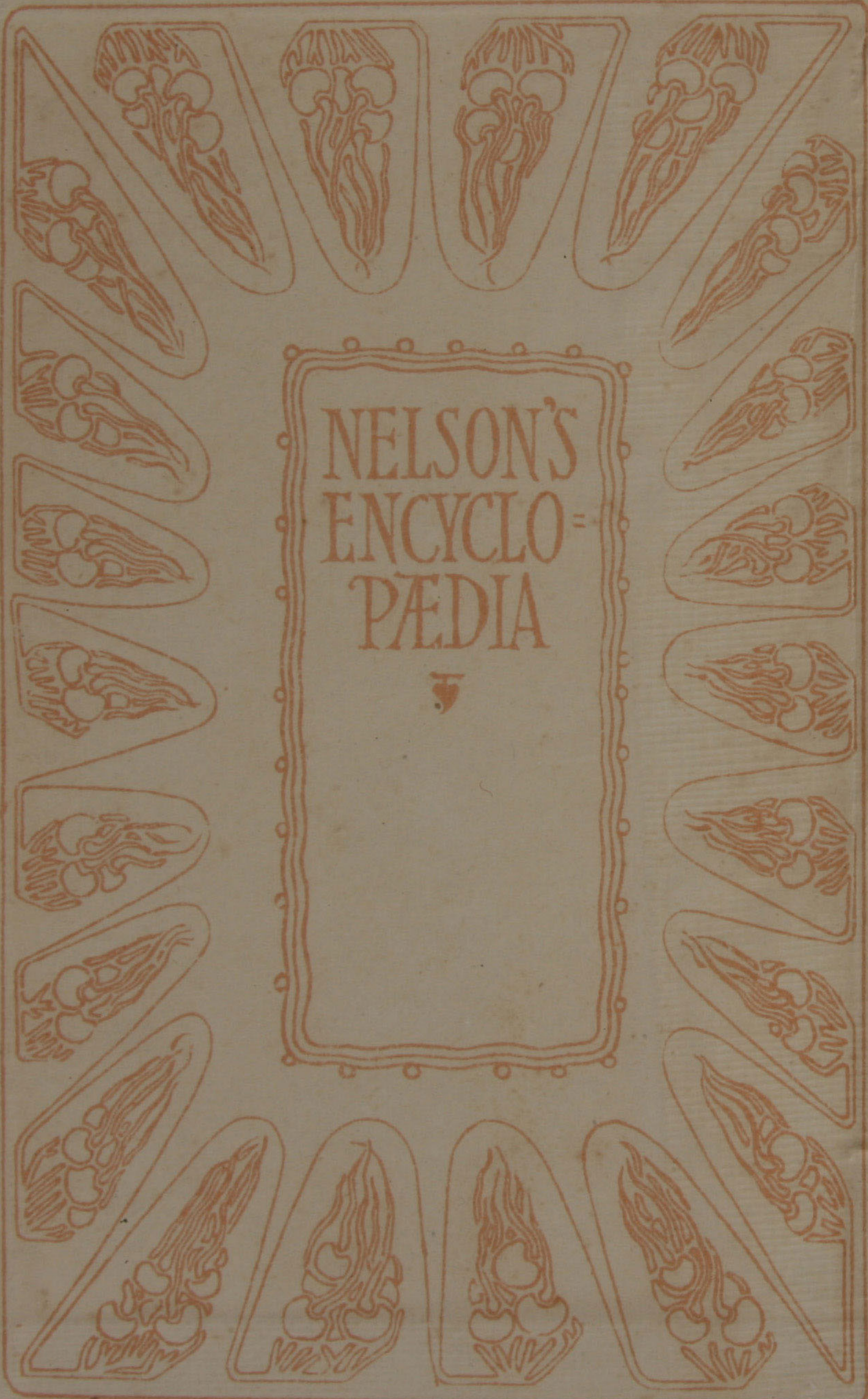


NELSON'S  
ENCYCLO-  
PÆDIA







NELSON'S ENCYCLOPÆDIA

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VOL. V.

C—Chazy



NELSON'S  
ENCYCLOPÆDIA

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THOMAS NELSON AND SONS

LONDON, EDINBURGH, DUBLIN, LEEDS

PARIS, LEIPZIG, AND NEW YORK





## LIST OF CONTRACTIONS USED IN THIS WORK.

|                                    |  |   |
|------------------------------------|--|---|
| <b>ac.</b> , acres.                | <b>Gr.</b> , Greek.                                  | <b>stn.</b> , station.  |
| <b>agric.</b> , agricultural.      | <b>Heb.</b> , Hebrew.                                | <b>s.v.</b> , under the word.   |
| <b>alt.</b> , altitude.            | <b>I.</b> , <b>isl.</b> , island.                    | <b>Syr.</b> , Syriac.   |
| <b>anc.</b> , ancient.             | <b>ibid.</b> , the same.                             | <b>temp.</b> , temperature.   |
| <b>ann.</b> , annual.              | <b>i.e.</b> , that is.                               | <b>terr.</b> , territory.   |
| <b>Ar.</b> , Arabic.               | <b>in.</b> , inches.                                 | <b>trans.</b> , translated.   |
| <b>Aram.</b> , Aramaic.            | <b>Ital.</b> , Italian.                              | <b>trib.</b> , tributary.   |
| <b>arr.</b> , arrondissement.      | <b>Lat.</b> , Latin.                                 | <b>U.S.A.</b> , United States of<br>America.  |
| <b>A.S.</b> , Anglo-Saxon.         | <b>lat.</b> , latitude.                              | <b>vil.</b> , village.  |
| <b>aver.</b> , average.            | <b>l. bk.</b> , left bank.                           | <b>vol.</b> , volume.   |
| <b>bor.</b> , borough.             | <b>lit.</b> , literally.                             | <b>W.</b> , west.   |
| <b>bur.</b> , burgh.               | <b>long.</b> , longitude.                            | <b>wat.-pl.</b> , watering-place.   |
| <b>c. (circa)</b> , about.         | <b>m.</b> , miles.                                   | <b>yds.</b> , yards.  |
| <b>cap.</b> , capital.             | <b>mrkt. tn.</b> , market-town.                      | —   |
| <b>cf.</b> , compare.              | <b>Mt.</b> , <b>mts.</b> , mount, moun-<br>tain, -s. | <b>Railways</b> — <b>C.R.</b> , Cale-<br>donian Railway;  |
| <b>co.</b> , county.               | <b>munic.</b> , municipal.                           | <b>C.P.R.</b> , Canadian Paci-<br>fic Railway; <b>G.E.R.</b> ,<br>Great Eastern Railway;  |
| <b>Com.</b> , Commission.          | <b>N.</b> , north.                                   | <b>G. &amp; S.W.R.</b> , Glasgow<br>and South - Western<br>Railway; <b>L. &amp; N.W.R.</b> ,<br>London and North-<br>Western Railway;   |
| <b>comm.</b> , commune.            | <b>N.T.</b> , New Testament.                         | <b>N.B.R.</b> , North British<br>Railway, etc., etc.  |
| <b>cub. ft.</b> , cubic feet.      | <b>O.T.</b> , Old Testament.                         | <b>Bibliography</b> — <b>Biog.</b><br><b>Dict.</b> , Biographical<br>Dictionary; <b>Encyc.</b><br><b>Brit.</b> , Encyclopædia<br>Britannica; <b>Proc.</b><br><b>Royal Geog. Soc.</b> , Pro-<br>ceedings of the Royal<br>Geographical Society; |
| <b>Dan.</b> , Danish.              | <b>par.</b> , parish.                                | <b>Jour.</b> , Journal; <b>Hist.</b> ,<br>History; <b>Mag.</b> , Maga-<br>zine, etc., etc.  |
| <b>dep.</b> , department.          | <b>parl.</b> , parliamentary.                        |   |
| <b>dist.</b> , district.           | <b>Per.</b> , Persian.                               |   |
| <b>div.</b> , division.            | <b>pop.</b> , population.                            |   |
| <b>Du.</b> , Dutch.                | <b>Port.</b> , Portuguese.                           |   |
| <b>E.</b> , east.                  | <b>prov.</b> , province.                             |   |
| <b>eccles.</b> , ecclesiastical.   | <b>q.v.</b> , which see.                             |   |
| <b>ed.</b> , edition; edited.      | <b>R.</b> , <b>riv.</b> , river.                     |   |
| <b>e.g.</b> , for example.         | <b>r. bk.</b> , right bank.                          |   |
| <b>Eng.</b> , English.             | <b>R.V.</b> , Revised Version.                       |   |
| <b>episc.</b> , episcopal.         | <b>ry.</b> , railway.                                |   |
| <b>est.</b> , estimated.           | <b>ry. jn.</b> , railway junction.                   |   |
| <b>et seq.</b> , and following.    | <b>S.</b> , south.                                   |   |
| <b>F.</b> , Fahrenheit.            | <b>Sans.</b> , Sanskrit.                             |   |
| <b>fort. tn.</b> , fortified town. | <b>seapt.</b> , seaport.                             |   |
| <b>Fr.</b> , French.               | <b>Sp.</b> , Spanish.                                |   |
| <b>ft.</b> , feet.                 | <b>sp. gr.</b> , specific gravity.                   |   |
| <b>Ger.</b> , German.              | <b>sq. m.</b> , square miles.                        |   |
| <b>gov.</b> , government.          |  |   |



# NELSON'S ENCYCLOPÆDIA.

## Vol. V.

### C

**C.** Before the 3rd century B.C. there was no distinction between C and G; they were one letter, with the original value *g* (see G), and the later value *k*. After G came into use, C was left with the value *k*. With this sound it passed to Britain, and it is still so used in Welsh. But *k* is a sound very liable to change, under the influence of a consonantal *i*, which tends to slip in after it (dialectic English *cyar* = 'car'). Hence C in the alphabets derived from the Latin (English, French, German, Italian, etc.) has acquired a number of different sounds, such as *tsh*, *ts*, *sh*, *s*. In the English name it is now pronounced *s*, and this is generally its sound before *e*, *i*, and *y*; it is a value largely due to French influence after the Norman conquest. Other English sounds are *z* and *sh* ('sacrifice,' 'officiate').

*Ch* is used in the alphabets derived from the Latin to express various sounds originating in *c* = *k*. In phonetics it is best to use it for spirant *k*, Greek  $\chi$ , its value in German and Welsh (cf. Scottish 'loch'). Its principal English value is that found in 'church,' and is due to Old French influ-

ence. The modern French value also appears in English ('machine').

The form of C has varied very little since it was distinguished from G. Regarding *ç*, see Z.

C, in music (called on the Continent DO or UT), is the tonic of the 'natural' scale—*i.e.* that which has neither sharps nor flats. The key of C minor flattens E and A.

**C.A.**, chartered accountant.

**Caaba.** See KAABA.

**Caacate**, or CAACATI, tn., prov. Corrientes, Argentina, 77 m. S.E. of Corrientes. Pop. 5,000.

**Caa'ing Whale.** See CA'ING WHALE.

**Caazapa**, tn., S. Paraguay, 180 m. S.E. of Asuncion. Pop. 12,000.

**Cab.** A kind of gig called a cabriolet (its springing motion was supposed to resemble that of a kid) was in existence about the middle of the 17th century in Paris, and by the middle of the following century cabriolets came into general use. The original vehicle was a hooded gig on two wheels, with room inside for only one passenger, beside whom sat the driver. In the beginning of the 19th century an effort was made to introduce cabriolets into Britain, to supersede

hackney carriages. It was not until 1823, however, that licences were obtained for cabs. At first their number was limited to twelve. These were of an improved pattern, with a folding hood, and seated for two passengers, the driver being separated from them by a partition. In 1832 all restrictions were removed, and cabs came into popular favour. In 1836 a cab on four wheels, the precursor of the brougham, was introduced, and from this our present four-wheeler, or clarence, is descended. In 1834 a patent was taken out for an improved two-wheeled safety cab by Mr. Hansom, the architect of Birmingham town hall. The safety consisted in an arrangement of the framework which prevented the cab tilting backwards or forwards in case of accident. These cabs had a small body, hung between wheels of over seven feet diameter; but two years afterwards a fresh patent was obtained for an improved hansom, on the lines of the present vehicle. Great improvements have taken place both in the hansom and the clarence as regards smartness, lightness, and convenience. By means of a folding framework cover both may be used open or closed, and since the introduction of india-rubber tyres a remarkable degree of smoothness in running has been attained. Cabs in Great Britain are mostly under police or municipal regulation in the matter of fares, stances, etc., each town having its own by-laws on the subject. Motor cabs were first introduced in 1897, but they failed to pay. They have since been reintroduced into London, and are rapidly superseding every other form of conveyance. They are run on the taximeter principle. In 1909, at the instigation of Lord Rosebery, a fund was started to train cabdrivers to be chauffeurs of taxi-cabs. The

taxi-cab is now a familiar institution in the large cities. See LONDON—*Traffic*.

**Cabal**, a secret understanding between the members of a clique or party, and by transference denoting the clique itself. Charles II.'s cabinet was (1667-73) styled the 'Cabal,' not only because the term was considered peculiarly appropriate, but also because the initials of the noblemen forming the cabinet (Clifford, Ashley, Buckingham, Arlington, Lauderdale) made the word *cabal*. See *Political History of England*, vol. viii. (1910), and *Cambridge Modern History*, vol. v. (1908).

**Caballero**, FERNAN, pen-name of CECILIA FRANCISCA JOSEFA BÖHLDE FABER (1796-1877), Spanish novelist, of German parentage, until recently one of the most popular novelists in Spain, and largely read in England. Her best-known work is *La Gaviota*—'The Seagull' (1867); *Clemencia* also is well known. Her work is valuable for its true and vivid portrayal of Andalusian life and manners, and its genial humour. Although not so popular as *La Gaviota*, the *Cuadros de Costumbres Populares Andaluces* (1852; Eng. trans., *National Pictures*, 1882) is probably her most attractive book.

**Cabanatuan**, tn., Nueva Ecija prov., Luzon, Philippine Islands, 50 m. N. of Manila, on the Rio Grande de la Pampanga. Pop. 7,000.

**Cabanel**, ALEXANDRE (1823-89), French artist, born at Montpellier; studied painting under Picot, and in 1863 became professor at the Ecole des Beaux-Arts, Paris. His works include *The Agony of Christ*, *The Death of Moses* (1852), *The Christian Martyr*, *Michelangelo*, *The Birth of Venus* (1863), *Adam and Eve*, *Death of Francesca da Rimini* (in the Luxembourg, Paris), and *Scenes from the Life of St. Louis* (in the Pantheon,

Paris). But he was chiefly famous for his portraits of women of the French aristocracy.

**Cabanis, PIERRE JEAN GEORGES** (1757-1808), French physician and writer, was born at Cosnac, Charente-Inférieure. After being physician to Mirabeau, he was appointed clinical professor in Paris in 1797, and became a member of the Council of the Five Hundred, and, under Napoleon, of the Senate. His *Rapports du Physique et du Moral de l'Homme* (1802) is imbued with the ideas of Locke and Condillac, and exercised considerable influence at the beginning of the 19th century. He also wrote several books of medicine—e.g. *Coup d'Œil sur les Révolutions et la Réforme de la Médecine* (1804).

**Cabatuan, tn.**, Panay, Philippines, prov. of and 15 m. N.W. of Iloilo. Pop. 16,000.

**Cabbage.** The Greeks and the Romans ate cabbage both as a boiled vegetable and raw as a salad. Eaten in the raw state, cabbage leaves were supposed to ward off drunkenness and post-prandial headache. The cabbage (*Brassica oleracea*) is native to Britain. Gerard describes a number of varieties—white cabbage cole, red cabbage cole, swollen colewort, double colewort, rape cole, and others. It is a mistake to plant cabbages for home use in soil too heavily dressed with manure. Cabbages often do well when planted out in soil that has been deeply dug and well manured for a previous crop, the roller being run over the ground before planting the young cabbages.

Of spring cabbages, excellent varieties are dwarf early spring, earliest of all, Mein's No. 1, and flower of spring. These should be sown, not too thickly, in finely prepared soil, in two batches, one about the middle of July, the other about the middle of August, the young plants being planted out

about the end of September. The varieties named may be planted about 12 in. apart in the rows, 15 in. being allowed between the rows. Plant very firmly, especially when the soil is light. In autumn the stems should be earthed up well into the lower leaves, choosing dry weather for the process. Good varieties of summer cabbage are Kelway's placebo, matchless, and main-crop. These should be sown early in May, and planted out into rich, well-dug soil. If rapidly grown, they will furnish vegetables from the end of July to October. Of autumn cabbages may be named the rosette and the hardy green colewort. They should be sown about a month later than the members of the last-named class, and may be had for the kitchen from October to January. To carry on the supply from the time when the autumn cabbages fail to the time when the spring varieties begin to come in, we have a class of winter cabbages, of which St. John's Day, Christmas, drumhead, and St. Martin are among the best. They should be sown just before mid-summer, and are fit for use from Christmas to March. Savoy cabbages, sown in April, May, and June, may be made to yield a succession from September to April. Good varieties are Tom Thumb and green curled for early use, and perfection for the winter supply. For pickling purposes the dwarf blood-red cabbage is excellent. This should be sown early in the spring, and planted out 15 in. apart every way.

**Cabbage Butterfly**, a name sometimes given generally to butterflies of the genus *Pieris*, but applied especially to *P. brassicae*, the large white form so common in gardens in summer. The eggs are laid on the under surface of the leaves of cabbages and other cruciferous plants, and hatch in

about a fortnight, giving rise to bluish-green larvæ. These are exceedingly voracious, and very destructive to the host plants. When full fed the larvæ quit the host plant, and pupate on walls, trees, etc. The autumn brood remains in the pupa stage till spring, and then hatching gives rise to the early butterflies, whose offspring form the butterflies of full summer. In fine seasons there may even be three generations, for the rate of development depends upon the weather.

**Cabbage Fly** (*Anthomyia brassicæ*), a dipterous insect which in appearance closely resembles the common house fly. The larvæ attack the stalks of cabbages and other vegetables, and often cause great destruction. Other closely similar species infest radishes, lettuce, etc., the genus being a very large one.

**Cabbage Moth** (*Mamestra brassicæ*), one of the Noctuidæ, or owlet-moths, whose larva is often very destructive to cabbages. It lives concealed in the centre of the vegetable, and destroys the heart. Like its allies, the adult moth has numerous hairs on the head and prothorax, and is nocturnal in its habits. The allied 'hill-grub,' the larva of *Charæas graminis*, is very destructive to the grass of upland pastures.

**Cabbage Palm, or CABBAGE TREE** (*Euterpe oleracea*), a native of the W. Indies, where it often attains a height of 100 feet, is a handsome tree with a trunk free from the remains of the leaf-sheaths of dead leaves. The cabbage palm grown in Britain must have plenty of heat and a rich soil. The terminal bud and the interior of the stem are edible, pickled or boiled.

**Cabbala** (from Heb. *qabbālāh*, 'what is received,' 'tradition'), an ancient Jewish system of religious philosophy or theosophy,

said to have been given by God to Adam. According to some, the system was lost at the time of the Babylonian captivity, but was subsequently revealed to Ezra; and it has been held that the famous cabbalistic volume *Sohar*, a mystic commentary on the Pentateuch, was the work of Simon ben Jochai (A.D. 72-110). Dr. Ginsburg and others, however, believe that, for the purpose of opposing the philosophical system of Maimonides, the Cabbala was founded by Isaac the Blind and his disciples, Ezra and Azariel of Zerona, between 1200 and 1230 A.D. Some of its dogmas are akin to Christian tenets, and it was influenced in a considerable degree by Greek Neo-Platonism. The chief contention was that God is without end, and boundless, without will, intention, desire, or action; but that there have emanated from Him ten *sephiroth*, or intelligences, the first being called the Inscrutable Height, the names of the others being, in order, Wisdom, Intellect, Grace, Power, Beauty, Firmness, Splendour, Foundation, and Authority. The Cabbala teaches the doctrine of the transmigration of souls, and has exercised great influence upon the intellectual development of the Jews. Raymond Lully, Pope Sixtus IV., Pico della Mirandola, and Reuchlin were all more or less interested in the Cabbala. See Ginsburg's *The Kabbalah* (1865); Knorr von Rosenroth's *Kabbala Denudata* (1677-78), and its English translation, *The Kabbala Unveiled*, by S. L. M. Mathers (1887).

**Cabeiri** or CABIRI, APATÆKI or PATÆKI, ancient deities worshipped especially in the Greek islands of Samothrace and Lemnos. They were represented as dwarfs, and have been supposed to be sons of Hephaistos. Little is known of them or their worship, which was secret. Every

year there was a nine days' feast, when the worshippers were purified from all sin.

**Caber, TOSSING THE.** See ATHLETIC SPORTS.

**Cabes, or GABES** (anc. *Tacapæ*), seapt. tn., 200 m. s. of Tunis; exports esparto grass, dates and other fruits, henna, wool, etc. Pop. 12,000.

**Cabet, ETIENNE** (1788-1856), French communist, was born at Dijon. He went to Paris, became an advocate, and was for some time editor of the *Journal de Jurisprudence*. In 1830-1 he was *procureur-général* of Corsica. On account of an article in *Le Populaire* he had to flee to London. In 1839 he was back in Paris, and wrote a *Histoire Populaire de la Révolution Française* (1840), as also a *Voyage en Icarie* (1842; 5th ed. 1848), advocating utopian and communistic ideas, with the result that a French colony—mainly consisting of Parisian working-men—was founded at Nauvoo, in Illinois, where the 'Icariens' suffered great privations. He died at St. Louis. See Shaw's *Icaria* (1884), and Prudhomme's *Icaria and its Founder*, E.C. (1907).

**Cabeza del Buey**, tn., S.W. Spain, 95 m. E. by S. of Badajoz; with tanneries and cotton and cork industries. Pop. 7,500.

**Cabin.** (1.) A hut or shelter, usually applied to the primitive structures of the Scottish and Irish peasantry and the negroes of the Southern States. (2.) A sleeping compartment on board a ship.

**Cabinda**, dist. and small seapt., Angola, Portuguese W. Africa, north of the mouth of the Congo. The town has considerable trading importance.

**Cabinet.** In the British system of government the cabinet is a body composed of the heads of the chief executive departments, who are jointly responsible for the government of the country;

in other words, its members are the chief ministers of the crown for the time being. As ministers they all are of necessity privy councillors. Each minister's individual responsibility, which renders him liable not only to dismissal by the crown, but to impeachment by the Commons, is now practically merged in a corporate responsibility of the whole cabinet to the political party which it represents. This change from individual to corporate responsibility, from liability to impeachment to liability to dismissal, even for the faults of colleagues, is the most interesting feature of English constitutional history between the revolution of 1688 and the Reform Act of 1832. In the completion of the change is found the ultimate solution of that struggle between the legislature and the executive which forms the central feature of English history.

The neutral attitude of the crown to which we are now accustomed is, historically speaking, the result of the removal of direct means of influencing small constituencies and comparatively irresponsible members. The ministers were the king's ministers, and he claimed and exercised as long as he could the right of appointing whom he would, and of dismissing a minister when he chose. In fact, until late into the 18th century there existed a twofold cabinet—an outer cabinet, including great officers of the household and non-political officers of state, such as the Archbishop of Canterbury; and an inner cabinet, composed more or less of members of the political party which commanded the majority in the House of Commons. A heavy blow was inflicted on this claim of the crown when the younger Pitt practically forced from George III. the dismissal of Lord Chancellor Thurlow, whom the

royal influence alone had kept in successive ministries. This claim of the crown acted also in a negative direction. George III.'s steady antipathy accounts for the long exclusion of Charles James Fox from high ministerial office.

Among other causes for the refusal of ministers to recognize a joint responsibility, none, perhaps, was more potent than the reluctance of other ministers to acknowledge a prime minister. Walpole certainly occupied the position, but repudiated the title. It was the unquestioned supremacy of Pitt which brought the first clear recognition of the office. So long as there was no acknowledged head of a political party, it lay in the discretion of the sovereign to whom he should entrust the task of forming the cabinet. But the growth in the size of the constituencies, and the increase of business in Parliament, have brought into existence an extensive system of party organization and discipline both within and without the House of Commons. Before the movement which ended in the first Reform Act, a defeat in the House of Commons did not necessarily involve resignation of the cabinet, though the individual minister whose measure was rejected might retire. Up to the Reform Act of 1867, a defeat on a cabinet measure ended the life of the ministry in office. Since 1867, except in 1886 and 1892, the ministry, if beaten at the polls, have not faced the new House of Commons.

For the last two hundred years and more, then, the cabinet has taken the place which, for the previous two hundred years, had been held by the Privy Council. But the Privy Council was, and still in theory is, the executive. The cabinet, however, is 'the motive power in our executive;' though it cannot be correctly

described as a committee of the council, for the council is an executive body recognized by law. The cabinet has no legal recognition; it is merely a collection of individuals who happen to hold certain offices, for purposes of deliberation. The members of the cabinet meet, as a rule, at the Foreign Office, and not, like the council, at Whitehall or wherever the sovereign happens to be. For although the sovereign may or may not be present at the council, it is his absence from the meetings of the cabinet which largely accounts for its peculiar development. The British cabinet is so informal a body that ordinarily no minutes are taken, and as a practice none are kept.

But the ministers still remain the ministers of the crown. They are bound by their oath as privy councillors to secrecy in the sovereign's councils. As individual heads of departments, they have as much right to personal access to the crown as the First Lord of the Treasury or any other minister who happens to be the acknowledged premier in the ministry.

It would be difficult for a prime minister, in the face of a royal objection, to insist upon the nomination of one of his followers to a ministerial post, unless he were prepared to refuse office himself as the result. He cannot get rid of one of his colleagues without the consent of the crown, which, however, in practice is granted as a matter of course. On the other hand, the prime minister has become the recognized channel of communication on matters of general policy between his colleagues and the crown. By virtue of his position, he exercises a general supervision over all the departments of government; but no other minister would be allowed to interfere in the department of a colleague.



Finally the responsibility of the cabinet is to the House of Commons; though, owing to the power of dissolution and the extension of party organization, it can as a rule only be effectively controlled by the electorate itself. Offices are so distributed as to provide a spokesman for each department in each house. Generally, but not always, the Lord President of the Council, the Lord Privy Seal, the Lord Chancellor, and the Foreign Secretary have been peers; while the Chancellor of the Exchequer, the Home Secretary, and the representatives of the War Office and the Admiralty have been members of the House of Commons. Since 1906, however, the Foreign Secretary has been in the House of Commons. But the proportion of cabinet ministers in either house has changed most significantly. Pitt was the only commoner in a cabinet of twelve (1804-6). But for the last thirty years, while the numbers of the cabinet have risen to an average of sixteen, only some six offices, as a rule, have been allotted to supporters of the government in the upper chamber. Some new offices have been created; but the increasing size of the cabinet has been chiefly due to the necessity of having authoritative representatives in the House of Commons. The present (1911) cabinet consists of nineteen members, the holders of the following offices:—Prime Minister and First Lord of the Treasury, Lord High Chancellor, Chancellor of the Exchequer, Chancellor of the Duchy of Lancaster, Lord President of the Council, Lord Privy Seal, First Lord of the Admiralty, the Secretaries of State for Home Affairs, Foreign Affairs, War, Colonies, and India, the Secretaries for Ireland and Scotland, the Postmaster-general, Presidents of the

Board of Trade, Local Government Board, Board of Agriculture, and Board of Education, and the First Commissioner of Works. The offices of Lord Privy Seal and of Secretary for India are at present in the same hands. Owing to the numbers composing it, it is inevitable that the real conduct of the government should fall into the hands of a committee of the cabinet. For the history of the cabinet see Anson's *Law and Custom of the Constitution* (new ed. 1907-9), and the works of Bagehot, Boutmy, Courtney, Dicey, Low, and Lowell.

**Cabinet Noir**, a special secret department of the Post Office, engaged in opening private letters and reading them. It was first organized in France under Louis XIV., was disestablished during the Revolution, but again established by Napoleon, and existed in France until the last years of the restoration. A similar office exists in Russia.

**Cabiri**. See CABEIRI.

**Cable**, any large rope or chain, especially such as may be used for holding a vessel to her anchor. Cables are made of hemp, jute, or coir, and of wire, as well as of chain. Chain cables are usually made in eight lengths, each of 12½ fathoms, the lengths being fastened together by shackles. As a measure of length at sea, a cable equals 100 fathoms—i.e. 200 yards—or, to be more accurate, it is the tenth part of a nautical mile. The term is sometimes, however, used to signify a cable's length—viz. 120 fathoms. For SUBMARINE TELEGRAPH CABLES, see TELEGRAPHY; ELECTRIC CABLES, see ELECTRICITY, DISTRIBUTION OF; CABLE TRAMWAYS, see TRAMWAYS.

**Cable**, GEORGE WASHINGTON (1844), American writer, born in New Orleans, of blended New England and Virginian stock. After fighting for the Confederate cause,

he worked as a clerk in a mercantile house. But his strong literary impulse soon found an outlet, and his graphic pictures of Creole life drew the attention of the English-speaking world. His *Old Creole Days* (1879), a collection of stories, was followed by *The Grandissimes* (1880), *Madame Delphine* (1881), and *Dr. Sevier* (new ed. 1885), three novels which finally revealed his capacity for sustained and masterly work. His *Bonaventure* (1888) is a collection of short stories; *John March, Southerner* (1894), is not so interesting as its predecessors. A champion of the negro, he has indignantly denounced, in *The Silent South* (1885) and *The Negro Question* (1890), the treatment of the blacks at the present day. *The Creoles of Louisiana* (1884) is a serious work on a subject Cable has specially made his own. Later stories include *The Cavalier* (1901), a story of the Civil War; *Bylow Hill* (1902), a New England tale; and *Kincaid's Battery* (1908).

**Caboched**, CABOSHED, CABOSSED. In heraldry, when the head of a stag, or of some other animal, is represented in full face, and without body and neck, it is blazoned *caboched*.

**Cabot**, GIOVANNI, better known in England as JOHN CABOT (c. 1425-98), discovered N. America. A native of Genoa, he settled in Venice in 1461. His dominant desire was to discover new lands across the sea, and it was only after having failed to receive support at the courts of Spain and Portugal that he came (1491) to England. Here he was more successful: on March 5, 1496, Henry VII. granted letters-patent to John Cabot and his three sons, Lewis, Sebastian, and Sancto, to take possession, on behalf of England, of any unknown country that they might discover. In a little vessel, the *Matthew*, they set out from

Bristol in 1497, and on June 24 sighted the coast of Newfoundland or of Labrador, along which they sailed for three hundred leagues, and then returned to England with the news. In 1498 he sailed again from Bristol, with a small fleet of five ships; but of the fate of the expedition nothing more was ever heard. See Beazley and Wilson's *John and S. Cabot* (1898); HARRISSE'S *Jean et Sébastien Cabot* (1896).

**Cabot**, SEBASTIANO (c. 1474-1557), navigator and cartographer, born probably at Venice, although Bristol is claimed by some as his birthplace, is often mistaken for his father, John Cabot, who discovered Newfoundland, on which occasion Sebastian seems to have accompanied him. Henry VIII. commissioned him to prepare a map of Gascony and Guienne; and his skill in cartography was such that Ferdinand invited him to Spain (1512), and made him captain. On the death of Ferdinand (1516) he returned to England. Some authorities represent that in 1517 he sailed from Bristol and discovered the bay and strait now known as Hudson Bay and Hudson Strait. But it is unlikely that he undertook any voyage at this time, for he was negotiating with Venice, although in the service of Spain. Returning to Spain, he became chief pilot (1521), and after the dispute between Spain and Portugal concerning trade with the Moluccas, he set sail to discover Tarshish, Ophir, and Eastern Cathay (1526). Entering the river La Plata, he explored its tributary, the Paraguay; but being attacked by the natives, he abandoned the enterprise, and returned to Spain (1530). After acting again as pilot (1533-47), Cabot went once more to England (1549), where he betrayed to Edward VI. his secret business with the Spanish government, and was

given a pension, with the duties of chief pilot of England. He became governor of the Company of Merchant Adventurers (1553), which opened to England the trade with Russia. See Beazley's *John and Sebastian Cabot* (1898) and *Lives* by Nicholls (1869), HARRISSE (1896), and Weare (1897).

**Cabot Strait**, 60 m. wide, between Newfoundland and Cape Breton I., forms the entrance to the Gulf of St. Lawrence.

**Cabra**, tn., prov. Cordova, Spain, 32 m. S.S.E. of Cordova. Ancient city, with famous well on an eminence, mentioned in *Don Quixote*. Celebrated jasper quarries; wine much esteemed in Spain. Pop. 13,000.

**Cabral**, PEDRO ALVAREZ (1460-1526), Portuguese navigator, sent by the king of Portugal in 1499 to establish a factory on the Malabar coast of India, and to enter into friendly relations with the rajah of Calicut. But a landing was made on the coast of Brazil, which Cabral annexed for his sovereign. In 1501, Cabral, after visiting Calicut and the coast of Malabar, returned to Portugal, where he appears to have remained until his death. His tomb is in the Da Graça convent at Santarem. His voyages are described in Ramusio's *Navigazioni e Viaggi* (1563; new ed. 1835), and in Jayne's *Vasco da Gama* (1910).

**Cabrera**, RAMON, COUNT OF MORELLA (1810-77), Spanish general, born at Tortosa, of humble parents. On the breaking out of the Carlist war in 1833 he eagerly espoused the cause of Don Carlos, and during the next seven years led the Carlist soldiers against the Christinos with indomitable energy and valour, sullied, however, by many acts of cruelty. But in 1840 he suffered a total defeat. Later, in 1849, he made another attempt, but was wounded in the only engagement (Pasteral) that took place, and retired to London.

**Cabul**. See KABUL.

**Cabuyao**, or TABUCO, pueblo, La Laguna prov., Luzon I., Philippines, 25 m. S.E. of Manila, on Laguna de Bay. Pop. 6,500.

**Cacao**. See COCOA.

**Cacao Butter**, or OIL OF THEOBROMA, is the concrete oil obtained by crushing and heating the seeds of *Cacao theobroma*. It is yellow, is easily melted at body heat, and is used medicinally to form suppositories containing various drugs.

**Caccamo**, tn., prov. Palermo, Sicily, 4 m. S. of Termini Imerese. Pop. 12,000.

**Caccini**, GIULIO (1550 to after 1614), Italian musical composer, born at Rome. From 1564 musician at the court of Florence, he took a leading part in the efforts to revive the dramatic music of the ancients. To this end he composed the dramas *Il Combattimento d'Apolline col Serpente* (1590), libretto by Bardi; *Dafne* (1594); and *Euridice* (1600), the most important, libretto by Rinuccini. Besides these he published *Nuove Musiche* (1601), a collection of songs, with a valuable preface which laid down sensible rules for learning to sing.

**Caceres**. (1.) Province, Estremadura, Spain; contains two bishoprics, Coria and Plasencia, and has an area of 7,667 sq. m. The river Tagus intersects it. On the north of the river fruit, wine, and oil abound; on the south, grain and grazing. The most apathetic and backward province in Spain. Pop. 365,000. (2.) Capital of above prov., on Tagus, 50 m. N.E. of Badajoz. Streets very ancient and steep. The city, founded as *Castra Cæcilia* by the Romans in 74 B.C., was conquered from the Moors (1225). Pop. 17,000. (3.) Or NUEVA CACERES, tn., cap. of Ambos prov., Luzon I., Philippines, 160 m. S.E. of Manila. It is well built, and has a cathedral. Pop. 18,000.

**Cachalot**, or SPERM WHALE (*Physeter macrocephalus*), one of the largest of living animals, adult males reaching a length of sixty feet. The head is about one-third of the total length. From twenty to twenty-five teeth are present on each side of the lower jaw, but those in the upper jaw are rudimentary and functionless. The diet consists mainly of cuttle-fish, and the whale, which is a powerful swimmer, goes down to great depths in search of them. It is said to remain under water for as long as twenty minutes at a time. A widely-distributed form, the sperm whale, which goes about in 'schools' or droves, is commonest in tropical and subtropical seas, especially towards the south, and is absent from both Polar regions. It was hunted with great ardour during the earlier half of the 19th century, and has greatly diminished in numbers in consequence. The high commercial value depends upon (1) the quality of the oil (sperm oil) made from the blubber; (2) the spermaceti, a valuable oil contained in a cavity on the upper part of the great head; (3) the ambergris, a concretion formed within the intestine of the whale, and found both there and on the surface of the seas haunted by the cachalots. Ambergris is used as a basis in perfumery, and was formerly also employed as a drug. The teeth of the cachalot furnish valuable ivory. For a popular description of the hunting methods, see F. T. Bullen's *The Cruise of the 'Cachalot'* (1898).

**Cachar Plains**, a dist. in the Surma Valley division of E. Bengal and Assam, India, between Sylhet on the w. and Manipur on the e. It is one of the great tea-producing regions of Assam, grows large quantities of rice, and exports timber to Bengal. Area, 2,063 sq. m. Pop. 415,000.

Chief town, Silchar. See also NORTH CACHAR.

**Cache**, riv., Arkansas, U.S.A., rises in the N.E., and flows 230 m. s.s.w. to join the White R. at Clarendon, Monroe co.

**Cacheo**, riv., W. Africa, between Gambia and French Guinea. It is short, but has a wide estuary, on the s. bank of which stands the town and fort of Cacheo. Pop. of tn. about 15,000.

**Cachet**, LETTRES DE. See LETTRES DE CACHET.

**Cachexia**, a term usually applied to the general appearance, and especially the facial expression, which is characteristic of certain chronic diseases.

**Cachoeira**, tn., Bahia, Brazil, on the Paraguassu R., 55 m. N.W. of Bahia. Cotton, coffee, and tobacco are largely cultivated. Pop. about 15,000.

**Cacholong**, also called mother-of-pearl opal, and sometimes Kalmuck agate, a variety of opal, usually gray in colour, milk white, or bluish white, and resembling mother-of-pearl. It is banded with layers of different colours, and makes a beautiful ornamental stone. It is found mostly in crevices in certain igneous rocks in Iceland, Faroe, and several places in Ireland, Carinthia, Nova Scotia, and elsewhere. See Traill's *Treatise on Quartz and Opal* (1867).

**Cacique**, or CAZIQUE, a title equivalent to prince or chief; confined to the native tribes of Hayti, Cuba, Mexico, Peru, and the west side of S. America.

**Cacodæmon**. See DEMONOLOGY.

**Cacodyl**, tetramethyl diarsine ( $As_2(CH_3)_4$ ), is a compound prepared by heating cacodyl chloride with zinc. It is a colourless, highly poisonous, stinking liquid (f.p.  $-6^\circ$  C., b.p.  $170^\circ$  C.) insoluble in water, and easily catches fire in the air. It is also obtained mixed with cacodyl oxide by the distillation of arse-

nious anhydride with potassium acetate as a spontaneously inflammable liquid, known as 'alcarsin,' or 'Cadet's fuming liquid,' from which the chloride can be obtained by the action of hydrochloric acid. Cacodyl acts very like a simple metallic element, the group  $\text{As}(\text{CH}_3)_2$  uniting with oxygen, sulphur, chlorine, etc., just like a metal. When acted on by mercuric oxide, cacodyl oxide yields cacodylic acid,  $\text{As}(\text{CH}_3)_2\text{O}_2\text{H}$ , a sour-tasting, odourless, crystalline solid, which with some of its salts, especially the cacodylates of sodium and of magnesium, has lately been much used in the treatment of skin diseases, being administered through the alimentary canal, or hypodermically. Sodium cacodylate contains about 55 per cent. of arsenic, and can be used with advantage in all diseases in which arsenic has proved useful, the union with the alkyl making it less toxic, and therefore endurable in larger quantities and for longer periods. It has been recommended in skin diseases, early tuberculosis, and some mental affections.

**Cactus.** With very few exceptions, the cacti, to the number of 1,000 species, are natives of California, Mexico, and S. America. Their curious structure is specially adapted to arid plains and hillsides; their succulent stems are reservoirs for large quantities of water, and transpiration and evaporation are minimized by the small surface exposure in proportion to the total mass, and by the thick epidermis which covers the whole plant. These stores of water are often tapped by natives, and occasionally by cattle. The height of certain species is fifty feet or more, and the appearance of these prickly, almost leafless, roughly cylindrical masses, often with gaunt arms, is strangely grotesque. The common prickly pear, or Indian fig (*Opuntia Ficus In-*

*dica*), is a member of this family. There are altogether some eighteen genera of cacti, those most familiar to horticulture being *Mamillaria*, *Phyllocactus*, *Cereus*, *Opuntia*, *Epiphyllum*, *Echinopsis*, and *Echinocereus*. The soil should be composed of four parts fibrous loam, one part lime rubbish, one part broken bricks, and one part sand. The pot should be a quarter full of crocks, to ensure perfect drainage. At the time of potting, preferably in March, the soil should be somewhat dry, and no water should be added to the plants for the first four days. They should be repotted every two or three years. During the winter months very little water should be given them (about once a fortnight), and during the summer about every four days. Propagation is commonly effected by means of cuttings taken from the parent by means of a sharp knife and laid on a dry shelf till roots are formed. Cacti are not difficult to raise from seed, particularly in the case of the genera *Cereus*, *Mamillaria*, and *Echinopsis*. The flowers of most of the cacti are large and brilliant.

**Cacus**, a son of Vulcan, inhabited a cave in the Aventine Mount, one of the seven hills of Rome. When Hercules was returning with the oxen of Geryon, Cacus stole some of them, dragging them backward by their tails into his cave in order to elude pursuit. But Hercules heard their lowing, and after a struggle defeated and slew Cacus. To celebrate his victory he raised the famous Ara Maxima at Rome. (Virgil's *Aeneid*, viii.; Livy, i., etc.)

**Cadamosto**, ALVISE DA (1432-77), a Venetian who explored the west coast of Africa as far south as the Rio Grande, discovering (1457) Cape Verde Islands. His narrative has been translated into French, *Relation des Voyages à la*

*Côte Occidentale d'Afrique d'A. de Cada Mosto* (1897).

**Cadder**, par. and vil., Lanarkshire, Scotland, on Forth and Clyde Canal, 5 m. N. of Glasgow. Here is Robroyston, said to be the scene of Wallace's betrayal (1305). Pop. 10,500.

**Caddie**, a corruption of the word 'cadet'—a boy employed by a golfer to carry his clubs while playing.

**Caddis-flies**, insects regarded by some authorities as forming the order Trichoptera, and by others as included in the Neuroptera as the family Phryganeidæ. The wings are more or less clothed with hair, and the posterior pair are larger than the anterior; the antennæ are thread-like; the mandibles are absent, and the metamorphosis is well marked, the larvæ ('caddis-worms') being caterpillar-like, and usually inhabiting cases which they have themselves constructed. Almost all small, of feeble flight, and inconspicuous in appearance, the perfect insects have always attracted much less attention than the larvæ, which are common in fresh water, and are often kept in aquaria. The eggs are surrounded by jelly and dropped into the water. Immediately after hatching, the larvæ begin to make cases by spinning together with silk minute stones, fragments of shell, grains of sand, twigs, pieces of water-weed, or any other material which may be at hand. The case in the common British forms is open at each end, and from it the anterior end of the larva is protruded. When larval life is over, the creature passes into the pupa stage within its case, which is at this time closed with silk. Within the case the nymph—a form strongly resembling the perfect insect—is developed. It possesses strong mandibles, and with these cuts through the case, and swims to some body such as a water-

plant, by means of which it can climb from the water. The nymph-skin then bursts, and the imago emerges, and flies away to begin the short life of reproduction. See W. S. Furneaux's *Life in Ponds and Streams* (1896).

**Ca' De'**, the Latin name of the League of God's House (*Gotteshausbund*), the earliest in date of the three leagues of Rætia or the Grisons. It was formed at Coire, against Bishop Peter of Coire (Jan. 29, 1367), and was composed of the cathedral chapter of Coire (hence the name), of the city of Coire, and of the episcopal tenants. See W. Plattner's *Entstehung des Freistaates der drei Bünde* (1895).

**Cade**, JACK (d. 1450), the leader of the Kentish insurgents of 1450, who were roused to arms by the fiscal exactions of the royal officials. The insurgents constituted a well-organized force, and utterly defeated the detachment of the royal army sent against them by the king (Henry VI.), who was obliged to retreat upon London, and, a few days later, to Kenilworth. Thereupon Cade, or Mortimer (for he had now assumed this name, at the same time claiming kindred with the Duke of York), took possession, on July 2, of London, where he was received favourably by the citizens. On the following day Cade ordered the arrest of Lord Saye-and-Sele and his son-in-law, Crowmer, sheriff of Kent, who were regarded as the chief causes of the recent oppressive taxation. Both were beheaded, with little show of trial. The city now became alarmed at the excesses of the insurgents, between whom and the citizens a bloody struggle took place on the night of July 5. As a result of this, terms were arranged, and the Kentishmen retired from London. A reward being offered for the capture of Cade, he was taken prisoner on July 11, but died from wounds received in

the struggle. See *Political History of England*, vol. iv. ch. 15.

**Cadell, FRANCIS** (1822-79), Australian explorer, was born at Cockenzie, Scotland; took part in the Chinese war of 1840-1, being present at the siege of Canton and the capture of Amoy and Ningpo. In 1848 he visited Australia, where a series of expeditions culminated in the successful navigation of the Murray, Edward, and Darling rivers. During a trading voyage to the Spice Islands he was murdered by his crew.

**Cadell, ROBERT** (1788-1849), Scottish publisher, born at Cockenzie, Scotland, became (1811) a partner in the house of Constable and Co., Edinburgh. After the bankruptcy of the firm in 1825, he was chosen by Scott as the sole publisher of his subsequent novels. In 1827 he began to issue the successful 'Author's Edition' of the *Waverley Novels*. See *Lockhart's Life of Scott* (1860).

**Cadelle**, a name given to *Trogosita mauritanica*, a beetle often found in corn and flour. It is often said to be very destructive, but it would seem that it preys largely upon other insects found in the corn. It is now practically found everywhere.

**Cadenabbia**, vil. and health resort, Italy, on w. shore of Lake Como, nearly opposite Bellagio; is visited chiefly in spring and autumn. Here is the beautiful Villa Carlotta (1747), adorned with sculptures by Thorwaldsen and Canova.

**Cadence**, in music, is the name given to the closing—usually last two—chords of a phrase. The varieties of cadence may be grouped as perfect, imperfect, and interrupted. The *perfect* must have its last chord on the tonic. When the penultimate chord is on the subdominant, it is called a 'plagal'; when on the dominant, 'authentic' cadence. The har-

mony of the *imperfect* is often that of the perfect reversed. The *interrupted* is a progression of chords leading the ear to expect a tonic chord, for which, however, another is substituted; the effect is often as charming as it is unexpected.

**Cadency**, that department of heraldry which treats of the symbols (marks of cadency) borne on their shields by the younger members and branches of a family to distinguish their arms from those of the head of the house and of each other. See HERALDRY.

**Cadenus**. See SWIFT, JONATHAN.

**Cadenza**, in music, an ornamental passage sometimes introduced before the close of a section of a musical composition. At one time cadenzas were usually left to the improvisation of the performer, but now they are usually written out in full by the composer.

**Cadereyta**. (1.) Tn., Mexico, state of and 40 m. E.N.E. of Queretaro. Pop. 12,000. (2.) Tn., Nuevo Leon State, Mexico, 20 m. S.E. of Monterey. Silver mines are worked. Pop. (comm.) 17,000.

**Cader Idris**, mountain range with peak (2,929 ft.), 4 m. S.W. of Dolgelly, Merioneth, Wales; the summit is a favourite view-point.

**Cadet**, originally a younger son; now applied to young men training for officers in the military and naval services. (1.) NAVAL CADETS are the youths undergoing training at one of the naval colleges for appointment to one of the executive branches of the service. (2.) MILITARY CADETS in the British army are educated for commissions in the artillery and engineers at Woolwich, and in the cavalry, infantry, and Indian staff corps at Sandhurst. Cadets are also instructed at Kingston, Canada. The former public-school cadet companies now form the junior division of the Officers' Training

Corps (see TERRITORIAL FORCE); but a few cadet battalions have been organized in the larger towns.

**Cadi**, a judge of first instance under the Mohammedan system of law, possessing both civil and criminal jurisdiction. His powers under the latter branch include the infliction of the capital penalty. A court of appeal, originally presided over by the caliph in person, revises the judgments of the cadi's court. He has, further, various administrative functions; and being of necessity an ecclesiastic—for Mohammedan law is based upon the Koran—he sometimes performs purely religious duties. The Spanish *alcalde* is the Arabic *al-qazi*.

**Cadillac**, co. tn. of Wexford co., Michigan, U.S.A., 100 m. N. by E. of Grand Rapids. It is an important lumber centre, and has manufacturing interests, machine shops, etc. Pop. 6,000.

**Cadiz**. (1.) Province, Spain, one of the richest and busiest in the kingdom, including not only the great peninsular city of Cadiz, but also the important commercial centres of Jerez, San Lucar, Puerto Santa Maria, San Fernando, Chiclana, etc. Wine, fruit, and fish are the main natural products of the province, but every kind of manufacture is active. The province practically supplies the world with sherry. Area, 2,834 sq. m., including 6 sq. m. in Ceuta. Pop. 453,000, including 13,000 in Ceuta. (2.) Capital of above province, one of the first cities in Spain, standing on a peninsula with a very narrow isthmus, 95 m. by rail s.s.w. of Seville; founded by the Phœnicians in 1100 B.C. (the ancient *Gadeira*). On the Atlantic its almost insular position and fine sheltered harbour give it great advantages for maritime commerce with Europe and America. Although the trade of Cadiz is still large, it is small

in comparison to what it was when Spain was mistress of the New World. The shipping in the harbour was burnt by Drake in 1587, and the place was sacked by Essex and Raleigh in 1596. Viewed from the sea, Cadiz is highly picturesque. The architecture is almost entirely modern, most of the old town having been consumed by the fire in 1596. The modern town is well laid out, and has fine public squares and promenades. Among the principal structures are two cathedrals—one built in 1597, the other in the 18th century; Torre de Vigia, or watch tower; the academy of fine arts; and the church of Santa Catalina, containing one of Murillo's masterpieces. The city is a fortress of the first class; a great naval station, with shipbuilding yards; and an important centre of culture, industry, and trade. The imports amount to nearly three-quarters of a million sterling, the exports to over one million annually. About 40,000 butts of sherry are exported annually (from Jerez de la Frontera). Pop. 70,000. (3.) BAY OF, is divided into two parts. The larger and outer is exposed to the s.w., and has on the N. the town of Rota, and on the S. Cadiz. At the N. extremity is La Carraca, noted for its arsenal and shipbuilding yards; while on the island of Leon stands the observatory of San Fernando. Salt is obtained from the neighbouring marshes.

**Cadiz, BATTLE OF.** On July 21, 1640, at about fifteen leagues from Cadiz, a French squadron, under Armand de Brézé, defeated a Spanish convoy. In this action tactics much in advance of the time were made use of by De Brézé, who detached part of his force, under Rear-admiral de Coupeauville, to leeward of the enemy, while he engaged him to windward, thus putting the Span-



iards between two fires. The result was indecisive; but the Spaniards lost five vessels and about a thousand men, while the French loss was small. See *Cambridge Modern History*, vol. iv. ch. 4 (1906).

**Cadmium** (Cd, 112.4), a metallic element, compounds of which occur in small quantities associated with zinc. It comes off earlier than zinc in the preparation of that metal, condensing as a brown oxide which can be reduced by distillation with charcoal. Cadmium is a soft, bluish-white metal that is malleable and ductile. Its specific gravity is 8.6; it melts at 322° C., and boils at 778° C. It tarnishes slightly in air, and burns when heated in it, forming a brown oxide. It forms a series of salts, of which cadmium sulphate, CdSO<sub>4</sub>, a white, crystalline, soluble solid, is typical, and which are characterized by forming a bright yellow sulphide on addition of hydrogen sulphide. Cadmium is a component of one of the most easily melted of the fusible metals, and is alloyed with silver in electroplating; whilst cadmium sulphide is used as a pigment, different shades being produced by altering the acidity of the solution from which it is precipitated.

**Cadmus**, son of Agenor, king of Phœnicia, and brother of Europa, settled in Thrace, and then, by the advice of the Delphic oracle, in Bœotia, where he built the Cadmeia, afterwards the citadel of Thebes. There he killed a dragon which guarded the well of Ares, and sowed its teeth, which sprang up as armed men, who at once fought and slew each other, with the exception of five, from whom the Thebans claimed descent. Cadmus wedded Harmonia, and with his wife was changed into a serpent by Zeus, and removed to Elysium. Cadmus is said to have introduced the alphabet

into Greece, which means that the ancient Greeks believed that they learned the art of writing from the Phœnicians: this is still the accepted theory. See Lenormant's *La Légende de Cadmus* (1867).

**Cadogan**, GEORGE HENRY CADOGAN, FIFTH EARL (1840), was lord-lieutenant of Ireland from 1895 to 1902, during which time Ireland was visited by King George and the Queen (then Duke and Duchess of York) in 1897 and 1899, and by Queen Victoria in 1900. Lord Cadogan was under-secretary for war (1875-8), under-secretary for the colonies (1878-80), and Lord Privy Seal (1886-92).

**Cadoudal**, GEORGES (1771-1804), the most brilliant figure in the Chouan war, was born near Auray, in Lower Brittany; the son of a peasant proprietor. On the breaking out of the royalist insurrection in La Vendée, he at once (1793) joined the Vendéan army, and during the next six years carried on a determined and vigorous resistance to the forces of the republic. But his arrest for conspiracy against Napoleon, at Paris, on March 9, 1804, was followed by his execution on June 25 following. See G. de Cadoudal's *G. Cadoudal et la Chouannerie* (1887).

**Cadoxton**, par. and tn., near bor. of Neath, Glamorganshire, Wales; with coal mines, tin-plate and copper works. Pop. 17,000.

**Cadre**, a French word meaning a frame. In military parlance it denotes the permanently organized framework or skeleton of a regiment or corps, such as the officers and non-commissioned officers, etc., around whom the rank and file may be at any moment assembled.

**Caduceus**, originally an enchanter's wand, and later a herald's staff, is most familiar in the hands of Hermes. Its first form was three shoots, of which two were intertwined, while the

third formed the handle. The fully-developed form has, besides the rod itself, a pair of wings either at the top or in the middle, and two serpents intertwined.

**Cadwalader** or CADWALLADER VENDIGAID, ancient British king (d. 664), succeeded his father, Cadwallawn, as king of Gwynedd in 634. His heroic defence of Wales against the Saxons is recorded in Welsh poetry and tradition.

**Cadzand**, or KADZAND, vil., Zeeland, Holland, near mouth of W. Scheldt, 14 m. N.E. of Bruges. In 1337, the English, under Sir Walter Manny and the Earl of Derby, here defeated the Count of Flanders.

**Cadzow**. See HAMILTON.

**Cæcilia**, a small amphibian, belonging to the order Apoda, which includes wormlike, burrowing animals. There are six species of cæcilia, none of which is well known. It is found in Ceylon and the Seychelles Is.

**Cæcilius Statius**, a Roman comic poet, by birth an Insubrian Gaul, and originally a slave. He was the immediate predecessor of Terence, dying in 168 B.C. As a writer he is classed with Plautus and Terence. Only a few fragments of his plays survive.

**Cæcum** (Lat. 'blind'), a dilatation at the junction of the small and large intestines, having the vermiform appendix attached to it. It is the seat of typhlitis and perityphlitis—*i.e.* inflammation in the tissues about the cæcum. The latter may include or may start with inflammation of the appendix. See INTESTINES.

**Cædmon** was a servant of the monastery at Whitby, and well on in years, when one evening (as Bede tells) he had a vision in which a heavenly visitant said to him, 'Cædmon, sing me something.' Bede goes on to say that he sang of all the principal events in sacred history, from the creation to the day of doom.

There are extant two series of poems which correspond very closely with several of the subjects said by Bede to have been sung by Cædmon: they are usually entitled *Genesis*, *Exodus*, and *Daniel*, making the first series; and the *Fallen Angels*, the *Harrowing of Hell*, and the *Temptation*, or collectively *Christ and Satan*, making the second series. But this second series is certainly much too late in date to be by Cædmon, and it is impossible to deny that the entire first series may be by successors or disciples, rather than by the father of English sacred poetry. There are some marked resemblances between the *Genesis* and *Paradise Lost* in thought and phrase. The only complete text of the 'Cædmonian poems' is in C. W. M. Grein and R. P. Wülker's *Bibliothek der Angelsächsischen Poesie* (1883). The only complete translation is Thorpe's *Cædmon's Metrical Paraphrase* (1832; out of print). For criticism of this and all other O.E. works, see Wülker's *Grundriss zur Geschichte der Angelsächsischen Litteratur* (1885), Stopford A. Brooke's *Eng. Lit. from the Beginning to the Norman Conquest* (1898); see also W. J. Courthope's *History of English Poetry* (1895-1910). A Cædmon memorial cross was erected at Whitby in 1898.

**Caen** (anc. *Cadomum*), cap., dep. Calvados, France, on the Orne and Odon, 7 m. from the sea, and 124 m. by rail W.N.W. of Paris. Caen has many fine, imposing buildings, promenades, and public squares, and is noted for its educational institutions. Many of the buildings are fine examples of Norman architecture. The most notable churches are the church of St. Etienne (1066), containing the tomb of William the Conqueror; the church of the Trinity (11th century), containing that of Queen Matilda;

and the church of St. Pierre. Other edifices are the Hôtel de Ville, the Palais de Justice, the prefecture, and the university (1436), founded by Henry VI. of England. Caen exports iron ore, the well-known 'Caen' limestone (of which many 15th and 16th century churches in England were built), fruit, and dairy produce to England. There are manufactures of lace, oils, cottons, and woollens; also shipbuilding yards; and the town is the chief Norman market for horses and cattle. Auber the musician was born here in 1782. Pop. 44,500. See Delarne's *Histoire de Caen* (1842).

**Cæpio**, CNÆUS SERVILIUS, consul at Rome in 106 B.C., was in the next year, along with the consul Cn. Manlius, utterly defeated by the invading Cimbri; no fewer than 80,000 of his troops are said to have perished in the battle. In 95 B.C. he was brought to trial for his misconduct in this campaign, and was imprisoned; it is uncertain whether he died in prison or escaped to Smyrna.

**Cære**, an ancient Etruscan city, 28 m. N.W. of Rome. When Rome was captured by the Gauls, many Romans found refuge at Cære. See CERVETRI.

**Caerlaverock**. See CARLAVE-ROCK.

**Caerleon**, tn., Monmouthshire, England, on river Usk, 2 m. N.E. of Newport, on G.W.R.; under Romans called *Isca Silurum*, and was the capital of Britannia Secunda (Wales). Numerous Roman remains have been found, as walls, baths, and an amphitheatre (16 ft. high, and 222 by 192 ft.) called King Arthur's Round Table. Geoffrey of Monmouth connects the place with King Arthur. Pop. 1,400.

**Caermarthen**. See CARMARTHEN.

**Caernarvon**. See CARNARVON.

**Caerphilly**, eccles. par. and mrkt. tn., Glamorganshire, Wales,

7 m. N.N.W. of Cardiff; has large iron works and collieries. Blankets and woollen shawls are manufactured. It has ruins of a formerly very fine castle, with leaning tower 80 ft. high. Pop. (urb. dist.) 16,000.

**Cæsalpinia**, a genus of tropical leguminous trees and shrubs of much beauty, and of some economic importance by reason of the dyes obtained from them. They are all easy to propagate by seeds, which should be soaked in warm water for twelve hours before being sown. In Britain they require stove heat; but as they take up a good deal of space, they are not very much grown. Among the species may be mentioned *C. pulcherrima*, sometimes known as Barbados pride, a beautiful evergreen shrub with brilliantly-coloured flowers; *C. japonica*, which can be grown out of doors in sheltered places near the south coast of England; *C. sepiaria*, which bears yellow flowers in April; and *C. sappan*, an Asiatic tree valued for its wood.

**Cæsalpinus**, ANDREAS (1519-1603), Italian botanist, born at Arezzo, became professor of botany at Pisa. He was one of the first to attempt a comprehensive classification of plants upon a natural system, and Linnæus made considerable use of his *De Plantis Libri XVI.* (1583-1603) in framing his artificial system.

**Cæsar**, the cognomen of a Roman family of the Julian clan. It was of patrician rank, and claimed to trace its descent back to Iulus, the son of Æneas. Augustus took the name as the adopted son of C. Julius Cæsar, and from him it passed to Tiberius, Caligula, Claudius, and Nero, who were all by descent or adoption connected with the family. Later emperors also used the title, prefixing it to their own names—e.g. Emperor Cæsar Domitianus Augustus. When Hadrian adopted

Ælius Verus, he allowed him to take the name of Cæsar; and thenceforward it was borne by the intended successor to the imperial throne, the reigning emperor reserving the designation 'Augustus' for himself. The following members of the family are also worthy of note:—

(1.) LUCIUS JULIUS CÆSAR, consul in 90 B.C., in which year he passed a law which granted the Roman citizenship to all the allies who had not openly taken up arms against Rome. He was censor in 89 B.C., and, being a member of the aristocratic party, fell in the massacres under Marius in 87 B.C.

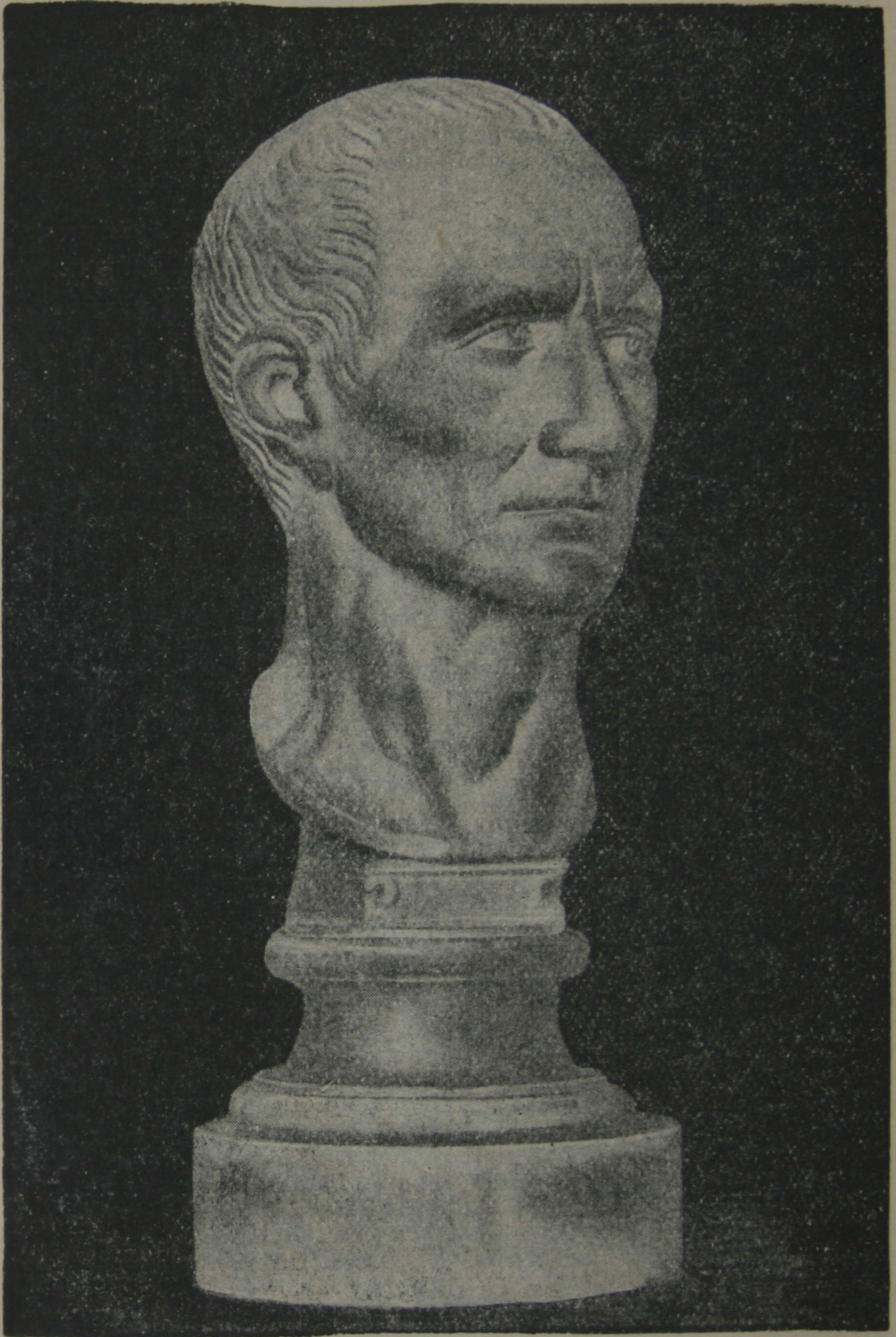
(2.) GAIUS JULIUS CÆSAR STRABO VOPISCUS, brother of the above; was curule ædile in 90 B.C. Like his brother, he was murdered in 87. He was famous as an orator and a poet; as such Cicero introduces him as a character in the *De Oratore*.

(3.) LUCIUS JULIUS CÆSAR, son of (1); was consul in 64 B.C., and in 52 one of Cæsar's legates in Gaul. Though originally of the aristocratic party, he attached himself to Cæsar, and remained in Italy during the civil war. In 47, during Antony's absence, he was prefect of the city. After Cæsar's death he joined the senatorial party against Antony, who for this reason put him down on the list of the proscribed in 43; but Lucius was saved by the intercession of his sister Julia, Mark Antony's mother.

(4.) LUCIUS JULIUS CÆSAR, son of (3); joined Pompey in the civil war; in 49 B.C. Pompey sent him to Cæsar with peace proposals. In 46 he served under Cato at Utica, and after the latter's death advised the inhabitants to surrender. He was, however, murdered by Cæsar's troops.

**Cæsar**, GAIUS JULIUS (102-44 B.C.), the founder of the Roman Empire. The day of his birth

is known to have been the 12th of July; the year is usually given as 100 B.C., but Mommson has made it probable that the date 102 should be accepted. He was made priest of Jupiter (*flamen dialis*) by Marius in 87 B.C. Marius was the husband of Cæsar's aunt, Julia; and this connection with Marius, then the leader of the popular party, marked Cæsar out as a leader of the people. The connection was confirmed by his marriage (83 B.C.) with Cornelia, daughter of Cinna, Marius's successor in the popular leadership. When Sulla returned from Asia, and became omnipotent at Rome, he ordered Cæsar to divorce Cornelia; but Cæsar refused to obey, was proscribed, and had to conceal himself in the Sabine country. Although pardoned, Cæsar did not feel safe at Rome; he went (81 B.C.) to Asia, where he served under Minucius Thermus, and at the capture of Mitylene won the civic crown—the Roman 'v.c.'—for saving the life of a comrade (80 B.C.). After Sulla's death he returned to Rome, and in 77 distinguished himself by his prosecution of Cnæus Dolabella for extortion in Macedonia. Subsequently he retired to Rhodes, to study oratory under the famous teacher Apollonius Molo. On the way there he was captured by pirates, and was only released on payment of a ransom of 50 talents (£11,500). When liberated he raised a force at Miletus, defeated the pirates, and took them to Pergamus, where he crucified them. He returned to Rome in 74 or 73, and in 70, when Pompey was consul, he supported a popular measure brought forward by Aurelius Cotta, which deprived the senators of the exclusive control of the jury courts. In 68 he obtained the quæstorship; in 65 the ædileship, when he spent enormous sums on public games and buildings; and in the next year



*Julius Cæsar.*  
(Bust in the British Museum.)

he was elected pontifex maximus, the chief priest of Rome.

In 68 his wife Cornelia died, and in 67 he married Pompeia, daughter of Q. Pompeius Rufus and Cornelia, daughter of Sulla, and proved his attachment to the Pompeian house by supporting the Gabinian and Manilian laws, which conferred extraordinary power on Pompey. He made attempts to obtain similar power for himself—in 65 in connection with a mission to Egypt, and in 64 by means of an agrarian law of Rullus—but his attempts were frustrated by the senatorial party.

In 63 he opposed the execution of Catiline's fellow-conspirators in an able speech before the senate. Some authorities accuse him of complicity in this and a previous plot of Catiline's, but without sufficient evidence. In 62 he was prætor, and in the next year went as proprætor to Farther Spain. This enabled him to pay his debts, and to gain some military reputation by victories over the Lusitanians. He was elected consul for 59 B.C., and in that year formed with Pompey and Crassus what is known as the first triumvirate. Cæsar's colleague in the consulship was Bibulus, a thorough aristocrat, who put his veto on an agrarian law of Cæsar's; but the latter disregarded his opposition, and carried the law. Cæsar also obtained easier terms for the knights in regard to the farming of the taxes of Asia, and the ratification of Pompey's actions in the East; and for himself, overriding an arrangement made by the senate, he obtained the province of Cisalpine Gaul and Illyricum for five years, to which the senate added Transalpine Gaul.

About this time Pompey married Cæsar's daughter Julia, and Cæsar married Calpurnia, having divorced Pompeia in 62 on account of the scandal connected

with Clodius's desecration of the mysteries held in his house as prætor. It was then that Cæsar made the famous remark that 'Cæsar's wife must be above suspicion.'

In 58 he went to his province, and remained there for nine years. In this period he subdued the whole of Transalpine Gaul, conquering the Helvetii, the Germans led by Ariovistus (58), the Belgian tribes (57), the Veneti and other tribes on the west coast (56), and the invading German tribes the Usipetes and Tencteri (55). In the latter year he invaded Britain for the first time, but returned after effecting a landing and demanding hostages from the tribes which resisted. In 54 he again invaded Britain, and Cassivelaunus, king of the Trinobantes, agreed to pay Rome a tribute. At the end of that year a revolt broke out in Gaul; one of Cæsar's brigades was annihilated, but Quintus Cicero and Cæsar saved the situation. In 52 the revolt reached its height with the accession of the Ædui (old allies of the Romans) under Vercingetorix. The fall of Alesia, in which Vercingetorix had taken refuge, practically ended the revolt.

Meanwhile Cæsar's relations with Pompey and the aristocratic party at Rome were somewhat strained. In 55 a new arrangement with Pompey and Crassus had secured the extension of his command for five more years—from Jan. 1, 53, to Dec. 30, 49—and the agreement that Cæsar should be elected consul for 48 B.C. in his absence; which was then ratified. But Pompey was growing jealous of Cæsar; the death of his wife Julia in 54 dissolved one of the few ties between them; and the death of Crassus at Carrhæ in 53 left Cæsar and Pompey without a mediator. Pompey there-

fore joined the aristocratic party, and after being sole consul in 52 B.C., secured the government of Spain for five years. It was Cæsar's object to secure a position at least equal to Pompey's; he therefore reminded the senate of the arrangement for his 48 consulship. This, however, was opposed by Pompey and the senate, and it was in consequence of this, and the failure of several other attempts at peace, that Cæsar crossed the Rubicon, on or about Jan. 12, 49. Pompey's troops deserted to him in crowds. Cæsar was welcomed everywhere; and after pursuing Pompey and his adherents to Brundisium, whence they sailed to Greece, he set out for Spain, where he defeated Pompey's armies under Afranius, Petreius, and Varro. Returning to Rome, where he had been appointed dictator, he held the consular elections, and was himself elected consul for 48. In that year he crossed over to Greece, and after some fighting near Dyrrhachium, of which he got the worst, as he had no navy, routed Pompey's forces near Pharsalus in Thessaly, on August 9. Pompey fled to Egypt, but was murdered before Cæsar arrived there. When he did so, he became involved in a war against the guardians of the young king, Ptolemy; for Cæsar desired that Cleopatra, Ptolemy's sister, should share the regal power. This war was brought to a close in March 47. He next marched through Syria and Asia Minor, and in Pontus defeated Pharnaces, son of Mithridates the Great, who was an ally of Pompey's, at the battle of Zela. The ease with which the battle was won inspired Cæsar's famous dispatch to the senate, 'Veni, vidi, vici' ('I came, I saw, I conquered'). He reached Rome in September 47; sailed before the end of the

month to Africa; and on April 6, 46, defeated the Pompeians, under Scipio and Cato, at Thapsus. He now returned to Rome as undisputed master of the Roman world, and surprised every one by his clemency. His reform of the Roman calendar falls in this year. Meanwhile Pompey's sons, Gnæus and Sextus, had collected fresh forces in Spain. Advancing to meet them, Cæsar routed them at Munda, not far from Cordova, on March 17, 45. The year before, he had been appointed dictator for ten years; in 45 he was made perpetual dictator; in the next year, at the festival of the Lupercalia, Antony offered him the kingly diadem, but he refused it. Already the conspiracy against his life had been formed; Cassius was ringleader, and Marcus and Decimus Brutus, Casca, and sixty others were implicated in it. Although Cæsar received many warnings, he neglected them all, and met his fate in the senate house on the Ides (15th) of March 44. Casca struck the first blow. Cæsar resisted, until Decimus Brutus also smote him; then, with the words, 'Et tu, Brute!' ('Even thou, Brutus!') he covered his face and fell.

Cæsar's reforms aimed at making all the provincial governors, military commanders, and even the magistrates of Rome, responsible to his central authority. He had not time to do much for the provincials himself, but it is clear that Augustus and his successors simply followed in the lines which he had laid down. Cæsar's domestic reforms tended to free the people from the unconstitutional dominion of the senate.

There are two questions which need special consideration in regard to Cæsar's position. The first is, whether from the beginning of his career he aimed at supreme power. This is the view of Mommsen, but it lacks evi-

dence. The second question concerns the form which he meant to give to his new power—a question which cannot be answered. One thing is clear—that, as compared with Augustus, he was very contemptuous of republican forms and prejudices: he left the city for months together without magistrates, filled the senate with provincials, and appointed officers of his own to govern both in Rome and abroad. Taking him all in all, he probably saw further than any statesman of the ancient world, and he laid the foundations so deep, that the whole mediæval and modern world still rest on them. He is the true father of western civilization.

Cæsar's honesty, his patriotism, his devotion to the welfare of the poorer classes and the provincials, his unprecedented moderation to his opponents, his extraordinary power of work, his statesmanship, and his eloquence are testified to by friend and foe alike. His military genius is proved by an exact study of his campaigns, and has been admitted by the greatest critics of modern times. In private life he was affable, witty, generous, and devoted to his mother, his successive wives, and his friends. It cannot be claimed that he was perfect in his morality, though there are no trustworthy proofs of the contrary; but allowance must be made for the manners of his day. He had other weaknesses: he was ashamed of being bald, and valued highly the privilege accorded him of wearing a laurel wreath, which concealed his lack of hair. As an author, he was placed in the highest rank by his contemporaries; his labours extended to a careful study of the Latin language, on which he published a work which has been lost. He was specially noted for the purity of his style. His only extant works are the *Commentaries*,

or *Diary of the War in Gaul* and the *Diary of the Civil War* (the book on the African war usually attached to it is not his). Editions of the *Commentaries* are innumerable; those of Mensel (1894), Rheinhard and Herzog (1892), Peskett, Allen and Greenough (1886), Benoist and Dosson (1892), may be referred to. See also Mommsen's *Hist. of Rome* (Eng. trans. 1894); S. J. Delorme's *Cæsar et ses Contemporains* (1869); Napoleon III.'s (1865), Froude's (1879), and Fowler's (1892) *Lives of Cæsar*; Baring-Gould's *Tragedy of the Cæsars* (1892); Holmes's *Cæsar's Conquest of Gaul* (1899; new ed. 1901); Ferrero's *Greatness and Decline of Rome*, vol. ii. (1907).

**Cæsar**, SIR JULIUS (1558–1636), English lawyer, born at Tottenham, became judge of the Admiralty Court (1584), Chancellor of the Exchequer (1606), and Master of the Rolls (1614). Bacon's 'good friend,' Cæsar had the reputation of being proof against corruption. Such was his general bountifulness that Fuller characterizes him as 'almoner-general of the nation.' He wrote a treatise on the Privy Council.

**Cæsar**, a British battleship, 14,900 tons, 17½ knots, launched in 1896. Since 1793 there have been several ships of the name, which is associated with Howe's victory (June 1, 1794), Saumarez's actions (1801), Strachan's action (1805), and Basque Roads (1809).

**Cæsarea**, now KAISARIEH, a name given to several ancient cities, among which were:—(1.) A seapt. of Palestine, 32 m. N. by E. of Jaffa. It was founded by Herod the Great, and is frequently referred to in the Bible. (2.) CÆSAREA PHILIPPI, or Paneas, now Banias, a city in Palestine, below Mt. Hermon, on the Jordan; founded by Philip the tetrarch in 3 B.C.

**Cæsarean Operation.** See LAPAROTOMY.



**Cæsarion** (47-30 B.C.), said to be the son of Cleopatra, who declared that Julius Cæsar was his father; but the relationship has been denied. Augustus had him executed after his mother's death.

**Cæsena**, Italy. See CESENA.

**Cæsium** (Cs, 132.9), an alkaline metal discovered by Bunsen in 1860, by spectrum analysis, in the mineral water of Dürkheim, in the Palatinate. It occurs also in a rare mineral pollux, and is best isolated by the electrolysis of its fused cyanide. Cæsium is a soft metal closely resembling potassium, specific gravity 1.85, and is characterized by a spectrum containing two bright blue lines, along with others in the red, yellow, and green.

**Cæsura**, a metrical pause in the middle of a line of verse, generally defined as the point at which a reader would pause to gather breath; and while it may also coincide with a grammatical pause, it need not do so. There may be more than one cæsura in a line; on the other hand, verses shorter than the decasyllable need have none at all. The cæsura most commonly occurs in English heroic measure after the fourth or sixth foot; but the most subtle effects are produced by a studied variety of usage. See BLANK VERSE.

**Café**. See RESTAURANT.

**Caffeine**, THEINE, or METHYL-THEOBROMINE ( $C_8H_{10}N_4O_2$ ), an alkaloid which forms the stimulating principle in coffee (where it amounts to 1.5 per cent.), in tea (where it forms 2 to 4 per cent.), in the S. American *maté* (an infusion of the leaves of *Ilex paraguayensis*), and in the kola nut of Africa. It crystallizes in long, silky, colourless needles, and dissolves very slightly in cold water, but readily in hot water or alcohol. It is obtained from a strong infusion of boiled tea, from which

the tannin is precipitated by excess of lead acetate; it is then filtered, the excess of lead is thrown down by hydrogen sulphide; this is again filtered, the liquid is evaporated down, and neutralized by potassium hydroxide when the caffeine crystallizes out. It is used medicinally in very small doses as a heart stimulant. In larger doses it makes the heart's action irregular, and in lethal doses causes narcotism, and arrests the heart. Habit weakens the effect of both tea and coffee on the nervous system. Caffeine is also a diuretic, acting much more markedly on some individuals than on others. Both on account of its action on the heart and blood-vessels, and also because of its stimulating action on the kidney cells, it is used in dropsy; it has been recommended for pneumonia, and its action on the brain is taken advantage of in cases of migraine. It is often of great value in counteracting the effect of poisonous doses of opium, alcohol, or other narcotics.

**Caffraria**. See KAFFIRS.

**Caffyn**, KATHLEEN MANNINGTON, novelist, who writes under the name of 'Iota,' was born in Co. Tipperary, Ireland; has lived several years in Australia. She is the author of *The Yellow Aster* (1894), *A Comedy in Spasms* (1895), *The Minx* (1900), *He for God only* (1903), *Smoke in the Flame* (1907), *Whoso Breaketh an Hedge* (1909), etc.

**Caftan**, or KAFTAN, an Oriental tunic similar to a kimono, with wide loose sleeves, and tied by a girdle at the waist.

**Cagayan**. (1.) Prov. (area 5,291 sq. m.) N. of Luzon, Philippines; extremely fertile and heavily wooded; exports large quantities of tobacco. Pop. 155,000. Tuguegarao, the capital, is 210 m. N. by E. of Manila. (2.) Cap. of Misamis prov., Mindanao I., Philippines, on riv. of same name, close

to the coast. Gold is found in the district. Pop. 7,000.

**Cage-birds**, as defined by Bechstein, are birds kept in confinement for the sake of their beautiful plumage, their agreeable song, their lively disposition, or for the interesting study of their habits. The favourite cage-birds are the songsters. In the first rank are the skylark, woodlark, nightingale, song-thrush, blackbird, starling, and blackcap. Among songsters of lesser note may be mentioned the bullfinch, linnet, goldfinch, siskin, and canary. Among birds remarkable for the beauty of their plumage are the parrots, parakeets, and cockatoos. The hardiest talking parrot is the yellow-faced Amazon, the well-known African gray being exceedingly difficult to acclimatize. The cockatoos, though very showy birds, are noisy, and do not make good talkers. Among foreign song-birds are the canary, American mocking-bird, Virginian nightingale, bluebird, and the Peking nightingale. The canary, though a foreign bird, has become thoroughly acclimatized in Europe.

Birds may be divided, in regard to their food, into four classes—(1) those, such as canaries, linnets, finches, siskins, and redpolls, which eat seeds only; (2) those which eat seeds and insects, such as the larks and tits; (3) those which feed on insects and berries, as nightingales, thrushes, blackbirds, and blackcaps; (4) those, such as starlings, wagtails, redstarts, hedge-warblers, red-breasts, and wrens, which feed on insects only. For most of the seed-eating birds canary seed and summer rape form the staple diet, varied occasionally with a little hemp and green food; for the insect eaters, meal worms, ants' eggs, insects, bread, and various seeds may all be given.

The nightingale is one of the most difficult birds to feed and rear properly; the starling and the redbreast, on the contrary, will eat and thrive on almost anything. Several prepared foods can be procured, upon which most birds may be safely fed.

The maladies of cage-birds are mostly due to overfeeding, unsuitable food, and want of exercise. Epilepsy, caused by excessive feeding, is very common; a remedy is to dip the bird in cold water, and then to cut its claws to the quick. A few drops of olive oil may produce a good effect. Other common complaints are constipation and diarrhoea. Pulmonary troubles may be brought on by a chill, or by too heating food. For ordinary ailments a drop of castor oil, administered on the point of a quill, is generally efficacious. As most birds are very delicate, they should never be allowed to remain in a draught. It is equally bad to expose them unprotected to the rays of the sun, or to keep them in an overheated room.

Moulting is a critical period for all birds. At such times great care is necessary; stimulating food should be given, and a rusty nail in the drinking water is a good tonic.

**Cages**, of iron or other strong materials, have several times in history been used by human tyrants for the imprisonment of their victims. For instance, Alexander the Great kept Callisthenes for seven months in an iron cage for refusing to acknowledge his divinity. Edward I. of England confined the Countess of Buchan and one of the sisters of Robert Bruce in iron cages on the walls of Berwick. Tamerlane was said to have kept (1402) the Ottoman sultan Bayazid I. in an iron cage, but it was only a barred palanquin. Louis XI. imprisoned Cardinal Balue for eleven years in

an iron cage at Loches, on the Indre. Catherine II. of Russia is said to have kept her wig-dresser shut up in an iron cage to prevent him from making indiscreet revelations. The Anabaptist leaders, John of Leyden, Knipperdolling, and Krechting, after their capture and execution, were exposed in iron cages (1536) on the church of St. Lambert at Münster in Westphalia.

**Cagli**, tn. and episc. see of Italy, prov. Pesaro and Urbino, 13 m. s. of Urbino; has silk industry. Pop. 12,000.

**Cagliari**. (1.) Province of Italy (area, 5,184 sq. m.; pop. 525,000), coincident with the s. half of the island of Sardinia. (2.) Town on s. coast of Sardinia, at the head of the gulf of the same name. It is the capital of the province and of Sardinia. Among the more important buildings are the citadel (13th century), the university (1596), the cathedral (14th century). The town also possesses a Roman amphitheatre, a Carthaginian-Roman necropolis, etc. The harbour, naturally good, has recently been improved by the construction of two breakwaters. Cottons, woollens, biscuits, soap, and salt are the principal products; large quantities of wine are made in the vicinity. Pop. about 60,000. Cagliari, the *Carales* of the Romans, was founded by Phœnician colonists, and in the middle of the 6th century B.C. became a Carthaginian stronghold. Three centuries later it passed into the hands of Rome; in 455 was conquered by the Goths, in 720 by the Saracens, and in the 11th century by the Genoese and Pisans—the former being defeated in the bay by the allied Venetians and Aragonese, the latter driven out by the Aragonese in 1326. In 1640 the place was attacked by a Turkish fleet, and in 1708 was bombarded by the English.

**Cagliari**. See VERONESE, PAOLO.

**Cagliostro**, ALESSANDRO, COUNT (1743–95), an *alias* of Giuseppe (son of Pietro) Balsamo, was born at Palermo. After a wild youth, he emigrated through fear of a goldsmith whom he had defrauded. At Messina (or Malta) meeting Althotas, a Greek chemist, he travelled with him through the Archipelago, till the latter died at Rhodes. From Turkey, Persia, Arabia (where he was entertained at Mecca and Medina as a man of repute), he returned with money (1773), and married, either at Rome or at Naples, the beautiful Lorenza Feliciana, with whom he resumed his travels and adventures, and visited at Holstein his rival, 'Count St. Germain.' At Strassburg (1780) he gained notoriety by his cures, and by vending the 'elixir of life.' In London he established a cult of freemasonry (Egyptian), but had to flee to Paris. Here he revived his Egyptian cult, creating the lodge 'Isis.' Intimate with Cardinal de Rohan, and implicated in the affair of the diamond necklace, he was put in the Bastille, and then exiled. In St. Petersburg his frauds were detected by Rogerson, a Scottish physician; at Basel he was visited by Lavater (see Mirabeau's *Letters on Cagliostro and Lavater*, 1786). Venturing to Rome (1789), he was tried (1790) for freemasonry and sorcery, and imprisoned first at San Angelo, then at San Leone, in the duchy of Urbino, where he died. His *Life*, compiled from his trial, was published at Rome (1791). Goethe saw him, and wrote a romance (*Der Gross-Cophta*) on his life; Dumas père, in his *Mémoires d'un Médecin*, and Carlyle, in his *Cagliostro and the Diamond Necklace*, have treated the same theme. See also Trowbridge's *Cagliostro* (1910).

**Cagnola**, LUIGI, MARQUIS (1762-1833), Italian architect, born at Milan. His works include the magnificent triumphal arch, Arco della Pace (built 1804, of white marble), the chapel of St. Marcellina in the church of Sant' Ambrogio, and the Porta di Marengo, all at Milan. He also built the campanile at Urgano, near Bergamo.

**Cagots**, the French name (Sp. Agots) for an outcast people in the Western Pyrenees. From the accounts cited by De Rochas, it seems clear that leprosy was originally one of the causes of their proscription. The descendants of the Cagots appear to have thrown off all hereditary disease, and to present no marked physical differences from the neighbouring population, unless in the fact that fair hair and blue eyes are common among them—a fact sometimes cited in support of the belief that they are descended from the Visigoths. Certain references, identifying them with the Arian heretics (Vandals), suggest that their religion was the chief cause of their persecution; and *cagot* itself is thought to be a corruption of *canes gothi*, 'dogs of Goths,' i.e. *Visigoths*, who were also Arians. There is no evidence that they ever used a separate language. The etymological question is specially dealt with by Michel in his *Histoire des Races Maudites de France et d'Espagne* (1846). See also De Rochas's *Les Parias* (1876); Webster's *Bulletin de la Société Ramon* (1867); Tuke, *Jour. Anthropol. Inst.* (1880).

**Cagsaua**, tn., Philippine Is. See DARAGA.

**Caguas**, tn., Guayama, Porto Rico, 18 m. S.E. of San Juan; has hot springs, and quarries of marble and limestone; tobacco is manufactured. Pop. 10,000.

**Caher**, par. (13,646 ac.) and mrkt. tn. in Co. Tipperary, Ireland, on Suir R., 11 m. W. of

Clonmel. On an island in the river stands the castle, founded in 1142. Once a centre of the straw-plait industry. Pop. par. 4,000; of tn. 2,000.

**Cahors** (anc. *Divona*), cap. dep. Lot, France, on a rock peninsula on the r. bk. of the Lot, 60 m. N. of Toulouse. It is an episcopal see, with a Roman-Byzantine cathedral and the palace of Pope John XXII. (1316-34), who was a native, and founded (1321) the university (closed 1751). Textiles and earthenware are manufactured, and there are large distilleries, dyeworks, and shoe factories, with a trade in corn, wine, brandy, and fruit. Clément Marot was born here in 1495, and Gambetta (bronze statue) in 1838. Pop. 13,200.

**Caibarien**, seapt., Santa Clara prov., Cuba, 193 m. E.S.E. of Havana; sponge fishing and the sugar trade are the chief industries. Pop. 7,000.

**Caicos and Turk's Islands**, isls. S. of Bahamas, W. Indies, are under the government of Jamaica; consist of more than thirty small cays, of which only eight are inhabited. The largest are North, East, and Grand, the last being the seat of government. Turk's Island is included with Caicos. The total area is 165 sq. m. The most important industries are salt-making and the cultivation of Sisal fibre. There are also a sponge industry and an export of turtle-shell. The total trade is valued at over £50,000 per annum. Climate healthy, but enervating to Europeans. Pop. 5,400.

**Caillard**, SIR VINCENT HENRI PENALVER (1856), English administrator, entered the Royal Engineers (1875), and was on headquarters staff in Egypt (1882). After serving on various colonial missions in the East (Montenegro, Epirus), he was (1883-90) president of the Ottoman Public

Debt Council, and financial representative of England, Holland, and Belgium in Constantinople; chairman of Tariff Commission, 1904. He was knighted in 1896.

**Caillé** (sometimes, though apparently erroneously, written **CAILLIÉ**), **RENÉ** (1799-1838), French traveller, was born at Mauzé, Deux-Sèvres; set out, April 19, 1827, from Kakondy in Sierra Leone, and arrived at Timbuktu, April 20, 1828. The Paris Geographical Society's premium of 10,000 francs was awarded him, and his *Journal* was published in 3 vols. (1830). See Goepp and Cordier's *Les Grands Hommes de France: Voyageurs—R. Caillé* (1885).

**Cailliaud**, **FRÉDÉRIC** (1787-1869), French explorer, was born at Nantes. During an expedition to Egypt in 1815 he succeeded in locating the ancient emerald mines of Jebel Zubara, and made other important archæological discoveries in the oases of Siwah. See his *Voyage à Méroé au Fleuve Blanc*, etc. (1826-7), *Voyage à l'Oasis de Syouah* (1828), and *Recherches sur les Arts.... des Anciens Peuples de l'Égypte, de la Nubie et de l'Éthiopie* (1831-7).

**Caiman**, or **CAYMAN**, a name given to five species of alligator found in Central and S. America, which differ in certain minor points alike from the alligator of China and from that of the S. States of N. America. See **ALLIGATOR**.

**Cain** (Heb. 'acquisition'), the first-born of Adam and Eve. He became a husbandman, and slew his shepherd brother Abel. In the land of Nod, Cain founded the first city, and there is a Jewish tradition that he was accidentally slain by his descendant Lamech. See C. F. A. Dillmann's *Genesis* (1881; trans. by W. B. Stevenson, 1897), on ch. 4; and **CAINITES**.

**Caine**, **THOMAS HENRY HALL** (1853), novelist and dramatist, was

born at Runcorn, Cheshire, but his early years were spent in the Isle of Man. For some years he was an architect and journalist in Liverpool. From Liverpool he went to London on the invitation of D. G. Rossetti, and wrote for the *Athenæum*, the *Academy*, and other papers. Since then Mr. Caine has led a very busy literary life, his works including *Sonnets of Three Centuries*, *Recollections of Rossetti* (1881), *Life of Coleridge*, *Cobwebs of Criticism*, and the novels *The Shadow of a Crime* (1885), *A Son of Hagar* (1887), *The Deemster* (1887; dramatized as *Benny-Chree*), *The Bondman* (1890), *The Scapegoat* (1891), *The Little Manx Nation* (1891), *Capt'n Davy's Honeymoon* (1892), *The Manxman*, *The Christian*, *The Eternal City* (1901), *The Prodigal Son* (1904), *My Story* (1908), and *The White Prophet* (1909). *The Manxman*, *The Christian*, and *The Eternal City* have also been dramatized. Mr. Caine went to Canada to negotiate terms with the Dominion government with regard to Canadian copyright, and drafted a bill on the subject. See Kenyon's *Hall Caine: the Man and the Novelist* (1901).

**Caine**, **WILLIAM SPROSTON** (1842-1903), English politician and temperance reformer, was born at Seacombe, in Cheshire. Scarborough returned him to the House of Commons in 1880, and in 1884 he was appointed civil lord of the Admiralty in the Gladstone administration (1880-85). In 1886 he was elected by Barrow-in-Furness as a Liberal Unionist. In 1892 he became Home Rule member for Bradford, and from 1900 to his death sat for the Camborne division of Cornwall. His reason for returning to Mr. Gladstone in 1892 was Mr. Goschen's proposal to compensate publicans who might be deprived of their licences. He took an interest in Indian affairs;

sat on the royal commissions on the licensing laws and Indian finance; and wrote *Picturesque India* (1890) and other books. See *Life* by J. Newton (1907).

**Ca'ing Whale**, or PILOT WHALE (*Globiocephalus melas*), a cetacean which reaches about twenty feet in length, and occurs commonly round the Faroe Islands, and off the north of Scotland. Very similar forms are present in nearly all seas, but it is still doubtful whether or not these all belong to the same species. The ca'ing whale is gregarious, and is met with in large herds or 'schools.' Unlike the allied grampus, it does not display great ferocity, and lives chiefly on cuttle-fish. The colour is an almost uniform black, and there are small conical teeth in each half of the upper and under jaws. It yields a considerable quantity of oil, and the flesh and blubber are eaten both fresh and salted. The name is Scottish, and is derived from the fact that these whales can be 'ca'd' or driven like herds of cattle.

**Cainites**, an immoral sect of Gnostics, agreeing generally with the Ophites. Their distinctive feature seems to have been their approbation of the black sheep of Scripture—*e.g.* Cain, Esau, Korah, the Sodomites, and even Judas Iscariot, whom they held to have possessed an enlightenment and spirituality higher than those of their respective antagonists.

**Calque**, a light rowing boat used by the Turks. The larger kinds can accommodate as many as twelve rowers.

**Ca ira** ('It will go on'), a popular French song of 1789. The words were by Ladré, a street singer; the air was by Bécourt, an obscure musician. The refrain became the party cry of the revolutionists, and was prohibited by the Directory in 1797.

**Caird**, EDWARD (1835-1908), Scottish philosopher, was born at Greenock; was fellow and tutor of Merton College, Oxford, from 1864 to 1866; professor of moral philosophy at Glasgow University from 1866 to 1893; and master of Balliol from 1893 to 1907. In 1891-2 he was Gifford lecturer at St. Andrews, receiving the corresponding appointment at Glasgow in 1900. In 1877 Caird published a *Critical Account of the Philosophy of Kant*. To Blackwood's 'Philosophical Classics' he contributed *Hegel* (1882). His other works are *Religion and Social Philosophy of Comte* (1885), *Critical Philosophy of Immanuel Kant* (1889), *Essays on Literature and Philosophy* (1893), *The Evolution of Religion* (1893), *The Evolution of Theology in the Greek Philosophers* (1904), and *Lay Sermons and Addresses* (1907). See Innes Addison's *The Snell Exhibitions* (1901).

**Caird**, SIR JAMES (1816-92), Scottish writer on agriculture, born at Stranraer, Wigtownshire. A treatise on *High Farming as the Best Substitute for Protection* inaugurated his career. A Liberal in Parliament (1857-65), he carried a measure for the collection of agricultural statistics, backed by a vote of £10,000. Chairman (1863) of a Royal Commission on Sea Fisheries, he had a main hand in the report (1866) which has since guided legislation. His other works include *English Agriculture in 1850-1*, *Landed Interest* (1878), and *India: the Land and the People* (1883).

**Caird**, JOHN (1820-98), Scottish theologian, elder brother of Edward Caird, born at Greenock; was minister of Newton-on-Ayr (1845-7), of Lady Yester's, Edinburgh (1847-9), and of Errol, Perthshire (1849-57). In 1857 he preached before Queen Victoria the famous sermon 'Religion in Common Life.' He was minister

of Park Church, Glasgow (1857-62), and in 1862 became professor of theology in the university, and in 1873 was appointed principal. In 1890 his university made him its Gifford lecturer. Caird published *Introduction to the Philosophy of Religion* (1880; 2nd ed. 1900), and contributed *Spinoza* to Blackwood's 'Philosophical Classics' (1888). In 1899 appeared *University Addresses and University Sermons, 1873-98*. Caird's Gifford Lectures, to which a Memoir by his brother, the late Master of Balliol, is prefixed, were published in 1900 as *The Fundamental Ideas of Christianity* (2 vols.).

**Caird, MRS. MONA**, English novelist and writer on social questions, was born in the Isle of Wight. Her articles on 'Marriage' in the *Westminster Review* (1888) first brought her into notice; and she has also published *The Wing of Azrael* (1889), *A Romance of the Moors* (1891), *A Sentimental View of Vivisection* (1896), *The Daughters of Danaus* (1894), *The Morality of Marriage* (1897), *The Pathway of the Gods* (1898), and *The Romantic Cities of Provence* (1906).

**Cairn**, in Scottish archæology, a mound of stones raised over prehistoric interments, and thus akin to *barrow* in England. Ancient cairns are of two types—chambered, belonging to the stone age; unchambered, of the bronze age—the first being divisible into two varieties, long cairns and horned cairns. The latter are found over the British Isles, but the former exclusively in the north-east of Scotland. The essential constructive features of stone age cairns are a definite ground plan, and a passage leading from the bounding stones to the central enclosure of chambered tombs, megalithic in character, and implying family or tribal sepulture. In round cairns usually but one central cist is found, around which

there may be minor deposits of unenclosed urns, or of burials without urns. The pottery of the chambered cairns consists of broad, shallow, frequently round-based vessels, and the implements are neolithic in type; while round cairns yield vessels of the tall, flat-based, richly-decorated forms characteristic of the bronze age, and include implements of bronze and ornaments of jet. Cairns are also erected in modern times as monuments—*e.g.* the cairn in memory of the Prince Consort at Balmoral. See Anderson's *Scotland in Pagan Times: the Bronze and Stone Ages* (1886); also BARROW.

**Cairnes, JOHN ELLIOT** (1823-75), Irish political economist, was born in Ireland; in 1856 won the Whately professorship of political economy at Trinity College, Dublin, by competitive examination. His first course of lectures was published as *The Character and Logical Method of Political Economy* (1857). In 1862, in *The Slave Power*, he made a powerful defence of the cause of the Northern States of America. In 1866 he was appointed professor of political economy in University College, London. In 1873 he published a volume of *Political Essays*, and also a volume of *Essays in Political Economy*. His *Leading Principles of Political Economy* appeared in the following year, and placed him in the front rank of contemporary economists.

**Cairngorm**, brown and yellow varieties of quartz, used in the manufacture of jewellery, especially in Scotland; formerly obtained principally near Cairngorm, a summit of the Grampians. The crystals are formed in cavities in the granite, and are found in the loose material which accumulates when the rock decomposes. The mineral has been found also in the Mourne Mountains in Ireland, in the Scottish

island of Arran, and other localities in Britain, and in very large specimens in Switzerland, Colorado (U.S.A.), etc. The value of the stone depends on its colour, and on its freedom from flaws and enclosures. Coarse specimens are almost valueless. When pale yellow, it is known as citrine, or false topaz; when brown, it is cairngorm, or smoky quartz; when black and almost opaque, morion. The source of the colour is disputed, some ascribing it to the presence of a small quantity of oxide of iron, but it is more probably due to an organic pigment.

**Cairngorm**, mountain (4,084 ft.) between Banffshire and Inverness-shire, Scotland, 3 m. N.E. of Ben Macdhui. It is part of the Grampian range, and its western sides are clothed with pine forests. It gives its name to the rock crystals referred to above.

**Cairns**, seapt. on the N. coast of Queensland, in Nares co., 100 m. S. by E. of Cooktown. Its fine harbour is the outlet for mineral fields, including the Chillagoe. Sugar, bananas, and tropical crops are cultivated. Pop. 3,600.

**Cairns**, SIR HUGH M'CALMONT CAIRNS, FIRST EARL (1819-85), Lord High Chancellor of Great Britain, was called to the English bar in 1844, and became Q.C. 1856. He entered Parliament as member for Belfast (1852); was appointed solicitor-general by Lord Derby and knighted (1858); became attorney-general (1866). He was created Viscount Garmoye and Earl Cairns in 1878. Cairns was an accomplished pleader, lucid in argument, and passionless in manner. He was equally good in the House of Lords and the House of Commons, and his 'Peace with Dishonour' speech after Majuba is considered by many the greatest modern oration delivered in the House of Lords. See Atlay's *Victorian Chancellors* (1908).

**Cairns**, JOHN (1818-92), Scottish Presbyterian divine, was born at Ayton Hill in Berwickshire; minister at Berwick-on-Tweed in 1845. In 1867 he was appointed professor of apologetics in the United Presbyterian Theological Hall, Edinburgh. In 1876 he left Berwick, becoming joint-professor of systematic theology and apologetics. In 1879 he was appointed principal of the United Presbyterian Theological College, Edinburgh. Cairns published *Examination of Ferrier's 'Knowing and Being,'* and *The Scottish Philosophy: a Vindication and Reply* (1856); *Memoir of John Brown, D.D.* (1860); a strong criticism of Strauss and Renan in *False Christs and the True* (1864); *Outlines of Apologetical Theology* (1867); and an acute and searching treatise, *Unbelief in the 18th Century* (1881). *Christ the Morning Star, and other Sermons*, appeared in 1893. See MacEwen's *Life* (1895), and Masson's *Recent British Philosophy* (1865).

**Cairntoul**, one of the Cairngorm group of the Grampians, Scotland; alt. 4,241 ft.

**Cairo** (kī'rō) (*El-Kâhira*, or *Masr*), cap. of Egypt, is situated on the E. bk. of the Nile, 9 m. S. of the apex of the delta. It includes the district and port of Boulak. Cairo is reached by rail (147 m.) from Port Said in about 5 hours, and from Alexandria (130 m.) in 3½ hours. The mean temperature in winter is 59° F.; spring, 78°; summer, 83°; autumn, 66°. The khamsin, a hot sand-laden wind, blows irregularly, at intervals, for two or three days at a time during spring, the temperature during this time rising to 106° F. Owing to the extreme dryness of the air the heat is not oppressive, except from the end of July till October, when the thermometer at times reaches 122° in the shade. There are at least 150 mosques, of which





*Cairo—Street Scene.*

the Sultan Hassan is one of the most beautiful, and those of Amr and Ibn Tulûn are the oldest. In the eastern part of the city are the magnificent mausolea which are supposed to contain the tombs of the caliphs; in the southern part are the mosques containing the tombs of the Mamelukes; and to the southwest is the tomb of the founder of the Islamic sects, Imam esh-Shafil or Shaf'i. The El-Azhar, or native university, is not under government control.

Cairo is the see of a bishop of the Coptic Church, of the Greek Orthodox Church, and of the Roman Catholic Church. The principal public buildings are the Abdin palace, with barracks for the Egyptian army; the citadel, containing the barracks of a portion of the British army of occupation; the Abassieh barracks, and the Kasr-el-Nil barracks; the public works department and other government buildings; the British agency in Kasr-el-Dûbara; the Kasr-el-Aini hospital; two museums, one in which many of the Egyptian treasures brought to light by the excavations are preserved, the other containing specimens of Arab art; the vice-regal library, with a valuable collection of manuscripts of the Koran; the law courts and the opera house. Cairo is practically divided into two towns, the European and the native; the latter however, is fast disappearing, to make way for hotels, offices, and shops. There are three railway stations, and three bridges span the Nile. The water supply of Cairo is excellent. A network of electric trams covers the city, extending to some of the suburbs, and electric lighting is general. The principal suburbs of Cairo are Gezireh, Masr-el-Atîka, Shûbra, Abassieh, and Zeitûm, in some of which a large and increasing English population is

springing up. On the edge of the eastern desert, and not far from Matariya, in a most beautiful situation, an entirely new oasis city is being built, which an electric tram will bring within 15 minutes of Cairo. There are two noted health resorts in the neighbourhood—Mena House, 7 m. distant (electric tram), specially suited for lung complaints, and Helouan 15 m. (railway), celebrated for its sulphur baths, and saline and chalybeate springs.

In 1517 the Turks seized Cairo, and from that date until the time of the French expedition in 1798, the city was practically non-existent. Napoleon occupied the city in 1800, but in 1801 the French garrison was forced to capitulate to the grand vizier. Under Mehemet Ali Cairo began to assume its present modern aspect. (See also EGYPT.) Pop. (est. 1910) 620,000 Egyptians and 60,000 foreigners. See *The Story of Cairo* (1904); and *Modern Egyptians* by Stanley Lane-Poole; also Ball's *Cairo and its Environs* (1908); and Lamplough and Francis's *Cairo* (1909).

**Cairo**, city, Illinois, U.S.A., the co. seat of Alexander co., situated at the junction of the Mississippi and the Ohio, 125 m. s.s.e. of St. Louis; has considerable trade in grain, oil, and manufactured goods. It is the Eden of Dickens's *Martin Chuzzlewit*. Pop. 13,000.

**Cairol**, BENEDETTO (1825-89), Italian soldier and statesman, was born at Pavia. In 1848 he took part in the war against Austria. He accompanied Garibaldi to Sicily in 1859, was present at Catalafimi, and severely wounded at Palermo (1860). He was again with Garibaldi in the Tyrol (1866), and fought at Mentana (1867). Cairol, who had been a deputy for sixteen years, became leader of his party when the Left came into power (1876); and the following

year, on the fall of the Depretis-Nicotera ministry, formed a new cabinet with a Francophile and Irredentist policy. In 1878, when Passanante attempted to assassinate King Humbert, Cairoli was severely wounded while endeavouring to protect the king. Next year he formed a coalition ministry with Depretis, retaining for himself the premiership and the foreign office. Their policy having been severely blamed when France intervened in Tunis (May 11, 1881), Cairoli resigned.

**Caisson**, a water-tight box, usually of sheet iron, and so constructed that it may be floated or sunk at will. It is used for two distinct purposes. (1.) For closing the entrance to docks, the caissons being of two general types, floating and sliding. Floating caissons include all those which, when the height of water inside and outside the dock is the same, are raised by their natural buoyancy from the bottom, and may be floated out of their position against the sill into a recess provided for the purpose, leaving the entrance open. Sliding caissons fulfil the same purpose, but, instead of floating, are drawn back on a plane sliding surface or on rollers, which bear some portion of their weight. (2.) As foundations to a dam, quay wall, or bridge, the caissons being so constructed as to be capable of being floated into the required position, and there sunk. One common type has a timber bottom, separable from the sides. Masonry or concrete is built on to this while it stands beside the shore; and after the caisson has been taken out and sunk in position on a previously prepared site, the sides are detached and floated away. Another type has no bottom, but a cutting edge, which sinks into the ground when weight is applied or when the interior earth is dredged out, until the caisson

is at a sufficient depth to form, when filled with concrete, a stable foundation. Caissons are also sunk in clay, etc., and filled up with solid concrete to form the foundations of American skyscrapers. In the case of piers for bridges, where this depth cannot be attained by dredging and weighting alone, the method of excavating by hand under compressed air is usually adopted. An air-tight diaphragm is constructed across the caisson or cylinder, when sunk in position with its cutting edge embedded in the ground. Into the compartment formed below this air is forced through a pipe until the pressure is slightly greater than that of the greatest head of water. The water is thus forced out through the ground, leaving a comparatively dry bottom upon which to work. Access is obtained from the outer air by an air-lock, a chamber at the level of the diaphragm, with two air-tight iron doors, one into the lower compartment and one into the upper. Valves controlled from both inside the lock and from each compartment admit air into the lock or allow its egress.

**Caisson Disease**, a disease which affects divers workers who work in caissons, caused by pressure of water, the symptoms being fainting, paralysis, deafness, and even death. See *Luson and Hyde's Diseases of Workmen* (1908).

**Caithness**, co. in the N.E. extremity of Scotland, is bounded E. and S.E. by the German Ocean, and N. by the Atlantic. Triangular in shape, it is 28 m. wide and 43 m. long, with an area of 685 sq. m., the coast being bold and rocky. The chief mountains are Morven (2,313 ft.) and Scaraben (2,054 ft.). The climate is cold, wet, and windy, crops being late in ripening. The industries consist of agriculture and fisheries. There are also freestone and

slate quarries, and flagstones, well known and largely exported. The soils consist of black loam in the w. and N.E., clay in the N., and dark earth, with gritty sand, in the E., the Old Red Sandstone being the foundation of the principal rocks. The Highland Railway connects Wick and Thurso with the south. Stone circles are found at Stemster Loch and Bower; ancient castles at Scrabster, Dunbeath, Freswick, and Forss, and the site of John o' Groat's House. The early inhabitants of Caithness were Celts, who afterwards were mixed with the Norsemen and Danes who made many raids into the country. From the 10th to the 12th centuries Caithness was a Norse earldom. A bloody conflict occurred between the Sinclairs and the Campbells on the banks of the Altimarlach in 1680. Pop. 34,000. See J. T. Calder's *Hist. of Caithness* (1861; new ed. 1887).

**Caius, JOHN** (1510-73), English physician, best known by this Latinized form of his surname Kaye, was born at Norwich; travelled and studied on the Continent, notably at Padua; practised as a physician in England; lectured on anatomy; and was physician to King Edward VI., and afterwards to Queen Mary. In 1557 he refounded Gonville Hall, Cambridge (founded in 1348 by Edmund Gonville, rector of Terrington, Norfolk), which henceforth was known as 'Gonville and Caius College.' In 1559 he was elected master of his college, an office which he held till his death, in London.

**Caivano**, tn., prov. Naples, Italy, 7 m. by rail N.N.E. of Naples. Pop. 12,000.

**Caix, NAPOLEONE** (1845-82), Italian philologist, was born at Bozzolo, near Mantua; finally occupied the chair of Romance languages and comparative philology at Florence till his death.

His works, which deal with the Italian, Spanish, and Romance languages, are distinguished by their scientific method, and exhibit great ingenuity. His principal books are *Saggio sulla Storia della Lingua e dei Dialetti d'Italia* (1872), *Studi di Etimologia Italiana e Romanza* (1878), and *Le Origini della Lingua Poetica Italiana* (1880), this last being the most important.

**Cajabamba.** See RIOBAMBA.

**Cajamarca**, or CAXAMARCA, tn., cap. dep. of same name, Peru, on the river Cajamarca and the E. slope of the W. Cordillera of the Andes, 370 m. N.N.W. of Lima. The chief objects are the so-called house of Atahualpa, and the 'seat of the Inca' on the Santa Apolonia hill, 260 ft. above the town, probably a place of sacrifice. About 3 m. E. from Cajamarca are hot springs (Baño de Inca). It was here that Atahualpa was put to death in 1533. Straw hats, textiles, and steel are manufactured. Alt. 9,200 ft. Pop. about 12,000.

**Cajamarquilla**, tn., Libertad dep., Peru, 50 m. E. of Cajamarca. Pop. 7,000.

**Cajanello.** See EDGREN.

**Cajazzo**, tn., Caserta prov., Italy, 10 m. N.E. of Capua; good wine is produced. Pop. 6,000.

**Cajeput Tree** (*Melaleuca leucadendron*), an evergreen tree, bearing pendulous spikes of white flowers, found throughout Australia and S. Asia. It drops its bark every year, and the old bark is used by the natives as tinder. The cajeput can be cultivated under glass in Britain; it prefers a light, peaty soil. It may be propagated by cuttings taken in spring. Oil of cajeput, distilled from the leaves of *Melaleuca minor*, and imported from Batavia and Singapore, is one of the aromatic oils, resembling oil of cloves in its action, and is used externally as a stimulant and counter-

irritant, but has been largely displaced by other remedies.

**Cajetan**, JACOPO, known in religion as THOMAS DE VIO DI GAETA (1469-1534), Italian theologian, a native of Gaeta. He entered the order of the Dominicans in 1485, became professor of theology and philosophy at Brescia, Pavia, and Rome, and in 1508 was elected general of the order. Leo X. made him a cardinal (1517), and sent him the following year on a fruitless mission to Germany to admonish Luther and quiet the commotion raised by his schism. His works (*Opera Omnia*, 1639) include a translation of the Bible, and commentaries upon portions of Aristotle and Aquinas.

**Calabanga**, tn., Camerines prov., Luzon Is., Philippines, on river of same name, 8 m. N. by E. of Nueva Caceres. Manufactures fabrics of abaca, hats, and carpets of palm fibre. Pop. 6,500.

**Calabar**, a name formerly applied to a dist. of the Guinea Coast, W. Africa, roughly corresponding to the old Niger Coast Protectorate.

**Calabar, OLD**, or DUKE TOWN, now officially CALIBAR, tn., Southern Nigeria, on the Old Calabar river, an E. arm of the Niger delta. Exports palm oil, kernels, shea butter, ivory, rubber, etc. Its annual trade is valued at over £400,000. Pop. about 50,000. **NEW CALABAR** is a riv. and pt. of S. Nigeria, about 100 m. to the west.

**Calabar Bean**, the dried seed of *Physostigma venenosum*, found in W. Africa, and formerly used in Old Calabar as a test of witchcraft. The seed has two alkaloids—calabarine, not used medicinally, and physostigmine or eserine. The latter, administered internally, increases glandular secretion and intestinal peristalsis. It has little effect on the cerebrum, but acts strongly on the vital centres in the

medulla, and on the spinal cord, where it produces feebleness of muscular movement, and slightly affects sensation. It is given both by the mouth and hypodermically, for the relief of tetanus, and to antagonize the action of atropine. Its chief value in medicine lies in its action on the third cranial nerve, through which it acts on the eye, causing contraction of the pupil and relief of ocular tension. It paralyzes accommodation for distant objects. It has been recommended in the conjunctivitis of infants, in ocular paralysis due to diphtheria, and in glaucoma and corneal ulcers. It is believed to stimulate all unstriped muscle, and to increase all secretions.

**Calabash**, the hard shell of the fruit of the calabash-tree (*Crescentia cujete*), one of the order Bignoniaceæ, native to W. Africa, tropical America, and the W. Indies. The calabash is made into cups, jars, pots, kettles, and all kinds of vessels for holding liquids. It is often elaborately carved. See also BOTTLE-GOURD.

**Calabria**, a territorial division of S. Italy, stretching from 40° N. to Sicily. The S. extensions of the Apennines, 4,500 to 6,500 ft., fill the whole region, except the valley of the Crati. In the middle is La Sila, a land of great forests; and in the extreme S., overhanging the Strait of Messina, are the heights of Aspromonte (6,420 ft.). The low coasts are ravaged by malaria. Calabria contains the three provinces of Catanzaro, Cosenza, and Reggio di Calabria, with a total area of 5,819 sq. m., and a pop. of 1,450,000. Its products include wine, oil, grain, cotton, silk, rice, and fruit, and the fisheries (tunny, etc.) are important. The whole region is volcanic, and has frequently suffered from disastrous earthquakes, as in 1783, 1905, 1907, and 1908. (See MESSINA.) Calabria (formerly Brutii)

was colonized by the Greeks in the 8th century B.C. Among their settlements were the great cities of Croton, Sybaris, Thurii, Scylacium, Caulonia, and Rhegium, and, at a later date, Monteleone. Hence the country was called Magna Græcia, or Greater Greece. In the middle ages, Calabria, as it came to be called, fell into the power of the Saracens. These, again, were expelled by the Sicilian Normans, under Robert Guiscard, in the 11th century. Henceforth Calabria was governed by Naples. Down to the Byzantine supremacy (11th century) the name Calabria was applied also to the peninsula on N.E. of Gulf of Otranto, on which stood the powerful Greek cities of Brundisium (Brindisi), Tarentum (Taranto), Hydruntum (Otranto), Lupiæ (Lecce), etc. See G. Gissing's *By the Ionian Sea* (1901), and Hare's *Cities of Southern Italy* (new ed. 1911).

**Caladium**, a genus of plants the members of which are subtropical, herbaceous perennials, mostly suited for the 'stove.' They are chiefly grown on account of their beautiful foliage. The soil should be composed of equal parts of old manure, fibrous loam, leaf-mould, and peat. A liberal supply of water should be provided. During winter little or no water should be given, though a temperature of from 50° to 60° F. is required. The rhizomes should be left in the soil during this dormant season; and in March, when growth begins, the larger ones may be divided, and the pots placed in a pit or house where the night temperature does not fall below 60°.

**Calafatu**, Roumania. See KALAFAT.

**Calahorra**, city and episc. see, Spain, in Old Castile, prov. of and 25 m. E.S.E. of Logrono; one of the most ancient cities in Spain; birthplace of Quintilian,

and a noted shrine for pilgrims; produces wine. Pop. 10,000.

**Calais.** (1.) Seaport town, and chief port for continental travel via S. - E. and C. Rly., dep. Pas-de-Calais, on N.W. coast of France, 26 m. E.S.E. of Dover; strongly fortified, with lighthouse visible 20 m., several docks, sea-bathing, and a casino. The industrial commune of S. Calais contains tulle and lace factories, carriage, motor-car, engineering, and other works. The chief buildings are the weather-beaten church of Notre Dame, the old and new Hôtels de Ville (the latter at St. Pierre de Calais), and the Hôtel de Guise (originally built by Edward III.). Most of the trade is with Great Britain. Calais is an important fishing centre. In 1303 Calais entered the Hanseatic League, and after a heroic defence was taken in 1347 by Edward III. It remained under the English crown until 1558. The treaty of Brétigny was ratified here in 1360, and the town was taken by the Spaniards in 1596, but restored three years later. The total value of the trade of the port is about £11,500,000 per annum, of which lace and tulle exports account for nearly £3,000,000. Other exports are yarns, metal and brass goods, and champagne. Pop., including St. Pierre de Calais, 70,000. (2.) City, Washington co., Maine, U.S.A., 80 m. E.N.E. of Bangor, situated on the St. Croix R., which forms part of the boundary between Maine and Canada. It has a trade in lumber, and manufactures shoes and woollen goods. Pop. 8,000.

**Calamada**, Greece. See KALAMATA.

**Calamander Wood** (*Diospyros hirsuta*), the wood of a tree native to S.E. India and Ceylon, surpassing even rosewood in beauty as a cabinet wood. The prevailing tint is a fine chocolate, deepening into black, or fading into fawn,

varied with rich shades of brown. The wood is now very scarce.

**Calamba**, pueblo, La Laguna prov., Luzon I., Philippines, 17 m. s.w. of Santa Cruz; a centre for projected railways. It was the birthplace of Dr. José Rizal y Mercado, the Filipino martyr. Pop. 8,000.

**Calame**, ALEXANDRE (1810-64), chief representative artist of the Swiss school, was born at Vevey; devoted his talents to painting Alpine landscapes. His name first became known by his *Storm at the Handegg* in 1839. His principal picture is a view of Monte Rosa (1844). His style was somewhat theatrical, but his colouring fine, though he knew the snowy regions only as viewed from below. See *Life* by Rambert (1884), and examples of his work in Tate Gallery and South Kensington Museum, London.

**Calamianes Islands**, group of isls. in the Philippines, between Mindoro and Palawan; area, 677 sq. m. The chief islands are Busuanga and Calamian. The industries are cattle raising, and collecting bamboo, edible birds' nests, sea-cucumbers, turtles, shells, etc. Pop. about 17,000. Chief tn., Coron, 195 m. s. by w. of Manila.

**Calamine**, a name given to two common ores of zinc—the one being a hydrous silicate, also known as smithsonite, hemimorphite, or electric calamine; the other the carbonate. Both are frequent in veins which carry zinc blende, the commonest of the zinc ores, and seem to be derived largely from the decomposition of that mineral. They are pale yellow, pink, brown, blue, green, or colourless, and are often mixed in a fine yellowish powder, known to miners as 'dry bone.' Frequently they take the form of encrusting or stalactitic masses. They are found at Alston Moor, Cumberland, England, and at

Wanlockhead in Dumfriesshire, Scotland.

**Calamint** belongs to the order Labiatae, and much resembles its relatives the thymes and sages. Of the genus *Calamintha* several species are known, all being hardy, and all easily grown in ordinary garden soil in Britain. The tiny *C. glabella* and *C. alpina* are excellent inhabitants for the rock garden, and the larger *C. grandiflora*, which flowers in June, is suited for the general border. *C. officinalis*, the common calamint of old herbals, is a native of English hedges, as also are *C. Nepeta* (the lesser calamint), *C. clinopodium* (the wild basil), and the rarer *C. Acinos* (basil thyme).

**Calamite**, a well-known plant fossil which occurs in Carboniferous strata, and in external appearance somewhat resembles a reed, and is an extinct representative of the group Equisetaceae. The stems are often found to terminate beneath in a bluntly conical, tapered point; while towards their apex they bear many branches, which arise in whorls from certain of the nodes. On these branches finer branchlets are planted in similar fashion, and the ultimate ramifications bear whorls of little linear leaves which are known as annularia, asterophyllites, etc. Calamites are not the stem of a plant, but a cast or impression of the pith cavity.

**Calamus**, a genus of Asiatic palms, all the species of which, to the number of about 150, are of great beauty. Of the smaller species may be named *C. ciliaris*, in which the pinnate leaves are clothed with hairs; and *C. spectabilis*. Malacca canes are obtained from *C. scipionum*, and rattan canes from *C. rotang*, *C. tenuis*, and *C. viminalis*. See DRAGON'S BLOOD.

**Calamy**, BENJAMIN (1642-86), prebendary of St. Paul's, London, the son of Edmund Calamy the

elder. His *Discourse about a Doubting*—(2nd ed. has *Scrupulous*)—*Conscience* (1683) was accepted as a challenge by the Nonconformists, and replied to by Thomas de Laune in *A Plea for the Nonconformists* (1683).

**Calamy, EDMUND, THE ELDER** (1600–66), English divine, was born in London. From 1626–36 he was one of the lecturers of Bury St. Edmunds. He left the Anglican Church, became a Presbyterian, and in 1639 was appointed minister of St. Mary's Aldermanbury, London, where he officiated for twenty years. He was one of the five authors of the work entitled *Smectymnus* (1641), written in controversion of Bishop Hall's *Divine Right of Episcopacy*. He became chaplain-in-ordinary to Charles II. He was one of the representatives of the Presbyterians at the Savoy Conference. In 1662 he was ejected from his living by the Uniformity Act, and committed to Newgate.

**Calamy, EDMUND** (1671–1732), published forty-one works, vigorously upholding liberty of conscience as the foundation of Nonconformity. The best known is his *Account of the Ministers ejected after the Restoration* (1689). See his *Historical Account of my own Life* (1829).

**Calañas**, tn., prov. Huelva, Andalusia, Spain, 30 m. N. of Huelva. Produces copper. Pop. 8,500.

**Calandrinia**, a genus of plants of the rock purslane order (Portulacaceæ). All the species are fleshy, with sprawling or trailing habit and entire leaves. Some are annual and some perennial; but in English gardens all are usually raised from seed, and treated as half-hardy annuals. The flowers open fully only in sunshine. Among the annuals may be named *C. nitida*, with pink flowers; *C. discolor*, whose petals are pink and stamens bright yellow; and *C. grandiflora*; whilst of biennials

and perennials the crimson *C. umbellata* is the best known.

**Calanthe**, a genus of terrestrial orchids. The leaves are broad and plaited, and the large white-and-pink flowers, borne on long spikes, are characterized by the possession of a large calcarate lip. Some species are deciduous and some evergreen; the greater number of varieties grown by horticulturists are hybrids obtained by artificial crossing. The pot should be one-third filled with crocks, on which should be placed a thin layer of turf, with the grassy side downwards, and on this a mixture of two parts fibrous loam, one part leaf-mould, and one part peat, with a little sand. After potting, calanthes should be given very little water for three weeks, but during the period of active growth a moderate supply of water is desirable. Calanthes require the temperature of the E. India house, and may be well grown in cucumber houses. Of the species and hybrids may be named the white-flowered deciduous *C. vestita*, with its varieties *C. v. rubro-oculata*, *C. v. Turneri*, and *C. v. gigantea*; the lilac-flowered evergreens *C. Dominii*, *C. versicolor*, *C. Veitchii*, *C. Regnieri*; and the white-flowered evergreens *C. veratrifolia* and *C. macrolaba*. See White's *Book of Orchids* (1902).

**Calapan**, cap. of Mindoro prov., Mindoro I., Philippines, 90 m. S. by E. of Manila. Pop. 5,600.

**Calarasi**, or STIRBEY, tn., cap. of prov. Ialomita, Roumania, on the Borcea arm of the Danube, opposite to Silistria, 65 m. E. by S. of Bucharest. Exports grain. Pop. 11,000.

**Calas, JEAN** (1698–1762), a Protestant merchant of Toulouse, who (his son, Mark Antony, having hanged himself), was accused of having strangled the youth to prevent him from abjuring Protestantism and adopting Roman Catholicism. On this charge the



old father was condemned by eight judges to be tortured and burned, and the sentence was carried out. Calas's other son was banished, his daughters were placed in convents, and his wife escaped to Switzerland, where Voltaire took up her case, and got the sentence annulled. See Voltaire's *Sur la Tolérance*, and Dryandar's *Der Prozess Calas* (1887).

**Calascibetta**, tn. Sicily, prov., of and 15 m. N.E. of Caltanissetta, stands on an isolated hill (2,880 ft.) opposite to Castrogiovanni, and produces wine, olive oil, and silk. Pop. 9,000.

**Calash** (Fr. *Calèche*), a light four-wheeled carriage with a folding roof or hood.

**Calasiao**, tn., Pangasinan prov., Luzon I., Philippines, 9 m. E. by S. of Lingayan; manufactures hats, tobacco, and woven goods. Pop. 17,000.

**Calasparra**, tn., Spain, prov. of and 32 m. N.W. of Murcia; manufactures esparto goods and soap. Pop. 6,000.

**Calatafimi**, tn., prov. Trapani, Sicily, 32 m. S.W. of Palermo. In the vicinity are the ruins of the ancient Segesta, and about 2 m. to the S.W. Garibaldi defeated the Neapolitans in 1860. Pop. 12,000.

**Calatayúd**, city, Spain, in Aragon, prov. of and 52 m. S.W. of Saragossa, on main railway to Madrid. Curious ancient town on rocky eminence, with splendid ruined castle. Site of the ancient Bilbilis, and birthplace of Martial, the Latin poet; now purely agricultural, dull and backward. Pop. 11,500.

**Calathea**, a genus of perennial handsome-leaved stove plants, natives of Central and S. America, and members of the Scitamiaceæ. The genus is commonly confounded with that known as Maranta, but the flowers are usually borne in heads, while in Maranta the flowers are as a rule few, and loosely arranged. The

soil best suited to these plants is a mixture of two parts fibrous loam, one part leaf-mould, and one part peat, with a little sand, the whole being left in the form of small lumps. Calathea should be repotted annually, either in autumn, or preferably about the end of March. All the old soil should be carefully shaken from the roots, which may then be divided if desired. For a time after being repotted the plants should be kept slightly moist, warm, and shaded. During active growth abundance of water is needed. In winter the temperature should be kept always above 60° F., and the plants should never be allowed to get quite dry. In summer they should be shaded from the hot sun. Among the species and varieties may be named *C. Lindeni*, *C. Makoyana*, *C. nitens*, *C. Veitchiana*, and *C. Warscewiczii*.

**Calatrava la Vieja**, ruined fortress, prov. of Ciudad Real, Castile, Spain, on Guadiana, 12 m. N. of Ciudad Real. It was taken from the Moors in 1147. In 1158 the order of the Knights of Calatrava was founded here. The fortress was destroyed in 1197, and the knights were forced to transfer their castle to Salvatierra. In 1808 the order was changed into an order of merit.

**Calauria**, a small island (now Poros) in the Saronic Gulf (now Gulf of Ægina), Greece. It contained a temple of Poseidon, which was regarded as an inviolable sanctuary. Demosthenes took refuge there from Antipater, and poisoned himself to escape arrest in 322 B.C.

**Calaveras**, co. in California, U.S.A., near the middle of the state. Its forests contain gigantic oaks, pines, etc., but more interest attaches to its grove of *Sequoia gigantea* at Bigtrees.

**Calbáyog**, tn. on W. coast of Samar I., Philippines, 29 m. N.W.

of Catbalogan; has active fisheries, and exports hemp, abaca, etc. Pop. 16,000.

**Calbe**, tn., Prussian Saxony, on the Saale, 15 m. s. by E. of Magdeburg; has textile and sugar manufactures. Pop. 12,500.

**Calcaire Grossier**, a richly fossiliferous series of limestones and marls, which are developed in the Paris basin, and belong to the middle Eocene period. It is about a hundred feet thick, contains a great variety of fossil shells, and has yielded also numerous remains of mammals. The Bracklesham Beds of the south of England are of similar geological age.

**Calcarea**, or CALCISPONGIÆ, the group of sponges in which the skeleton consists of spicules of lime. The common British 'purple sponge' (*Grantia compressa*) is an example. See SPONGES.

**Calcareous Rocks** consist of carbonate of lime, whether in the form of calcite or aragonite. The majority have been formed in the sea, and are composed of the remains of marine animals, such as corals, crinoids, brachiopods, molluscs, echinoderms, and foraminifera. Similar materials are accumulating in the sea bottom at the present day as banks of shells or as coral reefs. The lime salts which exist in solution in sea water are extracted by the living tissues of these animals, and deposited in the form of carbonate of lime by their shell-secreting membranes. Most limestones, in consequence, are of organic origin; as a rule, they contain numerous fossils which indicate this; but others have formed as precipitates by the evaporation of calcareous solutions. Stalactite and calc-sinter belong to this group, and many geologists believe that oolites are of similar derivation. (See OOLITE.) Another series of calcareous rocks is crystalline, and may be called the marbles,

as marble is a typical example. They are associated usually with the crystalline schists and with the contact rocks which are developed by the action of the heat, given out by great masses of granite as they cool, on the rocks surrounding them. Their origin is still problematic, but many geologists hold that they were originally limestones of organic origin, and that their present crystalline structure, and the absence of fossil remains, are due to changes which they have undergone, and which have obliterated all traces of their original character.

**Calcareous Soils.** Most calcareous soils, such as those of the Upper Chalk, are not noted for their fertility or agricultural value. They are apt to be very thin, and full of hard nodules of flint, the insoluble ingredients of the chalk beneath, and are more adapted for sheep pasture than for corn-growing. But if in other respects the soil is good, the presence of a considerable amount of calcareous matter does it no great harm; and soils which contain no carbonate of lime are invariably improved by the addition of chalk or some other lime compound. The acids generated by the decomposition of vegetable matter require to be neutralized, and for this purpose carbonate of lime is essential; hence peaty soils are much benefited by being dressed with chalk. Calcareous soils are soft, friable, and 'light;' in other words, they are easily worked. They are comparatively dry, as they are more porous than clay soils, though less so than sands or sandy loams; and they retain a fair amount of water, so that they are not so readily parched in dry weather. Owing to their light colour, they absorb heat only slowly, so that in spring they do not warm so rapidly as dark soils, and are consequently

somewhat late. They do not become acid or 'sour,' and are usually rich in phosphates, which are a frequent ingredient of limestones; but, on the other hand, they are poor in potash. See W. Fream's *Soils and their Properties* (1890), Hall's *The Soil* (new ed. 1910), M'Connell's *Agricultural Geology* (1902), and King's *The Soil* (1900).

**Calcareous Tufa.** See CALC-SINTER.

**Calcasieu,** river, Louisiana, U.S.A., flows s.w. through Lake Calcasieu (20 m. long by 5 m. wide) into Gulf of Mexico, after a course of 230 m., 100 m. of which are navigable for steamers.

**Calceola,** or SLIPPER CORAL, a characteristic fossil of the middle Devonian, is so called from its resemblance to the toe of a slipper, being conical, slightly flattened on one side, curved, and tapering to a blunted point. It is abundant in the limestones of the Eifel, on the west of the Rhine, in Germany.

**Calceolaria,** a genus of plants, natives of S. America, Mexico, and the W. Indies, belonging to the order Scrophulariaceæ. From a gardening point of view the genus may be divided into two classes, composed respectively of herbaceous and shrubby varieties. The herbaceous kinds are usually raised from seeds, which are sown in July on light soil composed of equal parts of sand, leaf-mould, and loam. The pans of soil should be dipped in water, so as to become soaked previous to the sowing of the seed. A piece of glass should then completely cover the surface of the pan to check evaporation. They like a soil composed of equal parts of old cow manure, sand, leaf-mould, and fibrous loam. The temperature of the cool greenhouse is suited to them at all stages of their growth. The flowering season is from May to July. The shrubby kinds are usually propa-

gated by means of cuttings, preferably taken in September, and placed in a cool frame or greenhouse in a mixture of fine fibrous loam and silver sand, and kept shaded for a week. As soon as they are well rooted the young plants should be planted in small pots, and placed in a frame exposed to direct sun-heat. At about the end of February the points should be pinched off, and the plants transferred to larger pots. As they grow, they should again be moved, until the seven-inch pots are reached, or until they are planted out in May. If grown in pots, shrubby calceolarias like a soil similar to that recommended for the herbaceous kinds.

**Calchas,** a soothsayer who accompanied the Greeks to Troy. See Homer's *Iliad*, i. 68, ii. 322.

**Calciferos Formation,** of American geologists, is the lowest part of the Ordovician or Lower Silurian formation. It is a great limestone group, sometimes dolomitic and at other times arenaceous, which is well developed in the states of New York, New Jersey, Canada, Michigan, etc. The name of Beckmantown Beds has also been given to it.

**Calciferos Sandstone,** a name first given by Charles Maclaren to the lowest division of the Carboniferous rocks of Scotland. It consists of two groups of strata—a lower or red sandstone group (red, yellow, and white sandstones and marls), and an upper or cement stone group (white and yellow sandstones, black shales, thin limestones, and abundant volcanic rocks). The oil shales, on which the Scottish mineral-oil industry depends, occur in the upper part of the cement-stone series. The lowest red beds are sometimes known as the Ballagan group. The Calciferos Sandstones seem, in the main, to have been deposited in areas of shallow fresh water, but incursions of the

sea are indicated by the presence of occasional beds containing marine shells. For the distribution and subdivisions of the Calciferous Sandstones, see Sir A. Geikie's *Text-book of Geology* (4th ed. 1903). The volcanic rocks of the Calciferous Sandstone are described in his *Ancient Volcanoes of Great Britain* (1897), and 'The Oil Shales Series,' by Cadell, in *Trans. Geol. Soc. Edin.* (1901).

**Calcination**, a term used in metallurgy to denote the operation of roasting or burning ores. The process varies according to the nature of the ore, and may have for its object to expel certain volatile constituents such as sulphur or arsenic, or to produce an oxide by exposing the heated ore to air. Chalk is calcined in kilns to expel the carbon dioxide gas and produce quicklime.

**Calcite**, one of the commonest and most important of minerals, composing such rocks as marble, limestone, chalk, and oolite, and assuming an extraordinary variety of colours and forms, as stalactites, veins, concretions, petrifications, incrustations, etc. It is the principal ingredient of the shells of most marine animals, being obtained by them from seawater, in which compounds of lime exist in solution. (See also ARAGONITE.) Calcite often occurs in beautiful crystals. Over a thousand different forms and combinations of calcite crystals are known. Iceland spar is clear transparent calcite. Two of the commonest forms are known to miners as nail-headed spar and dog-tooth spar. Calcite is soft, and scratches easily with the knife (hardness = 3). It is easily dissolved in weak cold acid, and bubbles of carbon dioxide are given off. It is a frequent product of decomposition in rocks, and occurs also as pseudomorphs after other minerals. In composition it is carbonate of lime, but that compound forms also another

mineral, aragonite. See CALCIUM, LIMESTONE, etc.

**Calcium** (Ca, 40.1) is a metallic element that is found in great abundance in combination, both in the inorganic world and as a constituent of animals and plants. Thus, calcium carbonate ( $\text{CaCO}_3$ ) occurs as limestone, marble, chalk, and in coral and egg-shells; calcium sulphate ( $\text{CaSO}_4$ ) as selenite, gypsum, and plaster of Paris; calcium phosphate ( $\text{Ca}_3(\text{PO}_4)_2$ ) as phosphorite and in bones; and calcium fluoride ( $\text{CaF}_2$ ) as fluor spar. Calcium itself, owing to difficulties in preparation, is not well known, but is best obtained by the electrolysis of its fused chloride, when it appears to be a light, white, hard metal that soon takes on a yellow tarnish. It has sp. gr. 1.6, and sets free hydrogen from water, burning brightly also if heated in air. Calcium is closely related to strontium and barium, the three forming the group known as the 'alkaline earth metals.' The principal compounds of calcium include its oxide, quicklime ( $\text{CaO}$ ), which is obtained by heating limestone with coal, and is an infusible white solid, used in the lime-light, and for crucibles, to withstand the highest temperatures. When acted on by water, quicklime 'slakes'—i.e. is converted, with considerable evolution of heat, into calcium hydroxide ( $\text{Ca}(\text{OH})_2$ ), a voluminous white solid that is slightly soluble in water, forming lime-water. Slaked lime is the source of the other hydroxides, and when mixed with sand, etc., is used as mortar; whilst limewater is employed as a test for carbon dioxide, by which it is turned milky, and as an alkaline agent in medicine. The salts of calcium are also of importance, and are in general white crystalline solids. Calcium carbonate in its different varieties

is used as a source of carbon dioxide, and in the form of ground chalk as 'whitening.' The sulphate crystallizes with two molecules of water ( $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ ), which, if partially driven off by heat, yields plaster of Paris ( $2\text{CaSO}_4 \cdot \text{H}_2\text{O}$ ). Alabaster is a natural form of  $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ . Calcium fluoride is chiefly employed as a flux, and calcium sulphide as luminous paint. Calcium phosphate is the main inorganic constituent of bones, and is largely used for manure; the active ingredient of superphosphate being  $\text{CaH}_4(\text{PO}_4)_2$ , obtained by acting on calcium phosphate with sulphuric acid. Calcium silicate is a component of glass, and calcium nitrate and chloride are soluble and deliquescent, the latter being used for drying gases and organic liquids. Bleaching powder, or chloride of lime, is the combined chloride and hypochlorite of calcium,  $\text{CaCl}(\text{OCl})$ . The presence of calcium sulphate and bicarbonate in natural waters is the chief cause of their hardness. Hydraulic cement is chiefly a double silicate of calcium and aluminium.

**Calc-sinter**, or CALCAREOUS TUFA, a loose and porous deposit of carbonate of lime, formed by mineral or petrifying springs. Water charged with carbonic acid can dissolve carbonate of lime out of the rocks, and, on its emerging to the air, deposit part of it again in the form of an incrustation. Objects placed in the water will be covered with the deposit, and hence such springs are sometimes known as petrifying springs, though the process is not really petrification. The calc-sinter accumulates often in basin-shaped masses, or may form tunnels, arches, or other remarkable structures. At Matlock there are well-known petrifying springs; also near Tivoli, in Italy, whence comes the tra-

vertine of which Rome is largely built. At Carlsbad, in Bohemia, a group of petrifying springs has almost filled a whole valley with their deposits. The springs of Clermont, in Auvergne, are also well known.

**Calc-spar.** See CALCITE.

**Calculating Machines** are largely used at present, both to relieve the work of calculation and to obtain accuracy of result. In the construction of mathematical and astronomical tables and the tabulation of functions they are the only means of producing perfectly reliable tables. They are now also in constant use in insurance offices and large business houses. A very simple form of calculator much used by engineers is the slide rule. (See SLIDE RULE.) The oldest machine which directly performed the operations of addition and subtraction was that invented by Pascal in 1642, and known as the *machine arithmétique*. Several modern machines are modifications of Pascal's. Between 1822 and 1842 Babbage designed his machine for calculating mathematical tables by the method of 'differences.' (See BABBAGE.) About 1850 Thomas of Colmar invented a calculating machine known as the arithmometer. The numbers were inscribed on cylinders, which were moved by trains of toothed wheels. The elements of most ordinary calculating machines are cylindrical discs, on the surface of which are placed the figures 0 1 2....9. These discs are so connected that when a number disc is rotated ten places, the number disc of the next order moves one place. This suffices for addition. For subtraction, the discs are rotated in the reverse direction. Multiplication and division, the extraction of the square root, etc., are also performed by arithmometers. The motion of the discs was

formerly produced directly by the hand; now a lever is employed. The use of keys for setting the sums to be worked, has resulted in speed and accuracy of movement. Probably the most useful business machine is that of Burroughs—a combination of typewriter and calculating machine. It registers columns of pounds, shillings, and pence corresponding to the keys struck, and by the motion of a lever prints them on paper. The pressure of a special key, combined with the operation of the lever, causes the total to be printed in proper position below the column added up. For multiplication and division the 'Brunsviga' machine is generally used. See Shaw's 'Theory of Continuous Calculating Machines,' *Phil. Trans. Roy. Soc.*, vol. 176 (1885).

**Calculators**, LIGHTNING, the popular name for prodigies capable of performing mentally various exacting and sometimes intricate arithmetical operations. Such performers seem naturally endowed with an exceptionally good memory for combinations of figures, and a remarkable faculty of grouping numbers. Their feats usually include long multiplications or divisions, the extraction of the square and cube roots, the naming of the particular day of the week corresponding to a given date, and so forth.

**Calculus**, a concretion, of varying chemical constitution, which may form in any passage of the human body. The commonest are biliary, urinary, and salivary calculi, all of which may block the different ducts, and thus stop the flow of the secretion. For the treatment of calculi, see GALLSTONES; URINARY CALCULUS. The general course of procedure is to lessen the pain of the passage of a calculus by hot fomentations and baths, and by the administration of morphia or some other narcotic.

Belladonna is another favourite drug, given in the belief that it relaxes the non-striated (involuntary) muscles of the passage, and so lessens spasm and colic, and consequent resistance to the movement of the stone. When a calculus is causing trouble by impaction, it is removed by operation.

**Calculus**, INFINITESIMAL, also known as the Differential and Integral Calculus, is the mathematical method which treats of the laws of continuously varying quantities. The ancients had no difficulty in measuring the area of figures (*e.g.* fields) whose boundaries were built up of straight lines; but when the boundaries were partly curvilinear, the ordinary methods of geometry failed. It was soon recognized, however, that an approximate result sufficiently accurate for practical purposes could be obtained by regarding the curved line as polygonal—*i.e.* as consisting of a great many very short straight lines meeting in a succession of points situated on the curve. The area of this polygonal figure could then be estimated by ordinary geometrical methods; and the greater the number and the shorter the individual lengths of the little straight lines, the more nearly did the result approximate to the true area of the original figure. It is in exactly this way that the mileage on a curved railway track is measured. The line is said to be curved, but the individual rails, which by being laid end to end give the curved track, are themselves straight. In like manner, the mathematician, in estimating the length of a portion of a given curve, first imagines the curve constructed of excessively short straight line bits, or 'elements,' as he calls them. He then forms their sum, and finds that as the elements are taken shorter and shorter, and therefore in greater

and greater number, this sum gets nearer and nearer to a particular limiting value. It is this limit that measures the length of the arc. This process of summation is technically called integration, and the sum estimated in this way is called the integral. The method just indicated is fundamentally identical with the method of exhaustions as practised by Archimedes and his successors, and greatly extended by Kepler (1615), and the method of indivisibles (Cavalieri, 1635; Wallis, 1655). Thus, historically, it was the integral calculus which first received partial development. The fundamental notions underlying it are, however, those of the other branch of the subject—the differential calculus, or calculus of small differences or infinitesimal increments. The creation of this powerful branch of mathematics we owe to Newton and Leibniz. Newton called it the method of fluxions, and gave it a rigorous foundation in the early sections of the *Principia*.

Consider, for example, a curve being traced out by a moving point—say, the point of contact of one of the wheels of an engine as it moves along a curved railway track. At any instant this point is moving in the direction of the tangent to the curve at the position momentarily occupied, and the direction is measured as that of the infinitesimal element described in an excessively short interval of time. The position of the moving point is a definite quantity, being measured along the curve by the distance from a chosen fixed point. This position is changing at a definite rate, known as the speed or velocity of the moving point. The conception of this rate of change or 'fluxion' of the position is a perfectly familiar one; its measurement is accomplished by dividing

the short space described in a short but finite period of time by the measure of this period, and then considering what this ratio becomes as the corresponding changes in space and time are taken smaller and smaller, until, in short, they become infinitesimals. Thus, the velocity is the fluxion, or differential coefficient with respect to time, of the arc which has been described up to that instant; and the arc is regarded as a 'fluent' quantity, which may be obtained from the fluxion by a reverse process, the same process which we have already called integration.

As the point continues to describe the curve, the direction of motion is constantly changing, the direction at the beginning of any arc, large or small, being different from the direction at the end of the arc. When the curve is highly curved, this change of direction in a given length—say, one foot of the arc—is considerable, and becomes smaller if the arc is less curved. Now, the direction of the element at any point is a property of the curve; and it is a property which must change at a particular rate as the moving point travels along. In short, it has a fluxion just as truly as the length of arc has a fluxion; and the ratio of the fluxion of the direction, or *angular velocity*, to the fluxion of the arc described, or *linear velocity*, is the mathematical measurement of the curvature of the curve.

In this illustration we have taken time to be the quantity in terms of which the rates of change of other quantities are expressed. But that is not essential. For example, in measuring the curvature of a curve, we really take the arc to be the so-called independent variable, and the change of direction of the tangent is then a function of the arc. Its rate of change

per unit length of arc, or (to put it technically) its differential coefficient with regard to the arc, measures the curvature. When we know the rates of change, we are able, by aid of the methods of the integral calculus, to find the integral quantities, either quite accurately, or more or less approximately. It is always possible to differentiate an algebraic expression—*i.e.* to find its rate of change in terms of the rates of change of the variable quantities involved; but to integrate a given expression—*i.e.* to pass to the quantity of which it is the fluxion or differential coefficient—is possible in comparatively few simple cases. Every such integration involves the solution of what is known as a *differential equation*, involving not only the variable quantities themselves, but also their rates of change of the first and higher orders.

The importance of the infinitesimal calculus arises from the fact that all physical quantities are in a state of flux, and that it is impossible to discuss thoroughly their interrelations without taking full account of the laws governing the rates of change, and even the rates of change of these first rates of change themselves. It was in the attempts to get exact mathematical representations of the motions of the heavenly bodies, of the curve of equilibrium of a hanging cord, of the vibrations of a stretched string or drum-head, of the waves on water, of the flexure of a bar, and so on—it was in such attempts, in some instances only partially successful, that the immediate successors of Newton and Leibniz rapidly developed the method, which in these later times, in the hands of the pure mathematician, has been extended far beyond the demands of practical life. And

yet there are many familiar phenomena which are only partially amenable to its methods as developed—*e.g.* the spinning of a boy's top.

A good text-book on the calculus on modern lines, and including a sketch of differential equations, is Lamb's *Infinitesimal Calculus* (1902). A good book of its kind, but not systematic, is Perry's *Calculus for Engineers* (1896). For those who make a speciality of mathematics, the following foreign text-books are good: J. Tannery's *Introduction à la Théorie des Fonctions* (1886); G. Peano's *Differential- und Integral-rechnung* (Ger. trans.); C. Jordan's *Cours d'Analyse* (3 vols. 1882-7). For differential equations, Forsyth's (1890) is now the recognized English text-book, and Weber-Riemann's *Partiellen Differential Gleichungen* (1900) is particularly good for physicists. Picard's *Traité d'Analyse* (3 vols. 1901) is especially rich in the application of modern methods to physical problems. See also Carslaw's *Introduction to the Infinitesimal Calculus* (1905).

**Calcutta**, cap. of British India and chief tn. of the prov. of Bengal, is situated on the E. bank of the Hugli R., about 80 m. from its mouth. The citadel, Fort William (the nucleus of the city), standing on the river bank, is surrounded by an extensive esplanade, which is bordered by handsome public buildings and stately mansions; beyond, to the N., lies the native town. Fine squares and gardens adorn the city, and broad streets connect it with its suburbs, which lie outside the native town. On the opposite bank of the river is Howrah, where the E. Indian Ry. has its terminus. Numerous jute mills give evidence of local industry. The chief imports are cotton piece goods, metals, and mineral oils. The total value of imported goods aggregates close



upon 25 millions sterling; while 45 millions is about the value of Calcutta's exports, of which tea, jute (raw and manufactured), hides, opium, oil-seeds, rice, indigo, lac, and wheat are the more important. The value of the inland trade, by river, rail, and road, amounts annually to 70 millions sterling. The docks, which have been enlarged since 1890, extend for 10 m., the largest being at Kidderpur, immediately s. of the city.

The municipal administration of the city is vested, since 1899, in a corporation composed of Europeans and natives, about seventy-five in number, who, however, delegate their powers in great part to a special committee of twelve. The bulk of the inhabitants are Hindus, but there is a large Mohammedan population. There are a university (founded in 1857)—with about 2,300 students, but an examining university only—colleges, high schools, libraries, museums, a zoological garden, and a studiously moderate English and Anglo-vernacular press.

The climate of Calcutta is both hot and moist. The pleasantest months are November to March. April, May, and June are hot. From June to October, the 'monsoon' season, malaria is prevalent.

In 1686, the East India Company established themselves in the village of Sutanadi. Four years later they acquired this village and the neighbouring villages of Calcutta and Gobindpur by purchase from Sultan Azim (son of the Emperor Aurungzebe). In 1756 the capture of Calcutta by Surajah Dowlah, the nawab of Bengal, led to the well-known horrors of the 'Black Hole.' In January 1757 the British forces, under Admiral Watson and Colonel Clive, regained possession of the town, and from its ruins

rose the modern city. Pop. (census, 1911), 1,216,514. See Blechynden's *Calcutta, Past and Present* (1906), Cotton's *Calcutta, Old and New* (1907).

**Caldas-da-Rainha**, tn., Estremadura dist., Portugal, 50 m. N. of Lisbon; has warm sulphur and saline baths. Pop. 5,000.

**Caldas-de-Monchique**, tn. and watering-pl., Algarve dist., Portugal, to the s. of Monchique; has sulphur baths. Pop. 7,500.

**Caldas-del-Rey**, tn., Spain, prov. of and 12 m. N. of Pontevedra; with celebrated warm springs. Pop. 7,500.

**Caldecott**, RANDOLPH (1846-86), English artist, born at Chester, began his artistic career in London (1872) with sketches for *London Society* and other periodicals. He became famous as the illustrator of the works of Washington Irving. *Old Christmas*, a volume of selections from the *Sketch Book*, appeared in 1875, and *Bracebridge Hall* in 1876. His greatest achievement was a series of coloured books for children, beginning in 1878 with *John Gilpin* and *The House that Jack Built*, and ending the year before his death with the *Elegy on Madam Blaise* and *The Great Panjandrum Himself*.

**Calder**, riv., N.E. Lancashire and W. Riding, Yorkshire, England, rises s. of Burnley and flows E. to join the Aire at Castleford. Length, 45 m.

**Calder** (1.) EAST, vil., Midlothian, Scotland, 11 s.w. of Edinburgh. Pop. 1,100. (2.) MID, par. and vil., Midlothian, Scotland, 12 m. w.s.w. of Edinburgh. Bituminous shale is largely worked. Pop. 3,200. (3.) WEST, par. and tn., Midlothian, Scotland, 16 m. w.s.w. of Edinburgh, in centre of coal, shale, and ironstone district. Pop. 8,000.

**Calder**, SIR ROBERT (1745-1818), English admiral, took part in the battle of Cape St. Vin-

cent in 1797 as first captain to Sir John Jervis. Previous to Trafalgar, when in command off Ferrol, he engaged a much superior force of French and Spanish ships, part of the fleet which had been chased by Nelson from the W. Indies back to Europe, and captured two ships of the line. Public opinion, however, was not satisfied that he had done his utmost. Calder was consequently tried, convicted of an error of judgment, and severely reprimanded. He became a full admiral in 1810.

**Caldera**, a large basin-like depression of volcanic origin—an extinct crater. These are sometimes extensive and well preserved and occupied by lakes, thus giving the remarkable phenomenon of a lake occupying the whole summit of a mountain. A famous example is Crater Lake, Oregon, which is 5 m. in diameter and 4,000 ft. deep.

**Caldera**, seapt., Atacama prov., Chile, 40 m. N.W. of Copiapo, of which it is the port; exports copper and silver. Pop. 2,000.

**Caldera Bay**, ACTION IN, took place during the civil war in Chile (1891), between the Congressionalist ironclad *Blanco Encalada* and the Balmacedist torpedo gunboats *Almirante Lynch* and *Almirante Condell*, when the latter torpedoed the ironclad amidships, and sank her in two minutes.

**Calderbank**, tn., Lanarkshire, Scotland, on N. Calder Water, 2 m. S.E. of Airdrie; has extensive ironworks. Pop. 2,000.

**Calderon**, PHILIP HERMOGENES (1833-98), Anglo-French painter of Spanish parentage, was born at Poitiers, and received his artistic education chiefly in Paris. From 1853 he was a regular contributor to the Royal Academy, of which he became an associate in 1864, and an academician in 1867. He was appointed keeper

of the Royal Academy in 1887. The most famous of his later works was *The Renunciation of St. Elizabeth of Hungary* (National Gallery, London). Among his other works, *The Proposal*, *The Gaoler's Daughter*, *Widow and Orphans at the Funeral*, and *Aphrodite* deserve mention.

**Calderon**, SERAFIN ESTÉBANEZ, 'EL SOLITARIO' (1801-67), Spanish writer, whose fame rests upon a series of exquisite sketches of Andalusian scenes and manners which appeared in the early 'thirties in a weekly Madrid periodical, *Cartas Españolas*. His nephew, Canovas del Castillo, published his life and writings, *El Solitario y su Tiempo* (1883).

**Calderon de la Barca**, PEDRO (1600-81), Spanish poet and dramatist, was born in Madrid on Jan. 17, 1600. Although he is said to have written a play at the age of thirteen, he first became publicly known as a dramatist at the age of twenty. He appears to have served as a soldier in Italy and elsewhere from about 1623 to 1629; and on his return to Madrid, at the latter date, he at once became famous in the theatrical and poetic court of Philip IV. for his comedies and sacred plays. For the next ten years he produced a vast number of dramas, sacred and profane. Though more than one story exists of his early turbulence, he decided in 1651 to become a priest, and was ordained. Ecclesiastical preferments were heaped upon him, and he became one of Philip's chaplains in 1663, dying as superior of the congregation of San Pedro on May 25, 1681. The reign of Philip IV. was the golden age of the Spanish theatre. Already Lope de Vega had turned into facile verse the romantic, chivalrous mysticism that was the keynote of the national character; but Calderon brought to them a nobler moral ideal than that furnished by the stories of

lascivious intrigue which had formed the main stock of his predecessors. Calderon's genius came at a fit moment to stay the decadence of the drama, threatened by the over-floridness and fecundity of its producers. He at once sounded a higher note. The profoundest thought, the most elevated of moral sentiments, were clothed by him in words so chaste and eloquent as to reach the understanding of the peasant as easily as they touched the intelligence of princes and ecclesiastics. In ingenuity and invention far inferior to Lope, Calderon surpassed him in profundity and grace.

His most famous secular dramas are *El Magico Prodigioso*, *La Vida es Sueño*, *El Principe Constante*, and *El Alcalde de Zalamea*. The first of these is somewhat reminiscent of *Faust*, with a different ending. The best known of Calderon's plays in England, after *El Magico Prodigioso*, is *La Vida es Sueño* ('Life is a Dream'). It is, however, in his sacred plays (*autos*) that Calderon stands absolutely supreme, and a fine specimen of this species of drama may be judged in MacCarthy's English version of Calderon's *Encantos de la Culpa* ('The Sorceries of Sin'). MacColl has also translated *The Select Plays of Calderon* (1888); and Fitzgerald's (1877) and MacCarthy's (1873) versions of the *Magico Prodigioso* and other dramas may be recommended, as well as *Six Plays by Calderon*, ed. Dr. Oelson (1903). The Calderon literature is very large, especially in Germany, where Calderon is placed by some authorities above Shakespeare. See Schack's *Geschichte der Dramatischen Literatur in Spanien* (1854-5); Menendez y Pelayo's *Calderon y su Teatro* (1881); Archbishop Trench's *Essay on the Life and Genius of Calderon* (2nd ed.

1880); Miss Hassell's monograph on the same subject (1879); Juan Eugenio Hartzenbusch's '*Obras de Calderon*,' occupying vols. vii., ix., xii., and xiv. of the *Biblioteca de Autores Españoles* (1848-52); and another edition of the *Obras*, by G. Ramon (1882-3).

**Calderwood, DAVID** (1575-1650), Scottish ecclesiastic and historian, was born at Dalkeith, Midlothian. He opposed the introduction of prelacy, and in 1617 was deprived of his charge, imprisoned, and banished. He went to Holland, where, in 1621, he published *The Altar of Damascus*, a defence of Presbyterianism, and a Latin version of it in 1623. After his return to Scotland in 1625, he assisted in drawing up the *Directory for Public Worship*, and wrote his celebrated *Hist. of the Kirk of Scotland* (1678). See T. Thomson's 'Life of Calderwood' in Wodrow's edition of his *History* (1849); Walker's *Scottish Theology and Theologians* (1887).

**Calderwood, HENRY** (1829-97), Scottish philosopher, born at Peebles; ordained a minister of the United Presbyterian Church (1856); became professor of moral philosophy in Edinburgh University (1868), and chairman of the first school board of that city (1873-7). His chief works are, *The Philosophy of the Infinite* (1854), *Handbook of Moral Philosophy* (1872; 14th ed. 1888), *Relations of Mind and Brain* (1879; 3rd ed. 1892), and *Evolution and Man's Place in Nature* (1893). See *Life* by his son (1900).

**Caldicott, ALFRED JAMES** (1842-97), English musician, was born at Worcester; studied under Moscheles, Reinecke, and Hauptmann at Leipzig; was organist at St. Stephen's, Worcester (1865-82); professor at Royal College of Music and Guildhall School of Music (1890-2); and became conductor of the Comedy Theatre, London (1893). He composed the

glée *Humpty Dumpty* (1878), *Winter Days* (1879), and the oratorio *The Widow of Nain* (1893).

**Caldwell, HOWARD WALTER** (1858), American historian, born at Bryan, Ohio; head professor of American history at Nebraska since 1906. He is the author of a *History of the United States, 1815-61* (1896); *Studies in History* (1897); *Some Great American Legislators* (1899); *Life of Henry Clay* (1899); *Expansion of the United States* (1900); *Source Hist. of U.S.A.* (1909).

**Caldwell, ROBERT** (1814-91), Anglican bishop, born near Antrim; went to Madras (1837), where he joined the English Church (1841). For fifty years he laboured as a missionary, and was made bishop of Tinnevelly (1877). He wrote a *Comparative Grammar of the Dravidian or S. Indian Family of Languages* (1856), and *Political and General History of the District of Tinnevelly* (1881). See *Reminiscences* (1894).

**Caleb**, the son of Jephunneh, was one of the spies sent by Moses to explore the land of Canaan. Num. ch. 13 and 14, which relate the incident, are a crucial instance of the composite structure of the Hexateuch. Thus, in ch. 14:24 Caleb alone dissents from the timid report of his companions; while in ver. 6 and 30 Joshua is mentioned as his comrade in the advocacy of an immediate advance, and is associated with him in being the only survivors of the original exodus from Egypt who were privileged to enter the Promised Land. After the settlement, Hebron and its district were assigned to Caleb. See Commentaries on Numbers—e.g. Buchanan Gray's (1903).

**Caledon.** (1.) District and tn. in s.w. of Cape of Good Hope, S. Africa, 87 m. by rail E. of Cape Town; has mineral springs, and is a health resort. Pop. of dist. 15,000; of tn. 3,500. (2.) River,

rising in the high mountains (Mont aux Sources) which divide Basutoland and Natal; known as Great and Little Caledon at its source; a feeder of the Orange R.

**Caledonia.** The Roman name of North Britain. It occurs first in Lucan (A.D. 64). It is the conventional poetic name for Scotland.

**Caledonian Canal**, waterway, partly natural, partly artificial, through the picturesque Glenmore, Inverness-shire, Scotland, connecting the Atlantic Ocean with the Moray Firth branch of the North Sea. It consists of Lochs Lochy, Oich, Ness, and Dochfour, united by 23 m. of cuttings. It is chiefly used by the fishing fleets, and by small steamers which afford tourists easy access to Fort William for Glen Nevis and Ben Nevis, Fall of Foyers on Loch Ness, etc. James Watt made a survey in 1773, but work was not begun till after Telford and Jessop made their estimate of £474,531 in 1803. In 1822, when two-thirds finished, the canal was opened for navigation, and was completed in 1847. Total length, including lochs, 60½ m.; depth, at standard level, 17 ft.; breadth at surface 100 ft., at bottom 50 ft. The total cost up to May 1849 was £1,311,270. The canal is under the control of a Government Commission. See Annual Reports on Traffic, etc.

**Caledonian Railway.** This company was formed in 1845, and acquired by amalgamation (1865-6) the Scottish Central and the Scottish North-Eastern Rys., together with a number of small companies by which access was got to important places north of Perth. The total mileage, including worked lines and the company's proportion of joint lines, is 1,080½ m., the main lines running from Carlisle to Aberdeen, *via* Stirling and Perth, and from Edin-

burgh to Glasgow, Greenock, and Gourock, and to Oban and Ballachulish. The gross receipts for the year ending Jan. 31, 1911, amounted to £4,621,807, the working expenses being £2,478,705, equivalent to about 55 $\frac{3}{4}$  per cent. of the gross receipts. The authorized capital, including loans, is £58,881,850. The dividend on the ordinary stock for the half-year ending Jan. 31, 1911, was 3 $\frac{1}{2}$  per cent.

**Calembour**, a witty play on words, based on the difference of meaning between words pronounced alike. This habit of punning prevailed in France in the 18th century, and has been practised by such men as Balzac and Victor Hugo. See Larchey's *Les Joueurs de Mots* (1867), and *L'Esprit de Tout le Monde* (1892); *Dictionnaire des Calembours et des Jeux de Mots* (1884).

**Calendar.** The Roman calendar of Julius Cæsar was based on the solar year, which was assumed to be 365 $\frac{1}{4}$  days long. As at present, the quarter-day was accounted for by the insertion of an additional day every fourth year (leap year); and the names of the months, and the number of the days in each, were the same, after a few small alterations had been made by Augustus, as they are in a modern European calendar. The Julian solar calendar was defective, because it made the year more than eleven minutes too long. On the introduction of Christianity, some method of fixing the date of Easter, on which that of many other festivals of the church depended, became necessary. Much difference of opinion prevailed, and the Eastern churches commemorated our Lord's death on the fourteenth day of the moon after the spring equinox, and kept Easter two days later; while the Western churches celebrated Easter on the Sunday following the fourteenth

day of the moon. The sect called Quartodecimans commemorated only the death of Christ, on the fourteenth day, the day of the Jewish Passover. At length, in A.D. 325, it was decided, at the Council of Nicæa, that Easter should be held on the first Sunday after the fourteenth day of the moon that occurred next after the vernal equinox, and that if the fourteenth day of the moon fell on the day of the equinox, the following Sunday should be Easter day. It was also declared that, in finding Easter, the vernal equinox should be considered to fall every year on March 21. Now the length of a lunation is very variable, and cannot be used in combination with the length of a solar year. It was therefore necessary to adopt a fictitious or calendar moon, of which a certain number of lunations would be equal in length to some number of solar years. Thus cycles were formed in which the dates of Easter recurred in the same order. It was not, however, till A.D. 533 that a scheme was propounded which found favour with the majority of churchmen. Victorius, bishop of Aquitaine, had brought into notice a period formed by a cycle of 28 solar years, combined with the lunar cycle of 19 years introduced into Athens by Meton. Meton made 235 mean lunations equivalent to 19 solar years of about 365 $\frac{1}{4}$  days each, or 6,940 days. In the Calippic cycle of 76 years (so called from its inventor Calippus) this number was reduced to 6,939 $\frac{3}{4}$ . In the Victorian cycle each year contained twelve ordinary lunations of 30 and 29 days alternately, which together accounted for 354 days. The eleven remaining days of the year were carried forward till, at the end of three years, they amounted to 33 days, 30 of which were taken to form an embolismic or intercalary month; while the

remainder, amounting in 18 years to 18 days, together with the 11 days of the 19th year, formed a seventh embolismic month of only 29 days. If the above be added up, it will be found that  $4\frac{3}{4}$  days are needed to make up the number 6,939 $\frac{3}{4}$ . These are the days inserted in the leap years, and are common to both lunar and solar years. The seven letters A to G are placed beside the days of the months in the calendar, A being affixed to Jan. 1, and the whole seven recurring in regular order to the end of the year. Their number being seven, the same letter always recurs on the same day of the week. The length of the periods in which the dates of the Sundays occur in the same sequence is 28 years ( $4 \times 7$ ). This cycle, combined with the lunar cycle of 19 years, forms the Victorian period of 532 ( $28 \times 19$ ) years, in which the dates of Easter Sunday follow an invariable order. In A.D. 533, Dionysius Exiguus, a Scythian monk, adopted the Victorian period, and fixed for it certain starting-points. For the era of his reckoning he took the birth of Christ, which he calculated to have taken place in A.U.C. 753. The following year therefore became A.D. 1; and though there is reason to suppose that Christ was born three years earlier, the Dionysian era has been retained. He also decided that the dominical letter in A.D. 1 was B, and that the same year was the tenth of a solar cycle. The golden number—*i.e.* the number of the year of the lunar cycle—was 2 in A.D. 1. From these data the golden number and the Sunday letter for every year may be found. The calculation is usually effected by assigning certain numbers to the letters, those in modern English prayer books being A = 0, G = 1, F = 2, etc. This method gives for leap year the second letter, used for finding Easter.

To find the year of the lunar cycle, or the golden number, 1 is added to the number of the year, and the result divided by 19. The remainder is the golden number; but if there is no remainder, the golden number is 19. Accordingly, the golden number of 1265 is 12. A lunar cycle was reckoned by Alexandrian astronomers to begin on March 23, 323 A.D., the date of the vernal equinox in that year. Two months earlier (30 and 29 days), on Jan. 23, there would also be a new moon; and as the new moons are eleven days earlier every year, one would fall, in the third year of the cycle, on Jan. 1, 325, the year in which the Council of Nicæa was held—a fact which would also probably influence Dionysius in the choice of a starting-point. In the calendar the golden number was affixed to those days on which the new moons fell in that year of the cycle. It was therefore easy to find the fourteenth day of the moon that fell next after March 21, and the next day to which the Sunday letter of the year was affixed was Easter day. This calendar was known as the Perpetual Julian Calendar, and from it tables were compiled to find Easter 'for ever.' But the solar year is 11 min. 14 sec. less than  $365\frac{1}{4}$  days, and 235 mean lunations are about 1 hour 29 minutes less than 19 Julian years. As centuries passed, the defects of the calendar became more and more apparent, the true equinox occurring before March 21, and the real new moons also preceding the calendar new moons. Accordingly, Pope Gregory XIII. determined to reform the calendar, and entrusted the work to a German Jesuit, Christopher Schlüssel, generally known by his Latinized name of Clavius, who carried out a scheme planned by Aloysius Lilius, a Neapolitan physician and astronomer. In 1581 the true

equinox fell on March 11, or ten days before the equinox of the calendar. To rectify this error, Oct. 15, 1582, in which year the reformed calendar was introduced, was made to follow October 4, the intervening days being omitted. The true new moons preceded the calendar new moons by four days; but Clavius moved the latter only three days back, in the hope of preventing Easter from falling at any time on the day of the Passover. That the solar error might not arise again, he decided to make all centurial years which did not contain a number of centuries divisible by 4, ordinary years. Thus 1600 was a leap year, but 1700, 1800, and 1900 were ordinary years. The lunar error in the Metonic cycle amounts to about eight days in 2,500 years, and therefore a day was to be omitted at the expiration of each of seven periods of 300 years each, and then at the end of a period of 400 years. This correction was first applied in 1800, and will again be applied in 2100, 2400, 2700, etc. Small errors still remain; but as that of the solar year amounts to one day only in about 3,520 years, its mode of application has been left to posterity.

In compiling his calendar Clavius made use of epacts. The epact of any year is the age of the moon at the beginning of the year. If there is a new moon on Jan. 1, 11 days remain over at the end of the year after the twelve ordinary lunations of 30 and 29 days alternately have been counted off: 11 is, then, the epact of the second year, and 22 of the third. At the end of the third year 33 days have thus accumulated, of which 30 days constitute an embolismic month, and 3 are carried forward as the epact for the following year. In 325, the third year of a cycle, there was a new moon on January 1, and therefore the epact of the year would be 30, or 0, which

Clavius indicated by \*. Clavius put the new moons three days back, and the days of the solar year ten days, which would bring the new moon in the third year of the cycle to January 8, seven days later than in the old calendar. 1800 was an ordinary year, but in that year the lunar correction was applied, so that the relation of the solar and lunar years was not disturbed, and therefore the new moons are now only nine days later than in 325. The first new moon in the third year of the cycle is therefore on January 10 instead of on January 1, and the epact for the year is 21 (30 - 9). By adding 11 for each succeeding year, and rejecting 30 when it occurs, the following series will be obtained:—

| Golden Numbers.— |        |       |     |      |     |
|------------------|--------|-------|-----|------|-----|
| I.               | II.    | III.  | IV. | V.   |     |
| 29.              | 10.    | 21.   | 2.  | 13.  |     |
| VI.              | VII.   | VIII. | IX. | X.   | XI. |
| 24.              | 5.     | 16.   | 27. | 8.   | 19. |
| XII.             | XIII.  | XIV.  | XV. | XVI. |     |
| *                | 11.    | 22.   | 3.  | 14.  |     |
| XVII.            | XVIII. | XIX.  |     |      |     |
| 25.              | 6.     | 17.   |     |      |     |

The last month of the cycle is the embolismic month of 29 days, so that the new moon of the next year is a day earlier than when found by the usual process. This is usually accounted for by adding 12 instead of 11 to the epact of the nineteenth year, and thus 29 is the epact for the first year of the succeeding cycle. The above series will remain in force till 2200, for 2000 will be a leap year, and in 2100 the lunar correction will again be applied. 2200 being the sixteenth year of the cycle, its epact will be 13, and the other epacts will be changed so as to form a new series. In the old calendar the new moons constantly returned to the same dates after the expiration of 19 years, and there were certain days on which a new moon could not fall,

and to them no golden numbers were affixed. But under the new system every day of the year will in course of time become the first of a lunation, and must therefore have an epact attached to it. Clavius made his epacts recur throughout the year in descending order, beginning with \* on January 1, so that the epact showed the days on which the new moons occurred in the year of that epact. Consider the epact 27. The moon will be 30 days old on January 3, and a new moon will begin on January 4, to which the number 27 is affixed. In order to make the lunar months 30 and 29 days long alternately, the two epacts 25, XXVI. were printed opposite February 4, and XXV., XXIV. opposite February 5; and the same device was repeated in April, June, July, August, September, and November. The epact 25 was chosen for repetition in order that no two new moons in the same cycle might occur on the same day of the year. If all the thirty possible series of epacts be written out, it will be found that 24, 25, and 26 never occur together in the same series; that when 25 and 24 are in the same series, 25 is the epact of a year the golden number of which is greater than 11; and that when 25 and 26 are in the same series, 25 is the epact of a year below 11. Hence, if the golden number of the year exceeds 11, 25 must be taken; in other cases, XXV. The epacts down to XXV. following one another in their proper places in February, the first month in the corresponding years will have 30 days, the second 29, the third 30, and so on. But 25, 24, and all the epacts following, are moved up one place, so that in the corresponding years the first month has 29 days, the second 30, and so on. To find Easter, the differences between the epact and 30 is taken, and to this are added 59 days for the first two months, and 14 more

because Easter comes after the fourteenth day of the moon. March 21 is the eightieth day of the year, and if the above sum equals or exceeds 80, as it will when the epact is 23 or less, the difference gives the number of days by which the Paschal 'full' moon, as it is inaccurately called in the English Prayer Book, follows March 21. If it be less than 80, a third month must be added, of 30 days if the epact be XXV., 26, or higher, and of 29 if the epact be 25 or 24. 1902 is the third year of the cycle, and its epact is 21. To find the Paschal full moon, we have  $9 + 59 + 14 = 82$ . The Paschal full moon is therefore on March 23. The Sunday letter of the year is E, and will be found in a calendar opposite March 23. According to the rule, then, Easter fell on the next Sunday (March 30). The table on the opposite page shows the days on which Easter falls during the 300 years ending 2199. Having found the golden number of the year and the Sunday letter, look in the table for the number in the same horizontal line as the G.N. of the year, and in the vertical column headed by the Sunday letter. This is the date of Easter, the name of the month being the one next on the left. It should always be remembered that the moon in this reckoning is a conventional moon, not the moon of the heavens, and that, consequently, Easter may fall on the day of the real full moon, the fourteenth day of the real moon, or, in spite of Clavius's precaution, on the day of the Jewish Passover. The New Style, as the Gregorian system was called, was adopted in most of the Roman Catholic countries, and in Denmark and the Netherlands, in the year of its promulgation, 1582; by the Protestants of Germany and Switzerland in 1700 (Prussia, in 1778); in Great Britain in 1752, when the eleven days between