from home and marriage of a prodigal or dissipating son, entitled in the catalogue, Le Depart et Le Retour; the former has been sometimes misnamed the Father’s Curse, owing no doubt to the very extravagant anger and attitude of the old man, who is one of the most spirited and characteristic pictures of the Village Bride. L’Accordéon du Village, which was purchased for the royal collection at the sale of the Marquis de Menars for 16,650 francs: the Marquis de Menars paid only 9000 francs for it. Greuze’s works, however, are increasing in value generally; yet he cannot be considered a great painter. His works have much truth of character, but nearly all his subjects are chosen from common life, and there is something generally theatrical in his treatment; they are however better as illustrations of character than as paintings. His brushwork is always most naturally correct and vigorous, but the intermediate modellings, except in the head, is feebie: he was very deficient in light and shade and colour, and his draperies want character, or indeed anything but a form; the heads are well modelled but generally extravagantly in expression.

(Gault de Saint-Germain, Les Trois Sicles de la Peinture en France.)

GREVILLE, SIR FULKE, afterwards LORD BROOKE, was born in 1654. He was the only son of Sir Fulke Greville, of Beauchamp Court, in Warwickshire. His mother was a daughter of Ralph Neville, Earl of Westmoreland. He became a fellow-commoner of Trinity College, Cambridge, but afterwards studied at Oxford. Having then travelled in Italy and on the continent, he was called to the English bar, and in 1683 was sent on a mission to France. He was also in France when his brother, Sir Philip Sidney, his distant kinsman and most cherished friend, were brought back by a royal messenger when they had already embarked to accompany Drake to the West Indies. Next year, 1693, Sir Fulke Greville, knighted in 1697, sat repeatedly for his native county in parliament, and continued to receive tokens of the royal favour till the queen’s death. King James was equally well disposed, bestowing on him Warwick Castle (which he repaired at a large expense); but he is said to have disagreed with Secretary Cecil, and did not obtain any new advancement till after that minister’s death. In 1615 he was appointed under-treasurer and chancellor of the exchequer; and in 1622 he was raised to the dignity of Viscount Greville at Beauchamp Court. Next year, resigning his post in exchequer, he became a lord of the bed-chamber. Soon afterwards he founded a history lecture in the university of Cambridge, endowing it with a hundred pounds a-year. On the death of his father, Fulke Greville, he was born, he had an altercation with an old serving-man, who, irritated by what passed, stabbed him mortally in the back, and then destroyed himself. Lord Brooke was buried in St. Mary’s Church, Warwick, under a monument which he had himself ordered, with this inscription— Fulké Greville, servunt to Queen Elizabeth, counsellor to King James, and friend to Sir Philip Sidney. Trophæum Poccini. He was never married.

Three volumes of his writings were printed after his death. 1. ‘Certain Learned and Elegant Works of the Right Honorable Fulke Lord Brooke, written in his youth and familiar exercise with Sir Philip Sidney,’ 1633, small folio. This volume contains three didactic poems (A Treatise of Human Learning, An Inquisition upon Fame and Honour, A Treatise of Wars), two tragedies on the model of Seneca (Alaham and Mustapha), Cecilia (being a collection of a hundred and nine small poems, called sonnets, though not answering to the name), and two prose letters, one of which is really a long moral essay. 2. ‘The Life of the Renowned Sir Philip Sidney; with the True Interest of England, as it then stood in relation to all foreign Princes,’ &c. &c., 1652, 12mo. 3. ‘The Remains of Sir Fulke Greville, and Lord Brooke, being the Works of Mr. Fulke Greville, both before, and after, 1693; with some few that were composed after, but not before, 1670, 8vo. All known copies of the volume of 1633 want the first twenty-two pages; and it has been conjectured that these contained the ‘Treatise on Religion,’ and the ‘Treatise on鐭ゥndramatic Poetry,’ which were not printed, as Mr. Greville himself ordered, with this enunciation—‘Fulke Greville, servant to Queen Elizabeth, councillor to King James, and friend to Sir Philip Sidney. Trophæum Poccini.’ He was never married.

Lord Brooke was likewise about being Sidney’s friend and of being the patron of Camden, Davenant, and other men of letters. His own literary fame, in modern times, has scarcely been equal to his merits. He is more remarkable, however, for power than for beauty of the literary style; he is not classical in his diction or for facility of language. His prose is lumbering and dissertative: his life of Sidney is a commentary, not a narrative. His rhymed tragedies too, in form as unadorned as those of his contemporary Sir William Alexander (to which they bear some resemblance), are in substance, indeed they are hardly so much as intelligible, as representations either of incident or of character. But even in them there is much of that which constitutes the charm of his didactic poem, the abridged enunciations of fact or of related metaphysical reflections. There could be culled from his works, and most abundantly from his noble ‘Treatise on Human Learning,’ a rich store of sententious and finely thought aphorisms, of the kind which sparkle at the lips of the present day. This poem contains several obligations. One of the lines oftenest quoted from the ‘Essay on Man’ is but an alteration of his line, ‘Men would be tyrants, tyrants would be gods.’ The pervading
fault is obscurantism of language, caused partly by an anxious straining after conciseness, partly by want of mastery over the mechanism of style. An imperfection that cannot be corrected by imitation of the conceptions which flowed in with such variety and vivacity upon his active and searching intellect. Southey had good reason for calling Lord Brooke the most difficult of our writers, and the best reason for recalling attention to his didactic poems.

GREY. CHARLES, second Earl GREY, was born March 13th, 1764, at Fallowdon, near Alnwick, in Northumberland. His family was enobled in the reign of Edward VI., and his great-grandfather, Sir Charles Grey, who had been a Whig, was a politician of great influence during the lifetime of the great Whig leader, Sir Robert Walpole. He died in November, 1707, in his seventy-ninth year.

Charles Grey was sent to Eton, and before he attained his sixteenth year he proceeded to Cambridge, where he remained about two years, and then passed over to the Continent and made the tour of France, Spain, and Italy, which occupied him about two years.

Mr. Grey's parliamentary career began in 1786, when he was returned as member for the county of Northumberland. In his youth he was too incomparably successful as a part of the political body of Mr. Fox. In these days it will perhaps be considered as inexplicable that his maiden speech in the House of Commons in 1787 was in opposition to Mr. Pitt's commercial treaty with France. He contended that its tendency would be to expose this country to the unmerited suspicions of other nations, and he had been associated in checking the long-cherished hostility of France towards this country; that the aim of France was to monopolize the trade with the recently revolutionized American colonies; that the powers of the House would prevent this ambitious plan, and that this was an exception to be made to the general policy of entering into commercial treaties with other nations.

In 1789, at the age of only twenty-four, he was selected as one of the managers to conduct the trial of Warren Hastings; and in the following year he was appointed one of the managers by the discussions on the Regency Bill. Notwithstanding his youth and the short time that he had been in parliament, he had already attained a position of considerable eminence, and a high reputation as a speaker, at a time when Mr. Burke, and Lord Sheridan were at the height of their fame as orators.

The opening scenes of the French revolution, and still more the future progress of that event, exercised for many years an absorbing influence over both the foreign and domestic politics of the time. The Whigs were agreed in their support of the interests of Mr. Fox. In these days it will perhaps be considered as inexplicable that his maiden speech in the House of Commons in 1787 was in opposition to Mr. Pitt's commercial treaty with France. He contended that its tendency would be to expose this country to the unmerited suspicions of other nations, and he had been associated in checking the long-cherished hostility of France towards this country; that the aim of France was to monopolize the trade with the recently revolutionized American colonies; that the powers of the House would prevent this ambitious plan, and that this was an exception to be made to the general policy of entering into commercial treaties with other nations.

In 1791, the French revolution was just beginning, and the country was divided into two parties, the constitutionalists and the federalists. The constitutionalists were those who wished to preserve the existing constitution, and to prevent any innovations that might tend to its destruction. The federalists were those who wished to see the constitution of the country completely changed, and to establish a new government on the model of the French revolution. Mr. Grey was a constitutionalist, and he supported the measures of the government that were taken to suppress the revolution in France. He was one of the managers of the Regency Bill, and he supported the measure of removing the king from the commons to the crown. He was also one of the managers of the impeachment of Mr. Pitt, and he supported the measure of impeaching the prime minister of the country.

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his public life had been spent in the House of Commons. In the House of Lords he and Lord Grenville were the leading Whig opposition. On this first act as a Whig he was to protest against the attack upon Copenhagen in the previous year.

In 1809 Lords Grey and Grenville were invited by Mr. Perceval to join his administration, which had been just formed, as Secretary of War, but the offer was at once declined. On the Prince of Wales being appointed regent, Lords Grey and Grenville prepared, at his request, the answer to be returned to the address of the Commons. But the prince, in the excitement, made use of it. Early in 1812 the regent addressed a letter to the Duke of York which he was authorized to communicate to the above two noble lords, in which he expressed a wish that 'some of those persons with whom the early habits of his public life were formed would strengthen his hands and constitute part of his government.' But as neither Lord Grey nor Lord Grenville could join the existing administration without a sacrifice of principle, it is needless to add that the prince's wish was not complied with. Again, on the death of Mr. Perceval, fresh negotiations were set on foot. The regent wished the cabinet to be composed of Lords Wellesley, Moira, Erskine, and Mr. Canning, and the terms offered to Lords Grey and Grenville were that they should be allowed to sit outside the cabinet, and that the number of ministers should be reduced from twenty to thirteen. If the terms were accepted, the cabinet would be composed of thirteen ministers. On the ground that an administration formed on this principle would be inconsistent with the prosecution of any uniform course of policy, these conditions were not accepted. Lord Moira was then employed in carrying on negotiations, at length, unsuccessfully; but the negotiations were broken off in consequence of Lord Moira not being authorized to make the power of removing the great officers of the household a part of the arrangement. Something having occurred which induced Earl Grey to believe that he was personally obnoxious to the regent, his lordship expressed his willingness for his friends to take office without him, and promised them his cordial support in parliament. The negotiations eventually terminated.

On the return of Napoleon from Elba, in 1815, Earl Grey was averse to hastily plunging into another war, and on this occasion he and Lord Grenville took opposite views. Earl Grey's character as a constitutional statesman never shone brighter than during the period of discontent and distress which the country experienced in the first few years after the peace. Force and terror appeared to be the main reliance of the government, but as Earl Grey had opposed this system when fear of the Liberal influence of the constitution was considered the worst evil, he was strongly urged that the natural means of removing the discontent of the country was to remove its causes. He therefore condemned the measures of coercion adopted by the government. He moved for an inquiry into the conduct of the government respecting what has been called the 'Manchester massacre,' and though the motion was rejected by 94 to 155, two members of the royal family, the Dukes of Kent and Sussex, voted with the minority. He was strongly opposed to the punishment of transportation for seditious libel, from its liability to become a means of persecution and proscription. Earl Grey took an active part in the trial of Queen Caroline, and in opposing the Bill of Pains and Penalties which had been brought in against her. The Act for the Emancipation of the Roman Catholics, which was passed in 1829, he opposed, and urged that the natural means of removing the discontent of the country was to remove its causes. He gave his support to Mr. Huskisson's measures of commercial reform.

When Mr. Canning became prime minister, early in 1827, he was supported by a large portion of the Whig party; but Earl Grey, so far from joining his party in this course, bitterly attacked Mr. Canning and treated with contempt his pretended liberalism. Himself the model of a severe and inflexible patron, with high connections and a lofty public character, he urged that if he required the support of a minority as a brilliant and dexterous adventurer. The only persons who listened with pleasure to this speech were men whose principles Earl Grey's public life had been devoted to oppressing; and one supporter of his ministry, a man engaged in politics from any other than a sense of duty and a lofty moral tone combined with a peculiar temperamental. This at the same time led him into a disast of popular opinion which was no less a feature of his character. In the same session he supported the amendment of the Duke of Wellington, which, whilst it won the support of the House of Lords, was defeated in the House of Commons. He was compelled to go into the country to support the ministry, and almost succeeded in turning the tables of the Commons by his speech supporting the bill. He knew how unpopular his vote on this occasion would be; but 'if,' he said, 'there should come a contest between this house and a great portion of the people, my part is taken; and with that order to which I belong I will stick, come what may.' On the death of Lord Grenville, virtually the last hour of my existence the privileges and independence of this House were maintained. The period was now approaching when, as the crowning act of his long political life, he would make the amendment of the representative system, the object for which his earliest energies had been exerted in unfavourable times. Up to 1830 the slightest measure of parliamentary reform had been resolutely denied. The Duke of Wellington, who was prime minister when the Parliament met which was elected after the death of George IV., affirmed, in allusion to something which Earl Grey had said, that 'the legislature and the system of representation possess the full and entire confidence of the country, and desperately possess that confidence. But the second revolution in France, which had just occurred, had given a great impulse to questions of political reform; a new reign and a new parliament had commenced under these influences; and the country generally was in a disturbed and rebellious state. If these circumstances did not yield to the influence of these circumstances and resigned office. Earl Grey was sent for by William IV. and requested to form a new cabinet. He announced as prime minister that 'peace, Retrenchment, and Reform' would be his objects. On the 20th of May, Sir John Russell, as the organ of the cabinet, introduced the first Reform Bill into the House of Commons. A brief history of this measure is given in William IV., P. C., vol. xxvii. p. 401. It was carried an important motion, which, it was considered by the cabinet, placed the Reform Bill in peril, and they immediately resigned office. The ministerial interregnum was terminated on May 17 by the return of Earl Grey to power. The independence of the House of Lords was then destroyed, and means were used, with the king's consent, to prevent the peers who were opposed to the Reform Bill from attending in their places to vote against it. This may have been an inconsistency in Earl Grey, who had so lately pledged himself in favour of the independence of the House of Lords; but he had to choose between successfully carrying out his plan of parliamentary reform and a violent political convulsion. On the 4th of June the Lords passed the bill by 106 to 22, and three days later of the House of Commons. The first Reform Parliament met on the 29th of Jan. 1833, and its first measures were the abolition of colonial slavery, the abolition of the East India Company's monopoly, the emancipation of Roman Catholics, and the transfer of property. The cabinet was early shaken by some personal changes. In March, 1833, Lord Durham was compelled to resign from illness. At the end of May, 1834, Mr. (now Lord) Stanley, Sir James Graham, the Earl of Ripon, and the Duke of Richmond, left the ministry on account of differences within their colleagues. Earl Grey had considered a Coercion Act necessary for Ireland, and a misunderstanding arose with Mr. O'Connell on the subject, which in July led to his lordship's resignation and that of Lord Althorp. Lord Althorp returned to office in about a week, but the cabinet, which no longer possessed the confidence of William IV., was dismissed in the following November, when Lord Althorp, by the death of his father Earl Spencer, was removed to the House of Lords. For some time after this date, he was out of office. Earl Grey occasionally attended the House of Lords, but the last ten years of his life were passed in retirement surrounded by a numerous family and honoured by the general respect and admiration of the country. He died at his seat, Howd House, in Northumberland, July 17, 1845, in his eighty-second year. The personal appearance of Earl Grey was stately and commanding; his action graceful and animated; and his voice strong, flexible, and sonorous. As a speaker his style was grand and pure, his manner firm and comprehensive. He rode on the 18th of November, 1784, to Mary Elizabeth, only daughter of the Right Honourable William Brabazon Ponsonby, afterwards first Lord Ponsonby, and by her he had two sons, whose names and offices were Lord Althorp, fourth of his daughters, survived him. Henry George, third Earl Grey, better known as Lord Howick, was for some time a member of Lord Melbourne's cabinet.
GRIAS, a genus of plants belonging to the natural order Myrtales. It has the tube of the calyx adhering to the ovarium; the limb small, 4-cleft, oblate; the petals 4, corose-cus; the stamens numero, inserted in a square disk; the filaments joined into 5 series at the base; the inner ones very short; the anthers kidney-shaped, Inull; the style wanting; the stigma cruciate, hidden in the incurred stamens; the fruit ovate, 8-surfaced, crowned by the calyx. There is but one species, G. cauliflora, the Anchovy pear. It is a tall little-branching tree with very long oblong leaves, and large white flowers, spotted on the outer many-petalled white and purple Cotes. It is native of subalpine districts of Jamaica in boggy places. The fruit is an ovate berry the size of an alligator's egg, and of a brownish russet colour, and is picked and eaten in the same way as the mango. It is believed by Linnaeus that the young plants must be kept in a moist heat. It grows best in a loamy soil, and may also be propagated by large cuttings placed under a glass in heat.

(Don. Gardener's Dictionary.)

GRIFFITH, WILLIAM, was born in the year 1810, and having been destined for the medical profession, he completed his education at University College, then called the London University. He distinguished himself in the medicinal class, and it was commonly said that he was the best physician of the class. Linley was the professor. He went out to India as an assistant-surgeon on the Maderas establishment, where he arrived on the 24th of September, 1832. Shortly after his arrival he was appointed by the Bengal government to examine the botanical gardens, and in 1835 Linley was selected to accompany Dr. Wallich into Assam for the purpose of reporting upon the growth of the tea-plant. From Assam he proceeded in company with Dr. Bayfield to examine the borders of the Indus. In 1835 he took up his residence on the extreme frontier of the eastern territories of Great Britain. In 1887 he was appointed to accompany Captain Pemberton on his mission to Bootan. Two years afterwards, in 1839, he was sent with the army of the Indus to examine the character of the vegetation of Afghanistan. In these several journeys he lost no opportunity of making observations and collecting objects in natural history. Although his appointments mostly had regard to his botanical knowledge, his reports, and letters written during his journeys, as well as his papers, show that there was little of interest to the naturalist that escaped his notice. In his travels he collected both plants and animals. In collecting plants he had the object in view of writing a Flora of India, and to this great work he never ceased to devote himself. Many of his zoological specimens have been sent to Europe, and have been described and published by various naturalists. He devoted much time to the fresh-water fishes of India, of which he made a large collection, and an account of which he gave in his "Flora of India, and Fossil Flora of the British Museum." At the time of his death his collection of birds consisted of about six hundred specimens, affording perhaps one of the most extensive and instructive illustrations of the geographical distribution of the birds of India extant.

Grifith was appointed to the duties of Medical Officer of Health at Malacca, and upon Dr. Wallich's absence owing to illness, he was appointed to the superintendence of the Botanical Garden at Calcutta, and the duties of the Professor of Botany in the Medical College. On the return of Dr. Wallich he resumed his place at Malacca, and was there seized with the disease of his liver, which terminated his existence on the 9th of February, 1845.

Griffith's was a life of promise rather than of fulfilment. He was born in England at a time when the blind deference which was paid to the authority of Linneaus as the end of botanical inquiry was beginning to pass away under the influence of the writing and teaching of the present professor of botany at Uppsala; and when the genius and profoundly philosophical views of Robert Brown were becoming appreciated by his countrymen. He saw the right direction of botanical investigation, and in the wide field for research which his residence in India afforded aimed at something which it would be better to term a denunciation of the old traditions of species. His life was too short to observe much, and his death-illness too rapid to afford opportunity for publishing many of the results of his observations. He has however left papers, the result of journeys and collections, which illustrate his extraordinary powers of observation, and throw much light on the subjects on which they treat. Of these papers those which are at present best known are three:—On the Ovulum of Santalum, Oviris, Lonanthus, and Viscum, in the 18th and 19th volumes of the Transactions of the Linnean Society. These papers consist of an account of a series of microscopical observations on the development of the embryo in the ovule of the plants named. [Emerton, P. C. S.]

During the last session (1844-5) of the Linnaean Society he contributed a paper on the structure and relations of the various forms of rhizanthem. In this paper he pointed out the relation of these plants to certain exogenous forms of vegetation, and advocated the abolition of the rhizanthem as a distinct class in the vegetable kingdom. This paper is not yet published. Amongst other contributions to botany by Griffith may be noticed:—A Memoir on the structure of Zuccaria and Azolla, in the 'Calcutta Journal of Natural History'; a description of two genera of Hamamelidales, two species of Podostemon, and one species of Kautiussia, in the 'Asiatic Journal'; on the mode of propagation, and a report on the tea-plant of Upper Assam, in the Transactions of the Agricultural Society of Calcutta.

The materials collected by Griffith for his work on the Flora of India, as well as his zoological museum, have been consigned to the Directors of the East India Company and it is to be hoped that they will not he entirely lost to science by the death of their able and indefatigable collector.

GRIMALDI, GIOVANNI FRANCESCO, called II GRIMALDI, Giovanni Francesco, a painter, born in 1660, was the pupil and relation of the Carracci. He was particularly excellent in landscape, both as a painter and an etcher: he etched some of the landscapes of Titian. He painted also history and portrait, and was employed by Louis XIV. of France and Charles VII. of France. He painted portraits in Paris, painting in the Louvre and in the cardinal's palace. He was also much employed by Innocent X. at Rome, in the Vatican, in the Palazzo Quirinale, and in the Church of San Gregorio. He was the son of Dosopo, according to Montucla, employed during several years in giving instruction in the belles-lettres; and during the latter part of his life he applied himself to the study of astronomy and optics. He died at Rome in 1680: Pietro Santo Bartoli married one of his daughters. His son Alessandro assisted him in some of his works; he was a good painter in a similar style as his father.

(Malvasia; Fedino Pittrice, Gandellini, Notizie Istoriche degli Intagliatori; Lazi, Storia Pittorica, &c.)

GRIMALDI, FRANCESCO MARIA, an Italian philosopher, and a member of the order of Jesuits, was born at Bologna, in 1619. His education being counteracted, he was, according to Montucla, employed during several years in giving instruction in the belles-lettres; and during the latter part of his life he applied himself to the study of astronomy and optics. He died at Bologna, in 1689, in the forty-fourth year of his age.

Grimaldi was associated with Riccioli in making astronomical observations, and he gave particular descriptions of the spots on the moon's disk. It was asserted by Montucla that he was the discoverer of the first, which is now known by his name. There are now distinguished among astronomers; thus superseding the names of the mountains and seas of the earth which had been given to them by Herelles: but this is apparently a mistake.

That which has given celebrity to Grimaldi is his work entitled 'Physico-mathesis de Lumine, Coloribus, et Aride alliasque annexis,' which was published at Bologna, in 4to., in 1665. The greater part of the work consists of a tedious discussion concerning the nature of light; the conclusion of which is that light is not a substantial but an accidental quality; the rest, however, possesses the highest interest, since it contains accounts of numerous experiments relating to the interferences of the rays of light. A description of the work is given in the 'Philosophical Transactions' for that year.

Grimaldi, having admitted the sun's light into a dark room, through a small aperture, remarked that the heathens of the East, to avoid such a light, covered their eyes with cloths. In the sun's light they found that the rays of light were much greater than they would have been if the rays of light had passed by them in straight lines. He observed also that the circle of light formed on a screen by the rays passing through a very small perforation in a plate of lead was greater than that of the sun, and of the sun's diameter divergency of the rays; and he arrived at the conclusion that the rays of light suffer a change of direction in passing near the edges of objects: this effect he designated 'diffraction.' By Newton it was subsequently shown that the waves of light were of a very extraordinary length, which are the causes of the interference of the rays of light. He found that the shadow of a small body was surrounded by three coloured streaks or bands which became narrower as they receded from the centre of the shadow; and, when the light was strong, he perceived similar coloured bands within the shadow: there appeared to be two or more of these, the
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number increasing in proportion as the shadow was further from the body.

Having admitted the sun's rays into a room through two small circular apertures, Grimaldi received the cones of light on a screen beyond the place where they overlapped each other; and he observed, as might be expected, that the rays emerging from both apertures fell, the screen was more strongly enlightened than it would have been by one cone of light; but he was surprised to find that the boundaries of the penumbral portions which overlaid one another were darker than the corresponding portions in which there was no overlaying. This phenomenon of interference was, at the time, enunciated as a proposition:—‘That a body actually enlightened may become obscure by adding new light on it, as these birds (sea-fowl) that are already recently caught.'

Grimaldi also observed the elongation of the image, when a penelle of light from the sun is made to pass through a glass prism; but he ascribed the dispersion of the light to irregularities in the material of which the prism was formed; and he was far from suspecting the different refrangibilities of the rays. The discovery of this fact, which has led to so many important consequences in physical optics, was reserved for Newton.

(Physique Universelle; Mercuri, Histoire des Mathématiques.)

GRISTHORP BAY, a locality on the coast of Yorkshire, famous for the occurrence there, more remarkably than elsewhere, of numerous Cycasoid plants, Lycopodites, Ferns, &c.

GROATS, or Grits. [AVENA, P. C. S.]

GROS, ANTOINE JEAN, BARON, one of the most distinguished of the recent French painters, was born at Paris in 1799. He was a pupil of David, and, like many other historical pictures are in the dry manner of that painter. One of his first works of note was Bonaparte on the bridge of Arcola, in the celebrated battle of that place, exhibited at the Louvre in 1801. In 1804 he exhibited his celebrated large picture of the Plague of Jaffa, with Bonaparte visiting the sick, to whom he has given a most disgusting appearance, though the whole displays great vigour and power: it is now at Versailles: there is a large print of it by Laugier. He painted also several other large pictures:—the Battle of the Pyramids; Napoleon visiting the Field of Elyau, after the battle; the Battle of Wagram; the Capture of Madrid by Napoleon; and other subjects from the history of France during the eventful years of the early part of this century. His masterpiece, however, is considered the Coupole of St. Genevieve, at Paris, executed in oil, in 1824, and for which he was created Baron; it exhibits the saint as guardian of the throne of France, which is represented by Clovis, Charlemagne, and Louis the XVL His celebrated, and gorgeously effective, it belongs strictly to the school of ornamental art: the drawing is correct, and the colouring is florid, but the composition and expression are very ordinary.

The pictures of Gros generally are conspicuous for vigour and finish, and though they are sometimes somewhat coarse, sometimes in treatment as well as handling; they show little or no delicacy of feeling, and they are quite void of all pictorial refinement of tone and modelling, and are equally void of sentiment. Perhaps Sappho leaping from the promontory of Leucta, on the Island of Leucas, may be considered an exception to his prevailing style: there is a good print of it by Laugier. His picture also of the Visit of Francis I. and Charles V. to the Abbey of St. Denis is executed in a very sketchy style to his battle-pieces and similar large works; it has been admirably engraved by Forster. This and the Battle-field of Elyau are in the Louvre. Gros has painted also some excellent portraits.

He died at Paris, June 26, 1835. He was professor of painting at the Ecole Royale des Beaux Arts; member of the Institute; officer of the Légion d'Honneur; and knight of the order of St. Michael.

(Gabin, Dictionnaire des Artistes de l'Ecole Françoise, au dix-huitième siècle. Réveil et Duchenne, Musée de Peinture et de Sculpture, &c.; Notice des Tableaux exposés dans le Musée Royal, 1841; Kuntzthall, 1836.)

GROTIUS, WILLIAM, was born in 1583, at the Hague. He was the younger brother of Hugo Grotius, who directed his studies, and always behaved towards him with the greatest kindness. William Grotius became a learned and prosperous lawyer. He died at the Hague in 1692.

William Grotius collected and published at Leyden, in 1617, the Latin poems of his brother, in 12mo. He him-
This is suited to two-thirds... but the mixture is moistened with pure urine and re-dried. Even genuine guano differs so frequently in quality, that it is never advisable to give the proportion the above table for substitutes. PURCHASERS are often deluded with false analyses, and those who deal only with importers are not always safe. Dr. Uro advises the farmer before he buys to obtain an analysis of the competent chemist, and then to cork up a sample in a bottle, and in the future order his guano from this particular source. But even then he is in a better position for obtaining satisfaction for any fraud which may have been practised upon him. Farmers' clubs might retain a respectable chemist at a salary on condition that he visits the factories for the members at a moderate fee. This is what in effect is done by the Agricultural Chemistry Association of Scotland, and the consequence is that scarcely a single sample of adulterated guano has been offered for sale in that country.

Artificial guano may be easily compounded by an admixture of the constituents of natural guano, all of which, with the exception of bone-dust, may be procured of any druggist. Professor Johnson gives the following recipe for an artificial manure which will produce an effect equal to one cwt. of natural guano—78 lb. bone-dust, 25 lb. sulphate of ammonia, 14 lb. of pearlash, 25 lb. common salt, 2 lb. dry sulphate of soda; total, 132 lb.

The following artificial substitute for guano has been successfully used, at the rate of 3 cwt. per acre—

Bones... dissolved in spirits of turpentine in oil of vitriol... charcoal powder... charcoal... Sulphate of ammonia... (gas salt)... Common salt... Gypsum... Vermiculite... Sulphate of soda (cubic petre)... Sulphate of soda (Glanber salis)... Sulphate of magnesium (Epsom salis)... 158 lb.

It said that 4 cwt. of guano, which is the usual quantity applied to one acre, are equal in effect to fifteen tons of farm-yard dung. Mr. Lawes, an experienced agricultural chemist, gives the following table of the constituents of these two quantities—

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<th>Guano</th>
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</thead>
<tbody>
<tr>
<td>Phosphate of lime</td>
<td>112 lb.</td>
<td>Ammonia</td>
<td>54</td>
<td>Organic matter</td>
<td>171</td>
<td>Pozas, soda</td>
<td>90</td>
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<td>Dung</td>
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<tr>
<td>Phosphate of lime</td>
<td>100 lb.</td>
<td>Ammonia</td>
<td>100</td>
<td>Organic matter</td>
<td>8505</td>
<td>Pozas, soda</td>
<td>250</td>
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Experiments have been made, the results of which showed that 3 cwt. of good Peruvian guano were equal to twenty tons of good farm-yard dung; but much more is required to be known of guano and other hand-tillages recently introduced, before their exact value can be fully settled; and this can only be ascertained by extensive experiments under every variety of local circumstances. The question may also arise, whether guano and other stimulating fertilizers do not exhaust the land while they produce great immediate results. This has been the remark of a writer from California, according to a statement recently published, and though such deterioration of the soil is comparatively of little consequence where there is abundance of wild land, the state in which guano leaves the soil is an important consideration in a country like England. There are other possible considerations of the real nature of which little is present known; but it may be sufficient to allude to some analyses undertaken in 1844, by the Agricultural Chemistry Association of Scotland, in which it was found that turnips raised on dung and guano present remarkable differences in their chemical constituents; and it was further ascertained that the cattle which fed on the dung-grown turnips thrive more rapidly. In the application of guano one should be taken to prevent its coming in contact with the seed. The guano must be mixed with three times its bulk of finely pulverized earth, burnt clay, mineral ashes, &c.; but for cold soils the proportion of guano may be increased, and the quantity to be applied per acre may vary from two to four cwt., according to the nature and quality of the soil. It is important that rain should follow guano, and it is intended to be used per acre to two or three portions for some time, after which the part of the crop most favourable are not always determined. For small allotments or gardens it is often most convenient to use guano in a liquid state, in which case 4 lb. of guano may be mixed with twelve pints of water, and expect that after it has stood twelve hours, and the proportion per acre may be from a half to one cwt. of guano to 100 gallons of water.

In the year ending the 5th of July, 1844, the quantity of guano imported into the United Kingdom was 56,028 tons, which would cost nearly 300,000. It is said that Dr. Regnault's experiments in the application of guano to a grass carpet were attended with success. These experiments had been conducted with the most minute care, and the grass carpets were richly covered with beautiful verdure. But, as Dr. Regnault says, nothing is certain a priori—nothing is a priori certain. (Supplement to Rahn's Dictionary of the Farm; see also Journal of the Royal Agricultural Society; Journal of the Highland and Agricultural Society; Gardiner's Chronicle, edited by Dr. Liddle)

GUERIN, PIERRE NARCISSE, BARON, a distinguished French painter. He was born at Paris in 1774, was the pupil of J. B. Regnault. His works are too many to be enumerated in imitation of the antique; they display notwithstanding great skill and perseverance. By antique manner in painting is meant what may be termed a literal translation into colour of the common methods of the ancient Greek sculptors and bas-relieves, without giving them life or motion; such pictures are evidently paint, and sometimes have the effect of a show of painted statues, in which each figure is independent of its neighbour. The works of Guerin may be justly censured for this defect, even more so than those of David; it is perhaps more obvious in the works of Guerin, as his subjects are mostly antique and in antique costume. The following are his principal works:—The first which attracted general attention was 'Marcus Sergius,' painted in 1798, which escapes the proscriptions of Sulla, returns, and finds his daughter weeping by the side of her dead mother: exhibited in 1798: in 1802, he exhibited an Offering to Eucleus, and Hippolytus accused by Phaedra, brought before Theseus; in 1808, Bonaparte pardoning those who had revoluted at Cairo; in 1810, Pyrrhus and Andromache, and Cephalus and Aurora; in 1817, Dido listening to the story of Eneas, Egestus urging Clytemnestra to murder Agamemnon, and St. Genevieve. All those works have been engraved; the Cephalus and Aurora by Forster: this subject is suited to Guerin's style, and it is one of the most beautiful of his works; it is in the Sommaria collection. Eneas recounting the fate of Troy to Dido, likewise engraved by Forster, is a gorgeous and elaborate work; painted in costume and accessories; it wants chiaroscura, and has the defect already noticed in the highest degree; every thing is of the same substance and texture; it wants dramatic effect wholly; Eneas is not relating nor is Dido listening; it is a mere reproduction of an elaborately painted figures, Eneas, Dido, Ascanius, and Anna: it is now in the Louvre. The following five works are also in the Louvre—Marcus Seretus, Phaedra and Hippolytus, the Offering to Eucleus, Clytemnestra, and Andromache. The 'Revoile du Caire' is at Versailles. Guerin was appointed a professor in the Ecole Royale des Beaux-Arts, in 1814; and he was some years director of the French Academy at Rome: he was created Baron after his return from Rome in 1829. He was elected a member of the Institute in 1833, whither he had returned for the sake of his health, which was delicate. He was member of the Institute and many foreign academies, and chief of the Legion of Honour. (Gabet, Dictionnaire des Artistes de l'Ecole Francaise au XIXe. Siecle; Revell and Duchesne, Musée de Peinture et de Sculpture; Notice des Tableaux exposés dans le Musée Royal, 1841.)

GIERSEY. Since the publication of this article in the 'Penny Cyclopedia' some very important changes have taken place in the laws and constitution of that island. In the year 1884 a petition, signed by several hundred rate-payers, was presented to the Chief Justice, praying for a correction in the law of wills and inheritance. According to the then existing law, chiefly derived from the old Norman code, real property descended as follows: two-thirds of it were divided

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among the sons, and one-third among the daughters, with a reservation that in no case could a daughter's share exceed that of a son. The eldest son had the additional privilege of choosing about half a verge of land (about one-fifth of an English acre), estimated as naked ground, and consequently he might select in the different parts of the estate the most valuable buildings. This right was termed 'le Preciput.' In particular cases, likewise, all the sons were together entitled to the twentieth part of the estate, called 'La Vingtienne,' in addition to their own legal portion, and if two sons were to die, leaving no heir to the third, the estate passed to the other two. The sons could not inherit real property from a brother or sister, so long as there were other brothers or their descendants living, and, as real property could not be left by will, cases of occasional hardship occurred. This last circumstance gave rise to the principle of the dual inheritance. Thus, to the principal points contained in it were sanctioned by the States of the island, and on the 3rd of August, 1840, an order of the Queen in Council was registered on the records of the Court, which materially modified the law of real property in Guernsey. The following are the most important changes:—The right of 'vingt-\-tienne' was abolished for all sons who had not attained their fourteenth year when the law was passed. The eldest son's right to the 'preciput' was continued, subject, however, to a certain limitation. If there was no heir, the obligation to take it in a single enclosure, even should that enclosure not contain the quantity of land usually assigned as a 'preciput.' In collateral succesions to inherited real property, neither males nor their descendants shall inherit from their descendants, but the relatives of both sexes belonging to the line whence the property descends, shall divide the estate by branches, in the same proportion as in the direct line. In collateral succesions to personal and purchased real property, neither males nor their descendants shall exclude females nor their descendants, in parity of degree, but the nearest of kin to the deceased, in parity of degree, both males and females, shall share the property in the same proportion as if it had been the property of this nature, whether personal or real, would be shared in succession of the direct line. Ascendants, having no descendants living, shall inherit the personal and purchased real property of the last of their descendants.

Consistent with these changes in the law of inheritance was a reform in the law of wills. The feudal law, which was till lately that chiefly guided the division of property in the island, was opposed to the principle of wills. By the ancient law, a person who left neither wife nor children, could dispose by will of all his personal property, but he could never give more than one-third of his real property by deed of gift during his lifetime, whether he had inherited or purchased it; under no circumstance could he leave, by will or purchase, any real estate to his wife. At present, however, while none of his personal property may be bequeathed to his wife, if he leaves no children, she is entitled to one-third of his real estate. The law is not only about one in eighty-three; each one of the last four generations is the chief cause of this low rate of mortality; it nearly resembles that of the coast of the south-west of England, the prevailing winds being westerly, though the east wind is frequent in spring. The weather in winter is moderate; and during winter the snow, and frosts of long continuance are rare. The mean winter temperature has been ascertained to be about 41° F., which is 5° 11' higher than that of London; that of the summer at 60° 7', which is about 1° lower.

In the town of St. Peter's Port a Mechanics' Institution was established in 1831; it has now nearly 300 members, and its library contains upwards of 3000 volumes. The savings-bank has a rapidly increasing number of depositors; the total amount of investments was 20,678 pounds sterling on 20th September, 1845, being 82,392l., divided among 3137 depositors. There are also two well-established joint-stock banks, conducted chiefly on the Scotch system, and issuing one pound notes; every individual shareholder is, by the law of the island, liable to the loss of all his property. The shipowners established in 1838 a mutual insurance society, and the amount of shipping insured during the present year is 84,870l. Some idea of the increasing wealth of this island may be formed from the fact that in the year 1740 the total amount of property taxed in the town of St. Peter's Port was only 21,694 quarters, which represents a capital of 457,360l.; the highest tax was rated at 600 quarters, or 12,000l., belonging to a single individual. Whereas in 1845 the total capital of the island was about 2,387,000l., of which 3,007,100l. was the highest individual tax being rated at 1600 quarters, or 32,000l. It must moreover be borne in mind that the above does not represent the full amount of property, as a great number of persons having only seven or eight quarters are not rated.

The annual net revenue of the States in 1843 was 7554l.; raised chiefly by a duty on spirituous liquors of one shilling per gallon. There is however a debt incurred of about 2000l., the greater part of which sum has been expended on public buildings.

The state of trade is not at present very flourishing, and in that respect this island is very far behind its neighbour Jersey. In the year 1844 St. Peter's Port possessed 125 vessels, the largest carrying 2928 tons, and the smallest 30 tons. The foreign trade consisted of 26,414 imperial quarters of foreign wheat imported, and 11,317 exported. There is almost daily steam communication between the Channel Islands and the port of Southampton, from whence the English mail is conveyed three times a week, and those
of Plymouth and Torquay, and also between St. Maloes and Granville in France.

The grant is paid to agriculture, and many improvements have been introduced by means of an agricultural and also a horticultural society, established, the former in 1816, and the latter in 1822; the land is divided into a large number of freehold estates, many of not more than four or five English acres in extent; and the rents are very moderate, being about forty. Long leasehold tenure is unknown, but a great part of the land is heavily burdened with a species of irredeemable mortgage peculiar to the Channel Islands.

There are apparently high grants to be said to average from 5l. to 7l. the English acre; building-ground near the town is sold at very high prices; in the town itself it has been known to fetch at the rate of 30,000l. the English acre. Owing to the care taken in the cultivation the produce is great; as much as twenty bushels of wheat has been raised on an acre. The ashes of sea-weeds is the manure chiefly used for corn crops; the cost of manuring with it is about 2l. 10s. the English acre.

The ecclesiastical condition of the island has likewise undergone a favourable change. A new district has been formed out of the town parish, in which a church, dedicated to St. John, together with a residence for the minister, has been built by subscription, the district now forming a perpetual curacy. In each of the other parishes there are churches.

The parish church of St. Peter's, which, in point of internal architecture, is considered one of the finest in the diocese of Winchester, consists of a chancel, nave, north and south aisles and a tower; it was supposed to have been built at the commencement of the fourteenth century, and the style is the later Gothic of France, termed 'le Flamboyant'; several of its fine windows have lately been restored: it is capable of containing about 1200 persons. There are also parishes: St. Peter's, H. the Port, besides these two churches, three other churches or chapel of ease, and a licensed room. The value of the livings in the island has been increased by a grant of the crown of 100l. to the parish clerk; he may also allow himself the rent of 5l. to 6l. a year, as they have been granted to the country parishes; and the tithe on fish has been commuted to 20l. for the parish of St. Michael's-in-the-ale, and 10l. for each of the other parishes, except St. Andrew's, which does not border the sea. The present annual income of St. Peter's Port may be estimated at about 400l.; that of the country parishes varying from 170l. to 100l. per annum. Baptismal fonts have within a few years been erected in every parish church; the surplice in reading the Liturgy is now universally in use in town, and also in some of the country churches. Since the Reformation, the first confirmation was held in 1818. The present bishop of the diocese has already visited the Channel Islands on four occasions, and each time has administered the rite of confirmation and held a visitation of the clergy. The Church of England is involved in the same denomination; there are nine dissenting places of worship in town, besides chapels in every parish in the island, also a Roman Catholic chapel, and a meeting-house of Friends.

The last Lord de Guernsey, as were also Major-General Le Marchant and Sir Isaac Brock, the former of whom fell at Salamanca, and the latter in Canada: to these names may be added Sir Edmund Andros, governor of Virginia in 1651; the late Rev. P. P. Dore, regius professor of Greek, at Cambridge; Sir John Jeremie, governor of Sierra Leone; and Dr. John Macculloch, F.R.S.


GUEVINA. [XYLONCE, P. C.]

GUILDSHALL, London. [DANCE, P. C. S.]

GUN. A description of the principal varieties of fire-arms, both large and small, with notices respecting the dates of patent, &c., and the number of the patents. A number of engraved plates, and a description of the manufacture of great guns. We shall here supply a notice of the manufacture of the smaller kinds of fire-arms, to which the names of musket or musquet, fowling-piece, rifle, &c., are applied.

The rise of the gun-manufacture in Birmingham, which is principally found in the center and surrounding parts, dates from about the commencement of the eighteenth century. Hutton, in his 'History of Birmingham' (pp. 78, 79, of the edition of 1781), relates that, according to tradition, King William III. was extremely lamenated by the arms used by the Spaniards in his last campaigns, but that he was obliged to procure them, at great expense, and with greater difficulty, from Holland; that Sir Richard Newdigate, one of the members for the county, who was appointed to bring in a bill that guns might be procured in England, was a patentee of various gunsmiths, and that he made the only patent the king would listen to, in accordance with the king's wishes. The king being pleased with the remark, the manor posted to Birmingham, where the pattern was executed in such a manner as to give entire satisfaction. Large sums were expended, and the guns were at last only repeated, that, to quote Hutton's quaint expression, the manufactories never lost their road. From notices in Macpherson's 'Annals of Commerce' it appears that about 1787 the manufacture was prosecuted with great activity for the supply of foreign markets, the manufacture of Birmingham guns for the African market being estimated to give employment to between four and five thousand persons. By one of the strange perversities of taste, of which many examples may be found in the history of manu factor-y, the guns produced at Birmingham were preferred to those marketed in Birmingham, notwithstanding the well-known fact that Birmingham was the chief seat of the manufacture. The Birmingham manufacturers were thus enabled to sell their goods at a much higher rate than when, in 1813, a bill was brought into the House of Commons to compel every manufacturer of fire-arms to mark them with his real name and address, they took the alarm, petitioned against the bill, and instantly subscribed a large sum to defray the expense of opposing it, urging that they made the component parts of the London guns, which were, in fact, only put together and marked in the metropolis. The bill was defeated, and shortly afterwards the Birmingham gun-makers were allowed to mark their guns, after being subjected to the proof required by the Board of Ordnance, with a distinguishing stamp. Holland, in the work referred to at the close of this article, gives some curious information respecting the extent of the gun-manufacture of Birmingham, both during the protracted war in which England was involved at the commencement of the present century, and more recently, when English artificers have been employed to meet the demands of foreign states. From his statements, founded upon authentic authorities, it appears that more than two-thirds of the firearms made for the Board of Ordnance were supplied from Birmingham, and that the stands of arms manufactured there for the British government in the years 1812 and 1813 amounted respectively to 268,741 and 920,643.

This district is poor; and at the last census it was ascertained that the Birmingham manufacturers produced a musket per minute, which is not an extravagant assertion, seeing that, supposing the work to be carried on for sixteen hours every day in the year, Sundays excepted, they deliver guns at the rate of 300,240, or rather under the number supplied to the government alone in 1813. The contract price at that time was 35s. a gun; but with the peace came a great falling off in the demand, which led many gunsmiths to abandon the trade, and caused a great reduction of price. In 1819 the Birmingham gun-makers contracted with the French government for the supply of 140,000 stands of arms at the price of about 18 francs, or rather under 2s. per gun, and even that price, which was offered by Holland, was not accepted; it was repeatedly stated by M'Culloch and others, that between the years 1804 and 1818 Birmingham supplied to government and the private trade nearly 5,000,000 fire-arms; and Barlow, quoting from authentic documents, shows that between 1808 and 1816 the number of fire-arms received annually by the British government amounted to 3,297,716 muskets, 118,103 carbines, 27,895 rifles, and 208,266 pistols. In 1813 our allies alone were furnished with 500,000 muskets.

Before proceeding to notices respecting the most interesting features of this manufacture, it may be well, to prevent misapprehension, to quote Mr. Doid's remark, in the work referred to below, that in the great seat of the gun manufacture 'there is no such trade as a gun-maker, properly so called, in the world.' Where there are, as we have shown, however large they may be, being devoted to the production of parts only of a gun. 'The same gun,' observes this writer, 'travels about from factory to factory, from shop to shop,
before it assumes its finished form; and the only person who could consistently be called a gun-maker is he who has the gun finished by putting the several pieces together.'

The most essential part of a gun is the barrel, or cylindrical iron tube, closed at one end, in which the explosion of the gunpowder is produced, and through which the ball or shot is projected. The interior of the barrel, which is technically called the bore, is usually a perfect and smooth cylinder, but the exterior is made slightly conical, in order that the thickness of the metal may be increased towards the breech, or closed end, where the explosion is the greatest and where, consequently, greater strength is required than towards the muzzle, or open end. The very severe trials to which the barrel of a gun is exposed in use, and the fearful results which ensue without a proper knowledge of the defects, is the highest degree of importance to use none but iron of good quality in the manufacture, and to work it in such a way as to render the chance of failure as remote as possible.

Military muskets generally, and the cheaper descriptions of other guns, have their barrels formed of tenacious soft iron, which is wrought or rolled into the form of flat bars, called skelps, each of which is sufficient to form a single barrel. The length of a skelp is usually about three feet, and the breadth along its length is one inch and a half, which, in the form of a tube, has increased in thickness or substance to form the breech of the barrel, but gradually tapering to about two inches and a half at the other end, is reduced to form the muzzle. Until about the year 1811 skelps were usually manufactured by means of the forge hammer, and it caused the tubes to which their weight and regular gradation from the thicker to the thinner end, the workmen employed in forging them were able to command good wages. In the above year, however, in consequence of a patent being granted to Forgers for drawing these skelps, and increased by the exorbitant advance of wages, a method of fashioning them by rollers was introduced, it occurring to the inventor, according to Babbage's account, 'that if the circumference of the rollers between which the bar-iron was rolled, were to be equal to the length of a skelp, or of a musket barrel, and if also the groove in which the iron was compressed, instead of being of the same width and depth throughout (as in the ordinary manufacture of bar-iron by rolling), were cut gradually deeper and narrower from the entrance to the muzzle, until to the same point, then the bar-iron passing between such rollers, instead of being uniform in width and thickness, would have the form of a skelp.' The experiment succeeded, not only in effecting a great saving of labour, and rendering the manufacturers independent of the refractory workmen, but also in producing skelps of superior quality. 'The pure metallic particles, according to Holland's account of this invention, for which a patent was obtained by a Staffordshire ironmonger, were not always in the same condition as in bars, or in skelps, but rather an amalgamation of particles, sometimes called edgways and flatways at the same time, cohers more closely together; nor are the skelps so liable to iron or flaws as those which are edged up in a less hot state under a forge-hammer.' The barrels made of them are said also to turn considerably smaller than those formed by the old method. In the old method of welding the skelps into barrels, the thicker end was first heated to redness, and then hammered upon a groove or hollow cavity in the anvil until the edges were turned up. A mandril being then inserted in the cavity between them, the edges were turned over and welded together by the hammer. By the repetition of this process, up a length of two or three inches at a time, the skelp was gradually converted into a tube or barrel, each of the lengths thus secured being of the same section. In this state the skelps, with alternating high and low heats, the latter being intended to correct defects occasioned by the former. Several attempts were made to substitute the action of machinery for this process, without the necessity of being occupied in hammering the edges together, which, if successful, would have caused the completion of a large contract which was then being executed to be attended with a very heavy loss. A method which had been patented some time before this invention was one of theS. Jones, James and Jones, and described by Holland, the power was applied by a series of automatic hammers. Little, however, was done in bringing any such process into operation until a combination was found among the weilders, which was at that time employed in the manufacture of the kind of barrel called twisted, of which there are many varieties. In all of these the material of which the barrel is composed is rolled or forged into narrow bars, about equal in thickness to the intended substance of the tube, and so as to be separated from each other by slightly less than three-eighths of an inch to an inch or more. One of these narrow rods or ribands of metal, being moderately heated to increase its pliability, is wrapped spirally round a cylindrical mandril about the size of the bore, and in this state of being coiled together is wound on a fife, which may be slipped off the mandril at pleasure. As the rods are not usually made of sufficient length for one to form a barrel, several are usually joined end to end, those which form the breech being thicker and stronger than those in the middle, the length being only a coil of metal somewhat resembling, on a large scale, the kind of spiral spring employed by bell-hangers as a check-spring. It is then heated to welding heat, and forged into a solid or continuous tube partly by hammering upon a mandril, and partly by what is termed forming, or striking the end of the
barrel upon the floor, by which the edges of the helical or spiral rod are brought into very close contact, and eventually incorporated together. Many successive heats are, of course, necessary in this operation, and the welding proceeds only two or three inches at a time.

The manufacturers of the various kinds of twisted barrels are minutely described in Greenreer's works, entitled 'The Gun;' or a Treatise on the various descriptions of small fire-arms, and 'The Science of Gunnery, as applied to the use and construction of fire-arms,' especially in the first mentioned work. The use of iron of many varieties is also illustrated in the treatise on the various kinds of iron employed. From these it appears that considerable difference has arisen from the circumstance that, as the progress of science has enabled manufacturers to produce articles of greater value and utility, so little attention has been paid to the various kinds of iron employed. The appearance of iron in the various forms and states of manufacture is well described in the treatise on iron.

The common twist of the ordinary steel, the common scrap iron and steel, which consists of fragments of such articles when broken or worn out, and which is much sought after by the makers of gun-barrel iron, is very inferior to what was procurable a few years since. Even horse-nails, that is to say, the nails employed for fixing horse-shoes, and which when worn out are collected with avidity as furnishing one of the best descriptions of scrap-iron, under the name of horse-nail stubs, are now difficult to be procured of the quality required for making gun-barrels, since many of those used in this country are now made of malleable cast-iron, and a few such mixed with others would spoil the iron for the purposes of the gunsmith. Wire-twist is the technical name given to an excellent kind of twisted barrel, which by some ingenious contrivance is able to incorporate a small portion of the surface of the barrel, will, upon the application of a corrosive liquor which acts differently upon the two metals, present a fibrous or wavy appearance. In forming a barrel of such rods care is taken that the adjoining edges of the spiral be alternately composed of iron and steel, so that the pattern may have a uniform appearance, although the difficulty of welding is thereby increased.

Damascus barrels, or rather such as are manufactured in this country under that name, are composed entirely of steel, the rods are twined upon their own axes until their component fibres or lamins have from twelve to fourteen turns in an inch, and the rods are thereby doubled in thickness and proportionately reduced in length. Two such rods are welded together side by side, their respective twists being reversed. Barrels made of rods of Damascus iron have a very pretty appearance; but, as Greenreer observes, the metal is considerably weakened by the excessive twisting of its fibres, on the same principle, though not to so great an extent, as the iron employed by the native Indians. In illustration of this point Greenreer gives illustrations in the results of numerous experiments made by him on the cohesive strength of various kinds of iron. Stub barrels are formed of horse-haul stubs, cleaned to brightness by friction in a machine, and mixed with an equal quantity of wrought iron, worked into little bits resembling the stubs. These stubs and scraps are wedged compactly into a hoop or ring, which holds them together while they are exposed to welding heat in a furnace, and welded at the contact mass called a mould, which is drawn out by rollers into the narrow strips required for making twisted barrels. Greenreer states that the usual proportions of this compound metal are fifteen pounds of steel to twenty-five pounds of iron-stubs; but he thinks the proportion of steel may be increased or lessened by the best quality of iron-stubs. He states that iron-stubs of steel alone have frequently failed owing to its hardness. 'It is not,' he observes in 'The Gun,' 'sufficiently tenacious of itself, from its fineness of grain, to resist the sudden expansion or contraction of the steel strip.' These remarks were published in 1836, and in the second work above mentioned, published in 1841, Greenreer states that much progress had been made in the use of steel since 'The Gun' was published. Stub Damascus is a very beautiful kind of iron formed like the Damascus iron above described, but of stub-iron instead of wire.

The same subject is treated of in a work entitled 'The Principles of Gunnery,' by W. P. C. S., No. 66.

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We may here refer to a paper communicated to the Society of Arts in 1825, and published in their 'Transactions,' vol. xix., pp. 105-108, which contains an account of the process of making the large brass and iron blades of imitation of those made at Damascus; from which it appears that these barrels are manufactured of iron hoops, obtained from European and chiefly from British casts.

The more they are corroded by rust, the more highly are they prized by gunsmiths; and, as the hoops of these iron barrels are exposed to moisture until they become so. Being cut into lengths of about twelve inches, they are formed into a pile an inch or an inch and a half high, the edges being laid straight, and their upper edges are twisted, or, as they say, turned, as to return over each end, and hold the pile together while in the fire. After being heated the pile is drawn or forged out to a bar about an inch wide and one-third of an inch thick, which is doubled up in three or more lengths, welded together, and again drawn out before, this operation being repeated three or four times according to the degree of fineness required. The bar is then heated, a small portion at a time, and hammered on the edge so as to flatten it out the contrary way to that of the stratification, by which operation the wire or vein is brought out on the face of the strap or riband of iron. 'The barrel is then forged in the usual way, but,' Captain Bagnold states, 'much more jumbling is used than in the English method, in order to render the twist more dense.' This operation is a practice of covering the part exposed to the fire with a late composed of mud, clay, and the dung of cows or horses, in order to guard against any unnecessary oxidation of the metal. When the barrel is wrought to the proper size, the hoop or barrel from one to five days either in vinegar or a solution of the sulphate of iron, until the twist is raised; this process is called the wire-twist. 'To produce the curl,' he further states, 'the bars or straps are drawn out to bars about three-quarters of an inch square, and twisted, one towards one and others to the left; one of each sort are then welded together, doubled up and drawn out as before; and upon the experience of the workman, any intricacy of twist is produced by this drawing or twisting. Thereafter, and from this point it will be observed, resembles that of English workmen, as also does a piece of trickery which Captain Bagnold mentions, consisting in rough-filing a common English barrel, and welding a strap of Damascus iron spirally round it, or applying several such straps longitudinally to make the twist greater; it is a fraud which must be severely condemned as impairing the barrel in a similar way to the attempted union of iron and steel above alluded to. It is important to notice that the iron used will impair the quality of the metal itself. It also describes numerous ways, often very ingenious, in which frauds are committed by unprincipled gunmakers, to avoid not only the increased cost of the superior kinds of metal, but also the increased charges for labour in almost every department upon barrels of Damascus iron, and the iron is wrought to such extent as even be introduced into the heart of rods or bars of Damascus iron, by which, owing to the different expansive powers of the two metals, the gun will be impaired more than by the mere flux of a metal being wrought to the twist.'

The great amount of welding required in twisted barrels requires a very large fire, and Greenreer states that several hours should be spent in forging inferior barrels before the fire can be brought to a fit state for welding. London barrel-forgers do not attain such perfection in this operation as those of Birmingham, because they do not generally make the inferior barrels necessary to bring the fire into a good state. The junction of the several lengths at the end in which the twist is wrought is often effected by cutting each off in a sloping direction, and leaving them to be joined in the general welding operation; but it is better to weld them together before the twisting is completed. After welding the barrels are reheated to a welding heat, a few inches at a time, and hammered in a...
groove to the required size. Sometimes they receive a subse-
quent grinding to make them look as fine as possible; but
though this improves them much, it is often neglected.

After welding the barrels are very carefully examined, and
if needful, straightened by a few blows of the hammer. Holl-
and states that their soundness is tried also, by placing
one on the other, and hammering one end against the
other end, until the barrel is full of water, when, if there
be any crack or flaw extending through the substance of
the metal, it may be detected by the appearance of moisture
on the outside of the barrel. In order to keep the barrel
regular plug of tempered steel [Boring Instruments, P. C. S.,
p. 282], which is caused to revolve rapidly within the barrel,
a stream of cold water being directed upon the outside to
check the heat generated by the excessive friction of the tool.
Greenner gives the rules to be observed for this pur-
pose, as Dr. Ure has represented in the *Dictionary of Arts.*
The outside of the barrel needs also to be made smooth
and even, which was formerly done by applying it to the surface
of a large grindstone, the workman allowing the barrel to roll
slowly through his hands, so as to present every part of the
surface successively to the stone; but this process is now in a
great measure superseded by turning in lathes, a method which
claims great economy, as well as superiority in point of accu-
rate, and the advantage of doing away with a most unpleasant
some business, and one by no means unattended with danger.

In a lathe it is easy to ensure the perfect concentricity of the
inner and outer surfaces of the barrel, and the perfect rotun-
dity of the rim, which, when the grinding of the sides of the
gun were often very unequal in thickness, one side being in some instances nearly twice as
thick as the other. In all cases it is advisable to forge the
barrels as nearly as possible to their intended dimensions, in order
that the first and of the barrel be more easily and
smoothly ground. Grinding the sides of the barrel is often
done by coarse sand, which has been
condensed by hammering, may have to be removed. After
the first or rough boring the interior is fine-bored with an
instrument having but one cutting edge, which is kept to its
work by strips of soft wood attached beside it. Generally
speaking barrels are bored with a perfectly equal cylindrical
bore; but some gun-makers prefer enlarging the bore a little
towards the breech, under the idea that the consequent con-
traction of the muzzle will cause the shot to fly more closely.
The bore of the barrel is finished by a wire, or a screw-thread,
to receive the breech-plug, which closes it at that end, and
forms the abutment for the explosive force of the powder,
and in which, in many cases, is formed the chamber to hold
the powder, and the narrow passage by which that chamber
is connected with the touch-hole. The best form of this chamber,
and of the connection with the touch-hole, is a matter
upon which gun-makers differ widely.

The barrels are then ready for proving, which consists in firing
the barrels with shot, which is made of castor oil and
oil, with a charge four or five times as great as they will
have to bear when in use. A great number of barrels are fired at once, by laying them upon a strong framework of
wood, the tops of which are covered with a train of powder which is conducted outside the building,
within which is laid a heap of sand to receive the bullets.
Greenner, who considers the present mode of proving to be
very unsatisfactory, and recommends, among other improve-
ments, the testing of barrels by the hydraulic pump or press,
states that common barrels are so fixed as to prevent any
recoil in proving, while twisted barrels are allowed to fly
back into a mass of sand laid at the back of the frame, by
which the security and accuracy of the test is very much
lesser. Common barrels, he says, are allowed to lie twenty-
four hours in the proving-house untouched, in order that,
by the action of the nitre in the gunpowder, any crack or flaw
may be rendered visible. They are then carefully examined,
and such as show any defect, or have bulged with the explosion,
are returned to be reforged, after which they must be proved
again, while such as have stood the test satisfactorily are
stamped with a distinguishing mark. Notwithstanding the
strictness with which they are required to be thus
tested, Greenner thinks that in many cases the proof-mark is
forged, and states that sometimes a chest is committed by
welding unproved tubes on to piston barrels which have been
proved, so as to convert them into gun-barrels, for the sake of
saving the expense of proofing the other barrels. For this rea-
son, according to Greenner, they should not be mounted with
the bores perfectly parallel with each other, but slightly con-
verging, so that their line of fire may meet at a given dis-
tance; but opinions differ as to the best inclination or degree
to which the bore is to be curved.

The wooden stocks upon which the barrel or barrels are
mounted is most commonly made of walnut-tree, though bird's-
eyes maple and a few other woods are occasionally used. This
wood is preferred both on account of its toughness, and its
deendency to depend upon the metal fastenings by which they are con-
ected together. Great care should be taken to adapt the
weight, length, and curvature of the stock to the person for
whom it is intended. Greenner observes that it is very common
to find wood stocks full of knots and crooked; and Colonel Hawker, in a passage quoted by Hol-
land, says that the 'length, bend, and casting of a stock must,
of course, be fitted to the shooster, who should have his mea-
sure for them as carefully entered in his gunmaker's books
as that for a suit of clothes on those of his tailor.' He has
then, the colonel adds, only to direct that his guns may be
well balanced, to do which the maker will introduce lead in
proportion to their weight; so, that on holding each of them
flat on the left hand, with the end of the feather spring about
half an inch from the little finger, he will find a sufficient
equilibrium to make the gun rest perfectly steady on
the hand. When the shaping of the stock is completed, it is
lined with soft felt, and the rifle and ornaments are let into the wood, and every part is fitted with
suitable screws and fastenings, after which the whole is
removed to pieces; the woodwork is finished by staining and
polishing, the brasswork is filed and polished, and the barrels
are sent to be proofed in water, which is also

When intended to be bright externally, barrels are filed
all over with smooth files, and then polished with a steel
burnisher. Military muskets were formerly polished in this
way, but the time and labor involved in smoothing
proved so harassing during service, that the Duke of Welling-
ton, during the Peninsular war, dispensed with it, and
allowed the muskets to be browned. Of the various methods of
browning or staining barrels we may notice two, in the
first of which, as described by Holand, the steel
always consists of half an ounce of nitric acid and sweet spirits
of nitre, one ounce of spirits of wine, two ounces of blue vitriol,
and one ounce of tincture of steel. These ingredients are
mixed, the vitriol being previously boiled with water
to make, with the other fluids, a quart of mixture. The barrel,
being first thoroughly cleaned from grease and dirt, and having
the muzzle and vent stopped up with wood, is wetted all over
with this mixture, applied with a sponge or rag, and then ex-
posed to the sun or heat of the fire, as twenty-four
hours at least, by holding it in the hands. Afterwards is
rubbed with a hard brush to remove the oxide formed on the surface.

These operations may, if requisite, be repeated two or three
times, until the barrel becomes perfectly brown. It is then
washed thoroughly, while the stain is still wet, with cold
water, which holds the principal color of alkali matter in solution, in order
that the further action of the acid mixture may be prevented.
The barrel is then dried, rubbed smooth with a burnisher of
hard wood, and heated to about the temperature of boiling
water, after which it is coated with a varnish composed of spirits
of wine, one quart; pulverized dragon's blood, three drachmas;
and bruised shell-lac, one ounce. When this dry the barrel
is finally rubbed with the burnisher to give it a smooth glossy
face. The burnisher is next washed with cold
brown or stain, and is recommended by Greenner as one of the
best preventives of fraud in the manufacture of twist barrels,
since it brings out the grain or pattern in a way which, to say
the least, it is not easy to imitate. For producing it, the bar-
rels are anointed with a little vitriol, which is washed
off, and the surface rubbed dry. A forge fire is then lighted
and blown up, with coals containing as much hydrogen gas
and as little sulphur as possible. When the coals are burnt
up, one pulls out the ladle with his hand, and, while the smoke
is yet rising from it, the barrels are passed gradually backwards and for-
wards through the flame until they are covered with a black
sooty covering. They are then placed for eighteen hours in
a damp cool cellar, by which the iron particles will become
imbedded in the varnish, and thus the stain will not
float off their coat. The rust and soot being brushed off with a brush of
steel wire, the barrels are washed and polished with a linen
cloth dipped in water and fine washed emery, by which the
two metals become very distinct, the iron being dark and the

steel bright and polished. After drying, the smoking is repeated, and the barrels are left in the cellar for twelve hours, and treated as before; and thus the process is repeated until the barrel becomes as dark as may be wished, the darkest colour attainable being a fine purplish-black on the iron, with a coppery deposit on the surface.

The progressive steps in the invention of the fire-lock, or 'that contrivance attached to the breech of a gun by which the powder in the touch-hole is ignited, are noticed under Arms. In England, the earliest forms of the flint-lock, manufactured before 1500, first became obsolete in the seventeenth century. It has been said that the flint-lock was not then as perfectly adapted to the use of a proper fire-arm as the hammer-lock is to the present day. This is not altogether correct, for the hammer could not be prepared until the hammer had been knocked off the barrel.
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