

fication of treaties; and the gradual introduction of the British cabinet system, with the practice of the House of Commons in the exercise of government. The last colonies of British North America to receive self-government were Prince Edward I. (1850-1), Newfoundland (1856), and British Columbia (1863). The union also prepared the way for confederation by separating local interests (now the jurisdiction of the provinces) from general interests (now the jurisdiction of the Dominion). Equality of representation between the east and west divisions, French and English Canada, under the act resulted in a deadlock of parties, and necessitated a wider basis for the management of common affairs. The double purpose was served by the scheme adopted at Quebec (1864) and legalized at Westminster (1867).

The half-breeds of the north-west broke out in rebellion (1869-70), which collapsed as soon as the forces led by Colonel (now Lord) Wolseley reached Fort Garry, or Winnipeg. Riel, the leader, escaped, to return later and foment another outbreak (1885), which proved more dangerous, but was eventually suppressed, and Riel executed. The chief events since have been the Halifax award (1888), which justified the Canadian contention against the United States interference with the fisheries. The Bering Sea award (1897) settled the sealing difficulty; and a joint commission met at Quebec in 1898, to determine all outstanding questions between Canada and the United States. In 1903 these reached a final solution in the Alaskan Boundary Commission's settlement of the frontier line between British Columbia and Alaska. In 1905 the two new provinces of Alberta and Saskatchewan were

formed from the north-west territories, each with an area of over 250,000 sq. m. (See ALASKA.) In 1908 the tercentenary of the foundation of Quebec was celebrated with great pomp, and a permanent memorial erected to General Wolfe. In 1910 the decision of the Arbitration Court of the Hague on the Atlantic Fisheries Question removed certain possibilities of friction with the United States.

*Canadian Forces.*—Throughout her history Canada has proved herself one of the most loyal of British colonies. The principal occasions on which her forces have taken the field are: the American war of independence, the three years' war (1812-14), Papineau's rebellion (1837-8), the Fenian raid (1866), Red River expedition (1870), North-West rebellion (1885), and the Boer war of 1899-1902. The Canadian forces are divided into a permanent force of about 5,000 men, including cavalry, artillery, engineers, and infantry, and an active militia of about 55,000 men. Every male Canadian is liable for service therein between the ages of eighteen and sixty; all those not in the active militia are available for the reserve. The militia cannot be compelled to serve outside the Dominion, but special forces may be enlisted for this purpose, as in 1899-1902. Successful graduates of the Royal Military College, Kingston, may receive commissions in the British service. In 1905 the Dominion government took over from the British government the defences of Halifax in Nova Scotia, and in 1906 those of Esquimaux on Vancouver I. In 1910 a government bill was introduced and passed the Senate, for the formation of a strong Canadian navy.

*Literature.*—So far Canada has not produced any man of letters of the first order. In history

Alpheus Todd (1821-84) has written standard works upon British parliamentary government, and we have the works of Sir John Bourinot, T. C. Haliburton, Robert Christie, and George Bryce. To these we may add Arthur Doughty's *History of the Siege of Quebec*. The greatest Canadian man of letters has been Goldwin Smith, who, however, was born in England. Among the poets may be mentioned Archibald Lampman (1861-91), William Wilfrid Campbell, Charles Roberts, and Bliss Carman. Dr. W. H. Drummond (1854-1907) has written delightful poems in the *patois* of the 'habitant.' In fiction the best-known names are those of Sir Gilbert Parker and Thomas Chandler Haliburton, the author of *The Clockmaker*. The names of Sara Jeanette Duncan (Mrs. Everard Cotes) and Ralph Connor (Charles W. Gordon) may also be mentioned. Ernest Thompson Seton has inaugurated a new type of nature study. In French-Canadian literature the best-known name is Louis Fréchette (1839-1908), whose best works, such as *Les Fleurs boréales* and *La Légende d'un Peuple*, have a high reputation, both in France and Canada.

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*the Far North* (1898); and Selous's *Recent Hunting Trips in British North America* (1907). For the mountain region of the West see Green's *Among the Selkirk Glaciers* (1890); Stutfield and Collier's *Climbs and Explorations in the Canadian Rockies* (1903); and Wilcox's *The Rockies of Canada* (1900). See also NORTH AMERICA.

**Canada Balsam**, a kind of turpentine obtained from the trunk and branches of *Abies balsamea*, a tree which grows abundantly in Canada, and in Maine, U.S.A. By incision of the bark it exudes as a yellow liquid somewhat like honey, with a pleasant odour and a bitter taste. When exposed to the air it loses about a quarter of its weight, and dries to a transparent adhesive resin. It is used by opticians as a cement in making compound lenses; it is particularly valuable in this respect on account of its transparency; its refractive index is nearly the same as that of glass. It is also used to mount microscopic specimens, in the preparation of varnishes, and in medicine.

#### **Canadian-Australian Line.**

This line of steamships runs from Vancouver to Sydney, N.S.W., in connection with the Canadian Pacific Ry., and in conjunction with the Empress Line, which plies between Vancouver, Japan, and China.

**Canadian Northern Railway System**, included in which are the CANADIAN NORTHERN RY. CO., the CANADIAN NORTHERN ONTARIO RY. CO., the CANADIAN NORTHERN QUEBEC RY. CO., the CANADIAN NORTHERN PACIFIC RY. CO., the CANADIAN NORTHERN ALBERTA RY. CO., the CANADIAN NORTHERN WESTERN RY. CO. (the three last are under construction), the HALIFAX AND SOUTH-WESTERN RY. CO., and the INVERNESS RY. CO.

The CANADIAN NORTHERN RY. Co. was incorporated in 1899, the

first section, Gladstone to Dauphin (100 m.), having been opened previously by the Lake Manitoba Ry. and Canal Co. The main line runs from Port Arthur, in Ontario, through Winnipeg (where the company has a great depôt), to Edmonton, Alberta, a distance of 1,265 m.: the connecting branches bring the total mileage to 3,325. In March 1911 it was announced that another 600 m. would be built that season. The ordinary capital stock of the company amounts to \$70,000,000. The company in 1910 owned 372 locomotives, 336 passenger vehicles, 11,735 freight vehicles, and 600 service vehicles.

**CANADIAN NORTHERN ONTARIO RY. Co.**—The company was incorporated in 1895 as the James Bay Ry. Co.; name changed in 1906. Miles open and operated at June 1909, 367. The railway is being extended from Buffalo (U.S.A.) to Ottawa (365 m.), and from Sellwood to Port Arthur (500 m.). The ordinary capital stock of the company amounts to \$50,000,000, of which \$10,000,000 has been issued.

**CANADIAN NORTHERN QUEBEC RY. Co.**—Incorporated in 1906. Miles open and in operation at June 1909, 350.

**HALIFAX AND SOUTH-WESTERN RY. Co.**—Incorporated in 1901. Miles open and in operation June 1909, 372.

**INVERNESS RAILWAY AND COAL Co.**—Incorporated 1902. Miles open and operated, 61.

**Canadian Pacific Railway** was incorporated by Act of Parliament of Canada, 44 Vict. c. 1, 1881, and by royal letters patent, embracing contract and charter to carry out the obligation assumed by the Dominion government on the admission of British Columbia into union with the Dominion of Canada, to connect the seaboard of British Columbia with the railway system of Can-

ada. Subsidy, \$25,000,000, and 25,000,000 ac. of land, and 713 m. of completed railway. The chief movers in the scheme were Lord Mountstephen and Lord Strathcona. Its main line runs from Montreal to Vancouver, B.C., with extensions to Quebec, St. John, N.B., Toronto, Niagara, and through the Minneapolis, St. Paul and Sault Ste. Marie, and Duluth, South Shore, and Atlantic railways, which it controls, connecting with Minneapolis, St. Paul, Duluth, and Chicago. On June 30, 1910, the company owned and leased 10,531 m., and controlled in addition the Minneapolis, St. Paul, and Sault Ste. Marie Ry., 3,616 m., and the Duluth South Shore and Atlantic Ry., 605 m. It also has its own telegraph system, hotels, elevators, and steamships. The railway company is for ever free from taxation, and is also the owner of an enormous stretch of valuable land (12,000,000 ac.). The dividend paid has been 5 per cent. on the common stock from 1899 to 1902, 5½ per cent. for 1903, and 6 per cent. from 1904 onwards to 1909, and 6½ per cent. for 1910, with an addition of 1 per cent. per annum out of the interest on the proceeds of land sales since 1907. The capital stock of the company amounts to \$180,000,000, in addition to guaranteed bonds and debenture stock. The C.P.R. owns 1,534 locomotives, 1,870 passenger coaches, 49,717 freight vehicles, and 3,437 service vehicles.

**Canadian Pondweed** (*Anacharis alsinastrum*; nat. order, Hydrocharideæ), a dark-green perennial plant with long, slender, branched stems, and small, sessile, linear-oblong leaves, which grows submerged in rivers and ponds. It was an importation from America about 1840, and has become so abundant in

some canals and rivers as to impede navigation. The stem is very brittle, and every piece broken off is capable of forming a new plant. Water-fowl, and especially swans, are said to be very fond of it. The circulation of cell protoplasm is well seen in its leaves, under the microscope.

**Canadian River**, United States, a r. bk. trib. of the Arkansas. It rises in the N.E. of New Mexico, flows first south and then east across the Panhandle of Texas, Oklahoma, and Indian Territory, to its mouth. Length, 900 m. It drains a narrow strip of country, and accordingly is of comparatively small volume, and is much influenced by the wet and dry seasons. About 35 m. W. of its confluence with the Arkansas it is joined by the N. Fork or Rio Mitria, its chief tributary (length, 600 m.), which follows a parallel course.

**Canal**, an artificial water-course constructed for the conveyance of goods or passengers by boat or ship, for the purpose of drainage or irrigation, or for hydraulic power purposes. The earliest canals of which we have any record were in ancient Egypt, India, and China, and were designed for irrigation; but they soon came to be used for inland navigation as well.

Canals may be classified under two divisions: (1) ordinary inland navigation canals, admitting smaller crafts, also known as barge canals; and (2) ship canals, providing a means of inexpensive transportation between ocean and ocean, or between the ocean and some inland centre.

In building canals the following two main points have to be determined upon: (a) the cross-section of the canal; and (b) the longitudinal profile. Upon the best determination of those two points depend in a still higher degree than in railroad work the cost.

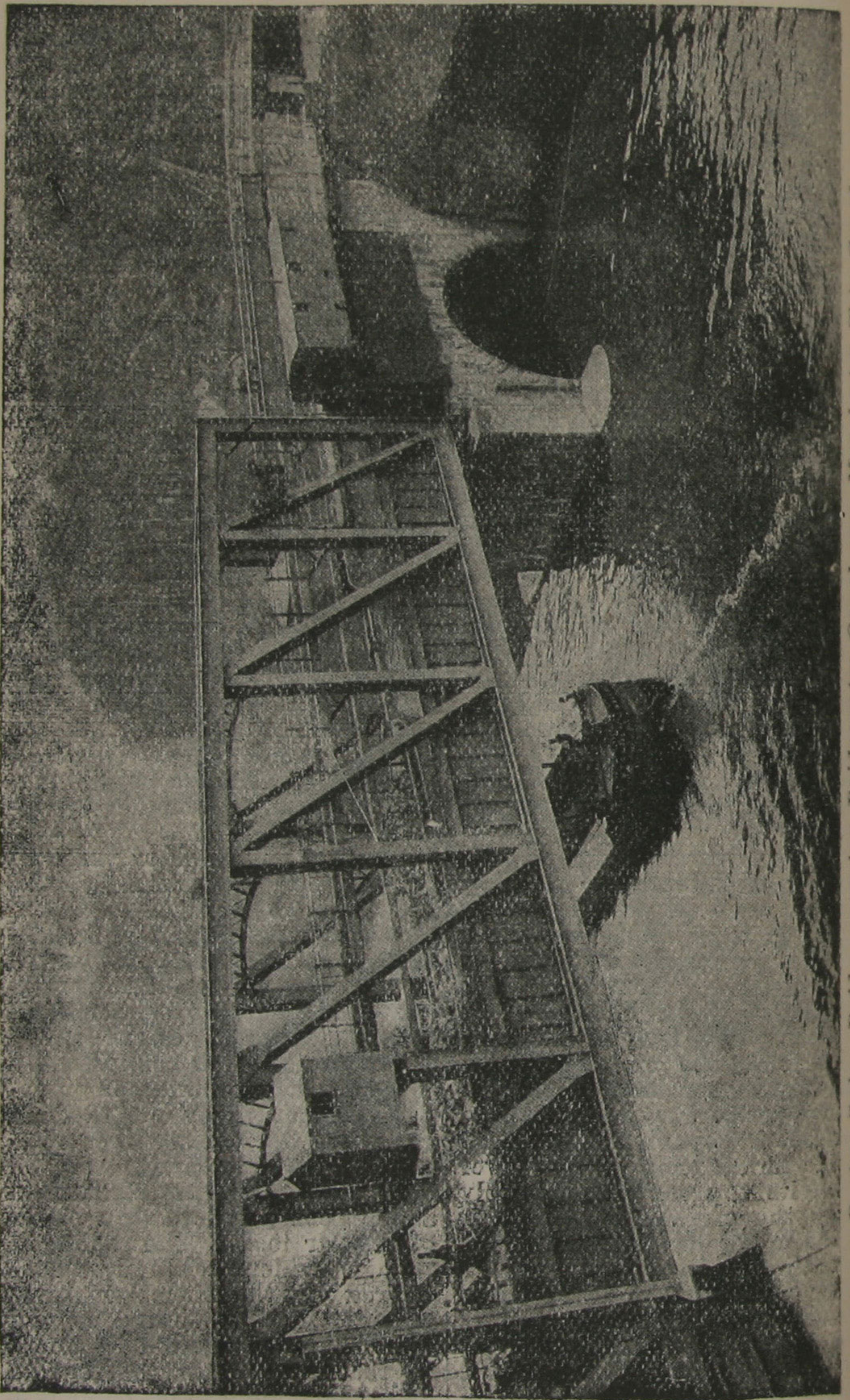
capacity, and time for finishing the canal. The greatest engineering skill may thus be developed by the occasion.

The channel is generally formed with a flat bottom and sloping sides, which in some situations have a stonework 'pitching.' The breadth at the bottom should be more than twice that of the largest boats or barges which are to navigate the canal; the depth should be at least  $1\frac{1}{2}$  ft. greater than the draught of the loaded boats. The embankments are from 2 to 3 ft. above the level of the water, and from 4 to 6 ft. in width; each embankment should have a vertical puddle wall in its centre from 2 to 3 ft. thick. Where the soil is not retentive the bottom and sides of the canal require to be puddled with clay, tempered and well mixed with sand and gravel. This prevents the percolation of water and the burrowing of animals. The angle of slope depends entirely upon the nature of the ground. In soft ground the angle is very flat; in rock the sides are made almost vertical.

Canals generally consist of a number of different sections or reaches, each on one level, but differing from each other in height. By means of locks, or by inclines or lifts, boats are transferred from one level to another. The lock is a water-tight enclosure of masonry of sufficient dimensions to contain the largest barges or vessels that navigate the canal, and is placed at the termination of the lower level, its top reaching slightly above the surface of the water in the upper level. Each end is closed by heavy swinging gates, which open in the middle against the direction of the current. As the double gates are somewhat wider than the lock, they meet before they form a straight line, and are forced firmly together by

the pressure of the water against them. Sluices, which are controlled from above, are inserted in the gates near the bottom, and when opened allow the passage of water, though the gates remain shut. When a boat in ascending a canal arrives at a lock, the upper gates are first closed, then the lower ones opened to allow the boat to enter, and when it has entered are closed behind it. Water is allowed to flow through the sluices in the upper gates, and sometimes also a side culvert discharges from the upper level into the lock. As the lock fills the water-level rises to that of the upper reach; whereupon the upper gates can be opened, so that the boat can pass out of the lock on the higher level. The lift of a single lock ranges from 2 to 12 ft., and is most commonly 8 or 9 ft. On some canals inclined planes are used instead of locks to transfer boats from one level to another, boats being placed upon wheeled cradles or carriages which run on rails and are hauled up by cables.

The lift (inclined or vertical) is also employed on some canals. The inclined lift consists of two counterbalancing troughs or caissons, each holding enough water to float a boat. Two lines of rails are employed, one caisson running on each line of rails; and the caissons are so connected by ropes or chains running on guide-pulleys that when one ascends the other descends. The vertical lift may in many cases be used, with a large saving in time and expense, instead of a series of regular locks. The saving in time is evident when it is considered that the lift lock in a few minutes lifts the barge to the same height it would take hours to reach by means of regular locks; but besides that there is a large saving in water. Accord-



Barton Swing Bridge carrying Widdowater Canal over Manchester Ship Canal

ing to the system employed—viz. regular hydraulic piston or hydraulic balance—the water consumed for every lift will vary a trifle only, as the main part of the water in the caissons remains the same when travelling up and down. The last point is in many cases of the greatest importance where the water supply is limited, or where water perhaps has to be pumped up to the summit of the canal to keep water on the right level. That a large amount

are given, also the saving in time.

The great advantage of the canal was recognized in ancient times, and remains and accounts of old canals in Egypt, Babylonia, Persia, India, China, Greece, Italy, and other countries are numerous. To get an idea of the size of those ancient works, it may be stated that the old royal Babylonian canal, built by King Nebuchadnezzar, was about 360 m. long. Further, the Grand Canal

	Anderton, England.	Les Fontinettes, France.	La Louvière, Belgium.	Lockport, N.Y. (Proposed.)
Date of opening.....	1875	1885	1888	.....
Type of operating mechanism.....	Hydraulic piston.	.....	.....	Hydraulic balance.
Number of troughs ....	2	2	2	2
Length of troughs.....	75 ft.	129 ft. 7 in.	141 ft. 1 in.	225 ft.
Width of troughs.....	15 ft.	18 ft. 4½ in.	19 ft. 0¼ in.	19 ft. 2 in.
Depth of water.....	5 ft.	6 ft. 10½ in.	8 ft. 6 in.	9 ft.
Height of lift.....	50 ft. 4 in.	43 ft. 1 in.	50 ft. 6¼ in.	54.43 ft.
Diameter of plunger ...	3 ft.	6 ft. 6¾ in.	6 ft. 6¾ in.	.....
Pressure on plunger in lbs. per sq. in.....	530	442	469	.....
Time of lifts in minutes	2½	5-7	2½	2
Time of lockage in minutes.....	8	20	15	15
Equivalent number of ordinary locks.....	6	5	.....	5
Time by ordinary locks in hours.....	1 to 1½	2½	.....	½ to 1½
Total cost.....	£48,500	£68,000	£48,000	£60,000

of water flows step by step from a higher level to a lower each time a boat passes the regular locks is evident without any further explanation. The first vertical lift lock was built in England at Anderton in 1875, the next in France, at Les Fontinettes, 1885, etc. In the United States a lift was designed in 1895 to take the place of the series of five locks at Lockport, N.Y., on the Erie Canal. In the above table the main data of some of the most important lift locks

of China, begun in the 7th century, and completed, according to Marco Polo, in 1289-92, connecting the waters of the rivers Yangtse and Peiho and the cities of Peking and Hangchow, is nearly one thousand miles long, and is still in use. The differences in level of the reaches are surmounted by inclined planes, along which the barges are hauled by means of capstans.

Of other ancient canals may be mentioned the Fossa Mariana, connecting the Rhone with the

Mediterranean (102 B.C.); Claudius's canal from the Tiber to the sea; the Nile canal to the port of Alexandria; Odoacer's canal from the vicinity of Ravenna to the sea; the Roman canals in England and Lombardy; the Moorish canals in Granada. Strange enough, in spite of the great skill of many of the ancient canal builders, the simple hydraulic lock was not invented until later. The honour of the invention of the lock is claimed by two Italian engineers in Viterbo, 1481, but also by a Dutch engineer. After the invention of the lock, the building of canals flourished in many countries, especially in France and Italy. The famous Languedoc canal was built by Riquet from 1667 to 1681, connecting the Bay of Biscay and the Mediterranean Sea and the two terminals Toulouse and Narbonne. The canal is 148 miles long, and the summit level is 600 ft. above the sea. There are about 100 locks and 50 aqueducts. The canal floats vessels of 100 tons capacity.

England was one of the last nations to direct serious attention to canals; but in 1755 the Duke of Bridgewater brought forward the project of connecting Manchester and Worsley by a canal; and when this had been successfully accomplished, other works of the same kind were built in such numbers that before the introduction of railways it was estimated that there were in Great Britain about 4,000 miles of navigable canals. The ordinary dimensions of the main English inland canals are 5 ft. depth of water, 25 ft. bottom width, and 40 to 45 ft. surface width. A few of the more important early inland canals—such as the Monkland, Glasgow and Paisley, and the Forth and Clyde canals—were made of a larger section, with a depth of water of from 8 to 10 ft.

The Forth and Clyde Canal in Scotland, completed in 1789 by the well-known engineer John Smeaton, builder of the Eddystone Lighthouse, is 35 m. long, with a summit level of 160 ft., surmounted by means of 39 locks. The Gloucester and Berkeley, Caledonian, and N. Holland ship canals, constructed in the early part of the 19th century, and the precursors of the large ship canals of the present day, were given depths of from 18 to 20 ft. and surface widths of from 99 to 125 ft.

The proprietors of English canals are in most cases common carriers, governed by such acts as the Railway and Canal Traffic Acts of 1854 and 1888, which put them very much on the footing of railways as to the necessity for providing in a reasonable manner for the needs of the public—*e.g.*, by settling and publishing rates for carriage, and providing facilities for transshipment. Many canals have been bought up by railway companies, and such companies are required to afford the same facility for canal as for railway traffic. If the proprietors leave a canal for three years in a state unfit for navigation, or if a canal is shown to be unnecessary, the Board of Trade may authorize the proprietors to abandon the canal, and it may then be vested in other persons. The Canal Boats Acts, 1877 and 1884, which do not apply to Scotland, provide for the registration of canal boats, their sanitary condition and inspection, and the education of the children on board.

The rapid development of canal building in Great Britain, when started, was, as was natural enough, followed with the greatest interest in the colonies. As early as 1750 a canal had been dug in Orange co., New York, by Lieutenant-Governor Colden, for the transportation of stones. The first



real lock canal planned was the canal from the Schuylkill River near Reading, Pa., to Middletown, on the Susquehanna, in 1762. Work was begun in 1791, and 4 miles opened in 1794. The whole canal was first finished in 1827 under the name of the Union Canal. On account of lack of experience, work did not always proceed so cheaply and quickly as possible, and it is interesting to note the advice given by so practical a man as Benjamin Franklin, in a letter to the Mayor of Philadelphia, S. Rhoads, dated London, Aug. 22, 1772. He recommends him strongly to employ young English engineers, with experience in canal building, at a 'handsome salary.' In the same letter he states, quite rightly, that the English seldom canalize rivers, when it can be avoided, as locks in rivers are subject to many more accidents than those in still-water canals. During the Revolutionary War all canal projects of course were stopped; but after the close of the war, work was taken up again with great energy. Washington is justly called the father of the scheme of a great interstate system of canals in the United States; he was the first to develop and stimulate general interest in plans for connecting the Great Lakes with the Atlantic Ocean. About twenty-five years later another great scheme of inland navigation was suggested by James Madison, that of connecting Lake Michigan with the Mississippi River.

Washington's original plan, to extend the Chesapeake and Ohio Canal to Pittsburg, and thence to Ashtabula at Lake Erie, was carefully worked out; but had to be postponed on account of the excessive cost. Otherwise Baltimore would probably have grown to the size and importance of New York, whose greatness is largely due to the Erie Canal. In

fact, the pre-eminence of the state of New York in the Union, although the neighbouring state of Pennsylvania is far ahead of it in natural riches, is largely attributable to the Erie Canal and the Hudson River. The beginning of the Erie Canal was made by the Western Inland Navigation Lock Company, formed in 1792. This company finished 6 miles of canal around the rapids at Little Falls, navigable for smaller barges going to Lake Ontario. In 1803 all canals built by it were bought by New York state, and a greater plan of connecting New York city with Lake Erie was suggested. De Witt Clinton was the leading promotor of this scheme, and on April 7, 1816, the act authorizing the construction was passed. Under Clinton, as governor, the canal was opened from Buffalo to Albany, November 1825, with a total length of 352 miles. The canal was rightly considered as a great triumph of engineering skill, as many difficult aqueducts over intersecting rivers had to be built. The total rise of 568 ft. from Albany to Buffalo was overcome by 72 locks, each 110 ft. long and 18 ft. wide. Of these, 57 are double. The most important lifts are those at West Troy, 188½ ft. with 16 double locks. At Albany the lift is 20 ft., and at Lockport 54½ ft., at first surmounted by means of 9 double locks, later by 5 higher ones, and finally by the above-mentioned hydraulic balance proposed in 1895. With the opening of the Erie Canal the time of freighting was reduced from 20 days to 10 days. At the same time the freight rate was reduced from £20 a ton to 12s. a ton. The passenger traffic was also cared for by means of light barges drawn by shifts of trotting horse-teams, and the whole trip thus made in 3½ days. As soon as the famous lines, now four-tracked, of the

New York Central R. R. were completed along the Hudson River and the canal to Buffalo, business decreased greatly, and is now about at a standstill with a tonnage of 3,000,000 during the 245 days of yearly operation, although navigation was made free and all tolls abolished 1883. One fact, however, should not be forgotten—viz. that the mere presence of the canal forces the railroads to keep the freight rates down. A real competition between railroads of the 20th century with canals of the 19th century is not to be expected in the United States, as in Canada, where the Canadian fight for lake supremacy, by building deep canals and deepening the rivers, tends to draw the lake traffic along Montreal and Quebec to the St. Lawrence River, and makes it possible for the canal navigation to compete effectively with the railroads. The same conditions are to be found in Europe.

In 1896 it was determined to increase the depth of the Erie Canal to 9 ft.; but the money was exhausted a year after, before the completion of the work. The latest plan, carried through by a popular majority of 250,000 votes, Nov. 1903, is to rebuild the present canal, where barges of only 240 tons capacity are now accommodated, so as to transform it into a canal capable of accommodating barges of 1,000 to 1,500 tons capacity. According to Major Symons, of the U.S. Engineer Corps, barges of this size will navigate safely in a canal 10 ft. deep. It is estimated that the freight rate on grain from Duluth to New York city, along the lakes and the proposed improved canal, would be lowered by more than 1 cent per bushel, and thus represent a saving of several million dollars a year.

Washington's original plan of connecting the Great Lakes with

the Atlantic Ocean by way of the Potomac River and across the Alleghanies may some day be carried out in a modified way. The Chesapeake and Ohio Canal from Washington to Cumberland is 185 miles long, and was finished at a cost of £2,275,000. Pittsburg has, with great energy, urged the national government to carry the canalization of the Monongahela River south to Fairmont, West Virginia, and is now planning a canal north to Ashtabula on Lake Erie, at a cost of £6,600,000 and with a depth of 16 ft. In this way Pittsburg, besides the already existing navigable connection through the Ohio River with the Mississippi, and thus with the Gulf of Mexico, would, by building the proposed connection with the above-mentioned Chesapeake and Ohio Canal, get a direct connection with the Atlantic Ocean.

The great canal scheme suggested by James Madison, as mentioned above, was finally carried out, as the Illinois and Michigan Canal was opened in 1848. The total length is 96 miles, with a total rise of 145 ft. from the junction point with the Illinois River, at La Salle, to Chicago at Lake Michigan. The rise is surmounted by 17 locks, each 110 ft. by 18 ft. The capacity is for 150-ton barges. Later, as it was found dangerous to discharge the sewage from Chicago into Lake Michigan, as the city water supply was drawn from the same lake, it was decided to build the famous Chicago Sanitary and Ship Canal, to carry the entire drainage from Chicago to the Illinois and Mississippi Rivers. The canal is 22 ft. deep, at the bottom 110 to 202 ft. wide, and at the top 198 to 290 ft. wide. About 40 miles have been finished at a total cost of £6,600,000; in fact, it is one of the largest ship canals in the world. The work is

suspended now, by the city of Chicago, but the government is expected to build the remaining part to St. Louis. A smaller canal, an addition to the Illinois and Michigan Canal, the Illinois and Mississippi Canal, was started in 1892. The canal will be 7 ft. deep, 80 ft. wide, with 37 locks, each 70 ft. long and 35 ft. wide. Beginning at Hennepin on the Illinois River, it will go 50 miles to the Rock River, and then 27 miles down the river to Rock Island, at the Mississippi.

Few realize when reading about the celebrated Suez Canal (see *SUEZ CANAL*), and the immense tonnage traffic through the same, that the 'Soo' Canal, the Sault Ste. Marie Canal, connecting Lake Superior and Lake Huron, only two miles long, can boast of a still larger tonnage.

For the various canal systems of Canada, particularly the recently projected Georgian Bay Canal system, see the subdivision *Canals* in the article on *CANADA*.

The Suez Canal, which was opened in 1869, is an example of a canal without locks, open at both ends to the sea, and freely supplied with sea water. The total length of the canal is 99 m., with a depth of 31 ft., and a width that varies with the direction of the canal and nature of the banks. The Baltic and North Sea Canal, known in Germany as the Kaiser-Wilhelm Canal, begins at the dockyard in Kiel, on the Baltic, and enters the Elbe near Brunsbüttel, 15 m. above the North Sea. Its total length is 61½ m.; width at surface 220 ft., and at bottom 72 ft.; the mean depth is 29½ ft. The Corinth Canal, cutting through the Isthmus of Corinth, saves two days in the voyage from the Adriatic to the Ægean Sea. It is an open waterway at sea-level, 4 m. in length, with a uniform bottom width of about 72 ft., and a depth

of 26 ft. The ridge pierced is 287 ft. in maximum height. The Amsterdam Ship Canal, improving the access to Amsterdam, extends westward to the North Sea, reducing the distance to 16½ m., instead of the 50½ m. by the old North Sea Canal, and enables much larger vessels than formerly to enter the port. It is 197 ft. wide at the water surface, 89 ft. at the bottom, with a minimum depth of 23 ft. It took ten years to complete. The Manchester Ship Canal is 35½ m. long, with a depth of 26 ft., and a width of 65 ft. in the locks. The bottom width varies from 120 to 170 ft. The Pontileff Canal connects Kronstadt with St. Petersburg, and is 17½ m. long., with a uniform depth of 22 ft. and a maximum width of 275 ft.

Among projected canals may be mentioned one from Riga, on the Baltic, to Kherson, on the Black Sea, 1,000 m. long, 27 ft. deep, and 213 ft. wide, estimated to cost £100,000,000, and to take five years to construct; a canal from the Baltic Sea to Berlin, with a depth of 25 ft. and width of 190 ft., estimated to cost £10,000,000; the Brussels Ship Canal, the scheme being to make the present waterway navigable for ships of 2,000 tons, the ascent being overcome by three locks.

The construction of the Panama Canal, to connect the Atlantic with the Pacific, was begun by a French company in 1881. The plan originally was for a tide-level canal 28 ft. deep; but, funds failing, a lock canal of 15 ft. in depth was substituted. Work ceased in 1888, but was resumed in 1894 by a new company, and continued with a small force of workmen until the property was sold to the United States Government, which is now engaged in completing a lock canal on new lines. The total French excavation was about 40,000,000 cub. yds.,

of which 29,908,000 cub. yds. has been of use under the present plan. The total American excavation has been (to Jan. 1, 1910) 94,969,387 cub. yds., leaving for future excavation a volume of 79,697,207 cub. yds. The present rate of removal is 3,000,000 cub. yds. a month. It is expected to complete the canal by 1915. (See PANAMA CANAL.)

*Inland Navigation.*

Length of inland waterways:—

United Kingdom.	3,907 miles.
France .....	7,459 "
Germany .....	6,214 "
Belgium.....	1,242 "
United States....	4,200 "

As to inland navigation in Europe, it appears that Belgium occupies, relatively to its size, a foremost place in the provision of inland navigation, its total length of navigable waterways amounting to 1,360 miles, or 1 mile of waterway to every 8½ miles of territory. During the last twenty-five years Belgium has spent £16,000,000 on the improvement of canals and ports, the result being that Belgian manufacturers can obtain their raw materials and send their finished products to the ports at the cheapest possible rate. In 1909, barges with a total tonnage of close on 8,000,000 cleared from Antwerp. A report, June 1904, by Dr. Rose, on the projected Rhine-Neckar-Danube canal gives figures revealing the immense importance of waterways to Germany. From 1877-97 the number of river and canal boats increased by 28 per cent., their carrying capacity by 143 per cent. The large increase in the number of steam canal boats reduced the cost of transport on the waterways during the period mentioned by about one-half, the present cost of transport per mile and ton being less than ½ cent. The Prussian Diet in 1904 considered

*Particulars of important Ship Canals.*

Canal.	Date of Opening.	Length (miles).	Depth (feet).	Width (feet).		Height above Sea-level (feet).	Locks (No.).	Traffic (tons).	Excavation (cubic yards—millions).	Cost (in million £).
				Top.	Bottom.					
Suez.....	1869	99	31	420	262	Sea-level	4	11,000,000	80	20·0
Manchester .....	1894	35½	26	300	120	60		3,000,000	54	15·0
North Sea and Baltic..	1895	61½	29½	220	72	Sea-level		4,500,000	106	8·0
North Holland.....	1825	50	18½	123	31	"	"			
Amsterdam.....	1877	16½	23	197	89	"	"			2·2
Bruges.....	1902	6½	26½	..	72	"	"			
Languedoc.....	1681	148	..	..	..	600	"			3·0
Caledonian.....	1823	60	20	120	50	102	"			0·92
Corinth.....	1893	4	26	..	72	Sea-level	25		15	1·3
Cronstadt.....	1885	17½	22	..	200					
Sault Ste Marie .....	1896	2	23	..	100					

canal projects involving an estimated expenditure of \$16,728,750. The Austrian government has

initiated canal works connecting the Danube, Oder, Moldau, Elbe, and Vistula rivers, and is committed to an expenditure of more than £10,000,000 between 1904 and 1912. Of all European countries France has best grasped the deep significance of cheap waterways, and her system is perhaps the best. Up to 1904 she had expended on canals and waterways £100,000,000, and is contemplating the further expenditure of £20,000,000. Dr. Rose thus sums up his report: 'A comparison of the two methods of transport is altogether in favour of the waterways—a fact which seems to be very keenly appreciated on the Continent. A canal ship of 600 tons carries as much goods as sixty railway cars, requires only one-thirtieth of the hauling power necessary on level railroads, is one-third cheaper in carriage per ton, is worked at a lower rate of expenditure for men and materials, and can load and unload at any place on the route, in addition to other minor advantages. Slight disadvantages are slowness and unpunctuality of carriage; a more serious one, stoppage in winter by formation of ice. The former can be avoided by electric-motor barges, especially as the number of locks provides a large amount of available electric energy; and the latter by small canal ice-breakers patrolling the canal in cold weather.'

Since 1901 there has been a revival of interest in British canals. In 1904, sixty-one chambers of commerce voted for a resolution nationalizing the canals by transferring them to a national public trust, with government guarantee, supervision, and control, forty voting against. The Mansion House Association on Railway and Canal Traffic carried a similar resolution on Dec. 15, 1904, and urged the government to promote a bill. A scheme giv-

ing powers to local authorities to form canal trusts and to acquire improved lines of waterways has been included in the Canal Traffic Bill, which, though adopted by the canals committee of the Association of Chambers of Commerce, has hitherto failed to pass its second reading. In March 1906 a Royal Commission, with Lord Shuttleworth as chairman, was appointed to inquire into, and to report on, the canals and waterways of the United Kingdom. This Commission issued its final report in December 1909. In Scotland the formation of a ship canal between the Forth and Clyde has frequently been suggested, and in 1909 and later the project was actively discussed in view of the extensive naval base which is being constructed at Rosyth.

See the Board of Trade *Returns of Canals and Navigations of the United Kingdom for 1898* (1900), De Salis's *Handbook of Inland Navigation* (1904), Bradshaw's *Canals and Navigable Rivers of England and Wales* (1905); Smeaton's *Report and Evidence of Royal Commission on Canals (Gt. Britain)* (1906-9); also SUEZ CANAL, PANAMA CANAL.

**Canal, GRAND.** See GRAND CANAL.

**Canal Dover,** tn., Tuscarawas co., Ohio, U.S.A., on Tuscarawas R., 52 m. N.W. of Wheeling. It has iron and steel works and flour mills. Pop. 5,500.

**Canaletto,** ANTONIO (1697-1768), properly ANTONIO CANALÉ, the great architectural painter of Venice in the 18th century. In 1764 he visited London, and painted several picturesque views of the city. He possessed the power of reproducing what he saw with an accuracy almost photographic. He was a master of perspective, his touch being firm and certain; while his best work is distinguished by broad simplicity of effect, clearness of tone, and occa-

sionally brilliancy of sunlight, though his usual tone is chastened and subdued. His topographical pictures are more valuable from a historical than an artistic point of view. The National Gallery, London, has ten of his Venetian pictures and one of Eton College. Edinburgh and Dublin also possess examples. The Wallace Collection, London, contains several of his pictures.

**Canaletto**, BERNARDO BELLOTTO, called CANALETTO THE YOUNGER (1724-80), Venetian painter and engraver. After studying under his uncle, Antonio Canaletto, whom all his life he imitated both in tone and treatment, he visited Rome, Verona, Brescia, Milan, Dresden, and finally England, where he painted an interior of King's College Chapel, Cambridge. His pictures are remarkable for correctness of perspective and subtle effects of light and shade. Thirty-four of them are in the Dresden Gallery.

**Canandaigua**, cap. of Ontario co., New York, U.S.A., 28 m. S.E. of Rochester, at N. end of Canandaigua Lake (15 m. by 1 to 2 m.), with beautiful scenery, and many fine buildings. The industries include tanneries, brickyards, canning-houses, and breweries. Pop. 7,500.

**Cañar.** (1.) A central prov. of Ecuador. Area, 1,570 sq. m. Pop. 64,000. Numerous Inca remains are found. Its capital is Azogues. (2.) Town in above prov., 25 m. N. of Cuenca.

**Canara**, districts, British India. See KANARA.

**Canarium**, a genus of trees which are natives of tropical countries. Many of them yield nuts of some economic value.

**Canary.** The wild canary (*Serinus canarius*) is found in the Canary Islands, in Madeira, and the Azores, and belongs to the family of Fringillidæ, or finches. It has been domesti-

cated for over three hundred years in Europe. The wild bird agrees in colour very closely with the tame variety known as the green canary. There is little apparent difference in habits between the wild and tame forms and even the song does not appear to have undergone any great change. But the breeder has brought about a great difference in colour and shape. The wild bird is only about four inches long, but many breeds of to-day are double that size. The Belgian fancy (or *bossu*, as the French call it) and the Scotch fancy are almost hunchbacked in appearance. The Norwich canary is bred chiefly for its rich colour; the lizard canary is so called from its spotted back; the cinnamon canary receives that name from its beautiful tint. The Yorkshire is a long, thin, very fine and closely feathered bird, with neat wings and tail, and may be self-coloured or marked. The Lancashire, a large bird of great substance, formerly much fancied, is now little bred. Birds which have a crest or a bunch of feathers radiating from the centre of the crown are termed 'cobby.' The Border fancy is a small, neat bird, with very close and almost waxy appearance of feather, close-fitting wings, and whip-shaped tail; its full size is five and a half inches. The London fancy is a pretty little yellow or buff bird with black wings and tail. The Scotch fancy is the only variety bred to any great extent in Scotland. It is a large, commanding bird, with very prominent shoulders and long 'reaching' neck; when showing, the head should be carried lower than the shoulders and the back and tail must form a graceful curve from shoulder to tip of tail. The roller canary is a variety kept solely for its song; it is trained with great care by means of a bird-organ or by an

other highly-trained bird called a 'schoolmaster.' The roller is a small bird with fine voice-power.

Of the many associations of the fancy, the London and Provincial holds the foremost place. It holds two of the largest shows in the country every year—one in November and the other in February—within the Crystal Palace, London. At the February show there are sometimes as many as 2,500 birds on view. The London Cage Bird Society (instituted in 1888) holds a splendid exhibition every November. Next comes the City of Glasgow Society (instituted 1853), holding an annual exhibition in October. The Edinburgh Ornithological Association (instituted in 1852) has a show every New Year, principally of Scotch fancy and Belgian canaries. A more recent but not less important association is the Scottish National Cage Bird Society, which embraces all varieties. About 2,000,000 canaries are reared every year in Germany, the most famous for singing powers being those bred in the Harz Mountains region.

**Canary Grass** (*Phalaris canariensis*), a hardy annual grass bearing beautiful flower-spikes in summer, followed by fruit containing the well-known canary seed.

**Canary Islands** (*Ganar*, or *Canar*, Berber name for a region of N.W. Africa), a volcanic group in the Atlantic Ocean, off the N.W. coast of Africa, between 27° 40' and 29° 25' N. and 13° 25' and 18° 16' W., forming a province of Spain. The group has a total area of 2,808 sq. m., and the principal islands are Tenerife or Teneriffe, Grand Canary or Gran Canaria, Palma, Lanzarote, Fuerteventura, Gomera, and Hierro or Ferro. They are bold and picturesque in outline and mountainous in character, the chief elevations being volcanoes, of which the highest (the Peak of

Teyde or Tenerife) rises to a height of 12,182 ft. The equable temperature and moderate rainfall make the islands an ideal health resort. From November to March is the rainy season; the summer and autumn are almost rainless. Mean temp. 70° F.; minimum, 50° F.; maximum, 86° F. The products are subtropical. There are over nine hundred species of flowering plants, over four hundred of which are peculiar to the group. The vine, sugar-cane, tobacco, wheat, and maize are produced, and Grand Canary and Tenerife especially export great quantities of fruit and early vegetables (potatoes, tomatoes, bananas) for the British market. The principal seaports are Santa Cruz de Tenerife, and, in Grand Canary, Las Palmas. The exports, which also include tobacco and cigars, cochineal, sugar (to Spain), onions (to Cuba), and petroleum, reach the annual value of £1,200,000, of which £1,000,000 is for fruit and vegetables. The imports are valued at about £1,600,000. The population (360,000) is mainly Spanish. Most of the inhabitants are engaged in agriculture, but some 10,000 are employed in fishing, and many are now finding occupation in the sugar and tobacco factories. The women excel in the making of lace and embroidery.

The islands were discovered in 1334 by a French vessel, and were first taken possession of (1402) by a Norman, Jean de Bethencourt, who afterwards surrendered his right to the king of Spain. After a struggle extending over the greater part of the 15th century, the Spaniards, in 1495, made themselves masters of the whole archipelago. See G. Glas's *History of the Canary Islands* (1764); Olivia M. Stone's *Teneriffe and its Six Satellites* (new ed. 1889); books on Teneriffe

by C. Edwardes (1888), J. Whitford (1890), G. W. Strettell (1890), J. H. T. Ellerbeck (1894); A. S. Brown's *Madeira and the Canary Islands* (6th ed. 1901).

**Canary Wine**, a dry white wine famous from the 16th to the middle of the 19th century. Since the disasters of the 'fifties this wine has never recovered its position on the market. It is, moreover, inferior to Madeira, which has largely replaced it, in all the properties of character, body, fullness, and bouquet. It was produced chiefly in the north-west of the isles and around Teneriffe, from whence Canary took the name of Teneriffe wine. From the same source was distilled the Teneriffe brandy. The best wine was the Vidonia. At the present time a Canary port and Canary sack are obtained from the south of Spain. The former is a fruity, tawny red wine somewhat like a port, and the latter a white wine of excellent flavour and in body resembling Madeira.

**Cancale**, seaside resort, Ille-et-Vilaine, N.W. France, 6 m. E. by N. of St. Malo; noted for its oysters. Pop. 7,000.

**Cancan**, sometimes called CHAHUT, a somewhat 'free and easy' manner of dancing quadrilles, invented by Rigolboche, a notorious *danseuse*, about 1830, and characterized by high-kicking and other suggestive movements. It was first adopted in the public gardens, the opera comique, and the casinos of Paris.

**Cancellation** (Lat. *cancellare*, 'to make like a lattice work,' 'to strike out by means of cross-lines'). (I.) IN MATHEMATICS. A fraction being a proportion, any common factor occurring in the numerator or denominator may be eliminated without altering its value. Thus—

$$\frac{4}{8} = \frac{\cancel{4} \times 1}{\cancel{4} \times 2} = \frac{1}{2}.$$

This process is known as cancellation, the obvious result being the simplification of treatment. Algebraical expressions are simplified on similar principles. (2.) IN LAW. The cancellation or destruction of a deed does not re-vest the thing granted in the grantor, though it terminates all personal engagements established by the deed. Fraudulent cancelling, destroying, obliterating, or concealing of any deed forming the title or part of the title to land, is a felony punishable by penal servitude or imprisonment with or without hard labour. The equitable rectification and setting aside of deeds and other instruments is assigned to the Chancery Division of the High Court.

**Cancer**, more technically called CARCINOMA, is a malignant growth of epidermic, epithelial, or glandular tissue structure, characterized by the tendency to form secondary growths along the lines of communication through lymphatic vessels to adjacent glands. The proliferating cells invade regions normally occupied entirely by cells of a different type. Cancer can sometimes be distinguished from simple epithelial growths only by the course of the disease, and especially by the presence of secondary growths. It includes, besides epithelial elements, a variable amount of connective tissue between the nests of cells. There is no true capsule round the tumour, and therefore cancer cannot be 'shelled out' like, for example, a simple fatty tumour. Its course may be divided into the stages of primary growth, breaking down or degeneration, and ulceration. In growth it may invade important structures; in breaking down and in ulceration it may cause fatal hæmorrhage, and always produces great weakness and the characteristic



cancerous cachexia. Secondary growths may make their appearance at practically any time after the development of the primary growth, or the secondary growth may be the first certain indication of a deep-seated primary cancer.

The symptoms depend to some extent upon the situation and variety of the cancer, and even a trained observer may find it difficult or impossible to diagnose the disease in its early stages. A recent swelling or ulceration about an old-standing wen or mole, and all abnormal growths in certain situations, such as the breast, lip, and tongue, should be regarded with suspicion. Such developments are not always malignant, but they should certainly be shown without delay to a surgeon. Elsewhere—as, for example, deep in the alimentary canal—pain and hæmorrhage may be the first symptoms.

*Causes.*—The origin of cancer is not yet definitely known, and indeed there are reasons for believing that there may be more than one cause. Cancer is essentially a disease of middle and senile life, by far the greater proportion of cases occurring in persons above forty. It occurs in most communities more among females than among males, in the proportion of three to two. If cancers of the female generative organs be excepted, however, the balance is rather on the side of the males. Heredity must be considered a factor, there being cases on record where the disease has shown itself in three successive generations. The proportion of instances supporting a theory of heredity is, however, small in comparison with the total number of cancer cases, and district and infection may perhaps account for some of the instances which are recorded. It must be fully understood, in any case, that by heredity one does not mean that

cancer is heritable, but merely that in some instances successive generations of one family show an abnormal tendency to develop cancer under conditions likely to encourage it, such as a chronic ulcer. Recent research has shown that certain types of locality contain more than the average number of cases. Cities show proportionately more cancer than country districts; and in the country there is a very marked preponderance of cases in low-lying villages, near either stagnant or running water, ill-drained, with trees abundant in the vicinity. Those following certain trades are specially liable to cancer, which among chimney-sweeps accounted at one time for 202 deaths out of 1,000 from all causes. Irritation by soot particles is in this case the exciting cause, the form of cancer produced being epithelioma; but with improved methods of sweeping the number of sufferers has greatly decreased. Still, the London hospitals show that the chimney-sweeper is specially liable to this malady. Mechanical irritation is, indeed, one of the commonest exciting causes; and a broken tooth or pipe-stem, setting up inflammation and ulceration, has often formed the starting-point of cancer in tongue or lip. Such factors, however, as age, sex, heredity, environment, and mechanical irritation are of merely secondary importance, and the ultimate cause of cancer remains undetermined. At the present time two distinct views are held with regard to the question. According to one theory, with which the name of Cohnheim is associated, malignant growths arise from the development and proliferation of certain cells included within the body before birth. The other view is that cancer is due to parasitic infection. The subject is one of

extreme difficulty, but of such outstanding importance that in 1902 the English Royal Colleges of Physicians and Surgeons promoted a scheme for cancer research. The undertaking which they initiated is now known as the Imperial Cancer Research Fund. In Germany and America similar projects have been started. The various commissions have, by careful and reliable work, thrown much new light upon the transmissibility and the zoological distribution of cancer, as well as upon the peculiar characters of malignant cells. They have not, however, as yet settled the crucial question of origin. In November 1904 the Harvard (American) Cancer Commissioners issued their third annual report, which disproves the parasitic nature of Plimmer's bodies, and does not tend to confirm the supposed relative increase of cancer. These results corroborate those of the Imperial Research Fund, which were published in the previous spring. Organisms, real or imagined, other than those of Plimmer, had previously been shown to have little or no bearing on the production of cancer; but towards the end of 1904 M. Doyen of Paris claimed that he had discovered not only the parasite but a curative serum. The microbe he called *Micrococcus neoformans*. To investigate M. Doyen's claims the French Surgical Society appointed a committee, one member of which was Professor Metchnikoff. M. Doyen's treatment has been followed by benefit in certain cases of malignant disease, but as yet at least the balance of evidence is against his views.

*Treatment.* — When cancer is present, the only form of effective treatment is to extirpate the disease. For this purpose, not only should the obvi-

ously diseased area be removed, but the lymphatics leading from it, whether they appear to be diseased or not, and the adjacent lymphatic glands, must all be included in the operation. For inoperable cases the injection of Coley's fluid, composed of mixed toxins, electrolysis, X-rays, and radium, with in some cases caustics, may prove of real service.

**Cancer**, a northern constellation, and the fourth sign of the zodiac, represented by the symbol  $\text{♋}$ . In ancient Egyptian uranography Scarabæus replaced Cancer. It contains the star cluster known as the Præsepe (*q.v.*).  $\zeta$  Cancri is visually triple, the close pair revolving about one another in 59 years, while the third component of the system moves round them in a period of undetermined length. Irregularities in its motion show that it revolves about a close, invisible companion in  $17\frac{1}{2}$  years. It is a spectroscopic binary, the period being 3.4 days.

**Cancer**, the name of the genus to which the edible crab belongs.

**Cancer Research Fund**, IMPERIAL, the scheme issued, March 1902, by the Royal College of Physicians and the Royal College of Surgeons, for systematic cancer research and the collection of statistical, dietetic, and topographical information, has developed into the Imperial Cancer Research Fund, with the King as president, and five trustees. The superintendent of cancer research and director of the central laboratory is Dr. E. F. Bashford, and the offices are at Examination Hall, Victoria Embankment, London. Four reports have been published.

The Harvard Medical School in the United States has pursued systematic investigation into the origin of cancer since 1898; and

in 1903 the Huntington Fund for Cancer Research was instituted, and investigations carried on, at Cornell University. See *Report of Cancer Laboratory, New York State* (1910).

**Cancionero**, in Spanish, were collections of whatever verses the person who formed them happened to fancy or was able to find—sometimes all by one author, sometimes by many—which began to come into fashion during the reign of John II. (1368–1406). Among the more famous were the Cancionero of Alfonso de Baena, the Cancionero in the Limousin district, that of Lope de Stuñaiga, that of Fernando del Castillo (1511); while no fewer than seven others are in the National Library, Paris. They belong to a state of society in which the great nobility, imitating the king, maintained poetical courts about them. In 1511 Fernando del Castillo printed at Valencia a *Cancionero General*, or general collection of poetry, the first book to which this title was given. Similar collections were made of Portuguese poems as early as the 13th century. See Ticknor's *Hist. of Spanish Literature* (new ed. 1888).

**Cand**, Cornish name for fluor spar or fluorite, occurring as a vein-stone; known in Derbyshire as blue-john. See FLUOR SPAR.

**Candaba**, tn., prov. Pampanga, Luzon, Philippines, 28 m. N. by W. of Manila, on the Pampanga Grande. Pop. 12,000.

**Candace**, a queen of the Ethiopians of Meroë, who invaded Egypt in 22 B.C., but was more than once defeated by Petronius, the Roman governor. She finally made her submission to Augustus.

**Candahar**. See KANDAHAR.

**Candeish**. See KHANDESH.

**Candela**, comm., Apulia, Italy, prov. of and 24 m. S. of Foggia; produces good wine. Pop. 6,700.

**Candelabrum**, a utensil which in ancient and modern times has

often served the dual purpose of a candlestick and a lampstand. It was frequently designed according to elaborately ramified or 'branched' patterns; was wrought in many metals, precious and base, as well as in several kinds of stone; and varied in height from six to nine feet. Specimens found in Pompeii prove candelabra to have been common amongst the Romans, both for sacred and domestic uses. A beautiful bronze specimen of the 12th century is in Milan Cathedral, and several fine examples are in the British Museum.

**Candia**, the largest town in Crete, midway on its north coast. It has a small artificial harbour (much silted; steamers to Athens, Syra, Smyrna, Constantinople, and Trieste, irregularly), a large bazaar, and growing trade in island produce. The exports and imports each exceed £300,000 in value per annum. The population (23,000) is mainly Greek, with a few Moslems, Jews, etc. Candia was founded in 823 by Saracens; stood a famous siege (1667–9), when the Turks captured it from the Venetians, and was further damaged by earthquake (1856), and by bombardment (1897). The Venetian walls, port, and arsenal remain, and traces of other fine buildings. The mediæval cathedral of St. Titus was demolished about 1880; a new Greek one was consecrated in 1893. Candia is also used as an alternative name for Crete itself. See CRETE.

**Candidate** (Lat. *candidatus*, lit. 'white-robed,' Roman candidates being thus arrayed), any person who offers himself or is put forward for election or appointment to some post of honour. A parliamentary candidate is thus defined by the Corrupt and Illegal Practices Prevention Act, 1883: 'Any person elected to serve in Parliament, and any person who is nominated as a

candidate, or is declared by himself or by others to be a candidate, on or after the day of issue of the writ, or after the dissolution or vacancy in consequence of which such writ has been issued.' The question as to when a political aspirant becomes a candidate is important (see ELECTIONS), but is not definitely determined by statute law. It is a question of fact, and seems to depend on the date when the election becomes 'imminent.'

**Candle**, a rod of solidified tallow, paraffin, or wax surrounding a wick. A chandler's apparatus has been found at Herculaneum, and a fragment of a candle, supposed to have been made in the 1st century, is in the British Museum; but candles are not mentioned in any writings before the end of the 2nd century. Wax and tallow were the only materials in use until towards the end of the 18th century, when spermaceti began to be introduced; and the manufacture of stearin began early in the 19th century. Candles are now made of tallow, stearin, paraffin wax, spermaceti (see articles under these heads), and compositions. Paraffin wax for candle-making is produced by several methods. (See PARAFFIN WAX.) Stearic acid, or stearin, a substance largely employed in candle-making, is obtained from tallow, or is a mixture of tallow and palm oil. See STEARIC ACID.

*Wicks* are usually made of fine cotton yarn. A wick must have good power of absorption, burn freely, and leave little or no ash; it must also be suited to the fatty matter employed. For moulded candles plaited or braided wicks are used; they are made flat, so that in burning they bend downwards into the flame and are totally consumed. Tallow dip wicks are bulky, and are loosely twisted.

*Manufacture.*—There are three modes of manufacturing candles—by pouring and rolling, for wax candles; by moulding, for most other varieties of candles; and by dipping, sometimes employed for tallow candles, hence called 'dips.' As wax cannot be moulded, on account of its tendency to stick to the mould, it has to be poured over the wick. The wicks are fastened to a hook, and the wax is poured over each in turn. When this has been done several times, the candles are reversed and the operation repeated, as the wax flows to the lower end and thickens it. The candles are afterwards rolled under pressure, and trimmed with knife and gauge. Spermaceti, paraffin, and stearin candles are moulded. The simplest form of mould is the hand-frame, in which hand-made candles are moulded. A number of mould-pipes (up to two or three dozen), held together by a frame, open into a trough at the top. The wicks are stretched through these, and secured at top and bottom by pegs or wires. The frame is heated to a little short of the solidifying point of the fatty material, which is then poured into the trough. When the candles in the moulds have solidified, the superfluous material is removed with a trowel. The machine now employed for candle-moulding will mould as many as 100 candles at one time. The moulds for the tips are made movable, so that when one set of candles has been moulded they are ejected from the tubes by an upward push of the tips, and are caught in clamps suspended above the trough. When the clamps are in turn raised, the wicks extend down through the tubes to bobbins arranged underneath. When the next set of candles is moulded, the wicks of those suspended in the clamps are cut, and

the candles are taken out; and so the operations go on continuously. The moulds are warmed and cooled by a device admitting steam or cold water. In dipping, the wicks are suspended from a frame, and are repeatedly dipped into the melted tallow until the requisite thickness has been attained, the tallow being allowed to cool after each immersion. The ornamental patterns sometimes given to candles require special hand-moulds. Aniline or vegetable dyes are generally used for colouring, as mineral dyes interfere with the combustion.

*Night lights* are made in two forms. Child's night lights (so named from the inventor) consist of three parts—the outside case, the fatty matter, and the wick. The first is a shallow cylinder of very thin card, coated on the outside with gum to make it waterproof, and bottomed with a disc of cardboard. The wicks, generally of fine flax yarn, are introduced through an aperture in the bottom, and are secured on the outside by a square of tinfoil and a drop of wax. The melted fatty matter is then poured into the cups from a can. This light is intended to be burned in a shallow vessel containing water. Patent night lights have no cases, but are moulded, the fatty matter being derived from palm oil. The wick is threaded through the light when cold, and is secured by a tinfoil cleat on the bottom. Patent night lights are burned in dry vessels.

Candle-making is an important industry in Britain, the largest works being at Birkenhead and London.

**Candle-fish** (*Thaleichthys*), a small fish allied to the smelt, which occurs in vast numbers off the Pacific coast of N. America. It owes its popular name to the fact that the flesh is so oily that it will burn like a candle. The

fish is also used as food, and is sometimes called 'eulachon' or 'oulachan.'

**Candlemas**, the day on which the Roman Catholic Church annually (Feb. 2) commemorates the Purification of the Blessed Virgin Mary. On the same day the candles for the use of the church services during the coming year are also blessed. The day is also observed in the Church of England as a solemn festival preceded by a fast. In the Armenian Church the sacred new fire is kindled on Candlemas Eve; not at Easter, as is the usage elsewhere. In some parts of Germany and in the Hebrides it was once the custom to observe certain rites on Candlemas Day, to ensure good crops of flax and oats in the coming year. Candlemas is chiefly known in Scotland, in secular matters, as the first of the quarterly terms; and the state of the weather on that day is proverbially said to determine that of the spring. See L. Duchesne's *Christian Worship* (1904).

**Candle Nut** and **CANDLEBERRY TREES** (*Aleurites triloba* and *A. moluccana*), are evergreen trees belonging to the order Euphorbiaceæ, which grow wild in the Pacific islands. They are characterized by large, thick, maple-like alternate leaves and clusters of small white flowers. The nuts are very rich in oil, which is extracted for economic uses, and the nuts themselves are sometimes used as torches for fishing by. The candleberry trees are easily grown in stovehouses, and may readily be propagated by means of cuttings.

**Candle-tree** (*Parmentiera cerifera*), a native of Central America, is only to be grown in Britain in the stovehouse, where it should be planted out in a mixture of loam, leaf-mould, peat, and sand. It bears large white flowers at the nodes, fol-

lowed by yellow edible fruit not unlike a wax candle in appearance.

**Candlish, ROBERT SMITH** (1806-73), Scottish preacher and theologian, born at Edinburgh; was presented in 1833 to the parish of St. George's, Edinburgh. After the death of Dr. Chalmers (1847) Candlish became the leader of the Free Church. In 1862 he succeeded Dr. Cunningham as principal of the New College, Edinburgh, the divinity hall of his denomination. His works are as follows: *Contributions towards the Exposition of the Book of Genesis* (1843-62); *The Atonement: its Reality, Completeness, and Extent* (1st ed. 1845; 2nd ed., rewritten and enlarged, 1861); *Examination of Mr. Maurice's Theological Essays* (1854); *The Fatherhood of God* (first series of the Cunningham Lectures, 1864-65); *Sonship and Brotherhood of Believers* (1872); *The First Epistle of St. John Expounded* (1866); *Reason and Revelation* (1859). See *Life* by the Rev. W. W. Wilson (1880); also Biographical Sketch prefixed to a volume of sermons (1873).

**Candon**, pueblo, prov. S. Ilocos, Luzon, Philippines, 25 m. S of Vigan. It is the second pueblo in size in the province, carries on an important coast trade, and produces indigo, rice, and tobacco, and manufactures cotton, silk, etc. Pop. 20,000.

**Candy.** See KANDY.

**Candytuft.** The Iberises, or candytufts, are hardy plants. The annual species, *I. coronaria* and *I. umbellata*, are of all colours, and can be had in flower at any time during spring, summer, or autumn by regulating the time of sowing. The perennial species are mostly beautiful white-flowering plants from three to nine inches high, usually evergreen and shrubby, and all hardy. The common evergreen candytuft, *I. sempervirens*, is one of the best;

and its dwarf variety, *I. s. coriifolia*, is no less useful. They bloom in April and May. A little later to flower is the larger and larger-flowered *I. correaefolia*. If given a warm, sheltered corner, the more tender *I. sempervirens* may be had in flower for ten months out of the twelve. The candytufts thrive in ordinary garden soil. They must, however, have full exposure to the direct rays of the sun.

**Cane**, a name applied to certain small palms, as well as to varieties of the larger grasses, such as the bamboo and the sugarcane, which have a slender, reed-like stem. Strictly speaking, the name should only be applied to the family of palms known as rattans (genus *Calamus*), of which there are many species, distributed over the E. Indies, India, Ceylon, the Malay Peninsula, and China. Owing to their lightness and strength, rattans are employed by the people of the East for the making of baskets, chairs, ropes, etc., and great quantities are exported for similar purposes. The name 'cane' is somewhat indiscriminately applied to certain kinds of walking-sticks; but the true cane walking-stick is the malacca (*Calamus scipionum*), a native of Sumatra, the stem of which is thicker than the rattan.

**Canea**, the cap. of Crete, residence of high commissioner, lies on the N. coast, about 25 m. from the W. end, and 5 m. W. of the head of Suda Bay. The town is cramped by mediæval (Venetian) walls, but has a pleasant European quarter 1 m. E. The only good roads in the country run from Canea to two neighbouring villages. The small artificial harbour (mediæval) is much silted. The total trade, of which the most important articles are soap and oil, is less than half a million sterling annually. Several Venetian monuments survive. Pop.

25,000, mainly Greek; but a few Moslems have survived the anarchy of 1897-9, when the town suffered severely. Canea was the centre of operations of the four protecting Powers, 1897-1909.

**Canella**, a genus of evergreen tropical trees, of which only one, *C. alba*, is grown as a stove plant in English gardens. It is a native of the W. Indies, and usually grows to a height of about twelve feet. It bears small violet flowers which yield a musklike fragrance, and the whole plant has a pleasant scent. It is propagated by cuttings taken in late spring.

**Cannelli**, comm., Piedmont, Italy, prov. of and 32 m. S.W. of Alessandria; with limestone quarries. Pop. 7,500.

**Canelones**, a s. dep. of Uruguay; fertile and wine-producing; area 1,830 sq. m. Pop. 93,000. Cap. Canelones or Guadalupe, 25 m. N. of Monte Video.

**Canephor** (Gr. *κρηφόρος*, 'basket-bearer'), high-born virgins and other Athenian women selected to carry baskets containing the implements of sacrifice in the Panathenaic and other processions. Canephor occur on the friezes of the Parthenon in the British Museum. In architecture canephor are female figures bearing baskets on the head; such figures support light entablatures in the manner of caryatides, with which they are sometimes confounded.

**Canes Venatici**, the Hunting Dogs, a small constellation close behind the Great Bear, formed by Hevelius in 1690. Its chief star, designated by Halley Cor Caroli, is of the third magnitude, and, with a fifth-magnitude companion, constitutes a pair delicately tinted in yellow and lilac. It contains a large number of nebulae. The 'Whirlpool' nebula, typical of the spiral class, was discovered in Canes Venatici by Lord Rosse in

1845. 3 Messier is a brilliant globular cluster, one seventh of the stars in it being short-period variables. 25 Canum is binary, with a period of 220 years.

**Cane Sugar**. See SUGAR.

**Cañete**, MANUEL (1822-91), Spanish man of letters. Strongly conservative in politics, his courtly poems are now largely forgotten, though some of his lighter verse (*Poesias*, Madrid, 1859) has undoubted merit. His best poems are *La Paz de Cuba* and *El Arbol Seco*, but he is best remembered as a fine literary critic, and editor and biographer of his famous friend, the Duke of Rivas. He also wrote dramas—e.g. *El Duque de Alba*, *La Esperanza de la Patria*, and *El Rebato en Granada*.

**Cang** (*cangue*, *kea*), a Chinese instrument of punishment for trifling offences, being a kind of wooden cage fitting closely round the neck, with the weight proportioned to the nature of the offence, but so constructed that the culprit cannot lie down or feed himself. It is not removed during the period of punishment, which may extend to two or three months. On the cang are inscribed the offence and the name of the criminal, who is generally left exposed at one of the town gates.

**Cangas de Onis**, tn., prov. Oviedo, Spain, 35 m. E. of Oviedo; founded in the beginning of the 8th century by Pelagius, who defeated the Moors in the neighbourhood. Near it is the celebrated abbey of Cobadonga. Copper mines. Pop. 8,500.

**Cangas de Tineo**, tn., prov. Oviedo, Spain, 37 m. S.W. of Oviedo; has woollen and linen industries. Pop. 23,000.

**Cango**, dist., Cape of Good Hope, South Africa, near the Zwartebergen, 19 m. N. of Oudtshoorn; tobacco and brandy are produced. Here are large stalactite caves, among the finest in the world.

**Canicatti**, tn., prov. Girgenti, Sicily, 15 m. N.E. of Girgenti, with sulphur mines. Pop. 25,000.

**Canicattini**, tn., Sicily, prov. of and 12 m. s. by w. of Syracuse. Pop. 9,000.

**Canicular Days.** See DOG DAYS.

**Canidæ**, the dog family, the only family included in the section Cynoidea, of the order Carnivora. The Canidæ are much less highly specialized forms than the cats, as is shown by their more numerous and less strictly carnivorous teeth, their blunt, non-retractile claws, and certain minor anatomical peculiarities. Most of the dogs hunt in packs, combining to overthrow animals which would be too powerful for the efforts of individuals. The members of the family are widely distributed, the type genus *Canis* being truly cosmopolitan, though it is probable that the wild dogs of Australia were introduced by man. To the genus *Canis* belong dogs, wolves, jackals, and foxes, animals which differ from one another only in minor peculiarities. The wild dogs of Asia are placed in a separate genus, *Cyon*; while the genera *Otocyon* (Cape fox), *Lycaon* (Cape hunting dog), and *Icticyon* (American bush dog) differ from the type chiefly as regards the number of the teeth. There are forty-two teeth in all—three small incisors on each side of upper and lower jaw, one large canine, four premolars, and two molars on each side in the upper jaw and three in the lower. See DOG.

**Canigou**, THE, a snow-capped mountain (9,137 ft.) at the east end of the Pyrenees, in French dep. of Pyrénées-Orientales. The ascent, which is easy until near the summit, is usually made from Vernet, on its N. slope. Here are famous manganese mines, 5,600 ft. above the sea, which have been worked since the 13th century.

**Caniles**, tn., Andalusia, Spain, prov. of and 50 m. E.N.E. of Granada. Pop. 5,700.

**Canina**, LUIGI (1795-1856), Italian architect and antiquary, born at Casale in Piedmont, was professor of architecture at Turin, where he produced his standard work upon ancient architecture—*L'Architettura Antica descritta e dimostrata coi Monumenti* (12 vols. 1832-44). He likewise carried on important excavations at Tusculum and on the Appian Way. His other books include *Indicazione Topografica di Roma Antica* (1831; 4th ed. 1850-1), and *Descrizione dell' Antico Tuscolo* (1841). See Raggi's *Della Vita e delle Opere di Luigi Canina* (1857).

**Canis Major**, the Dog of Orion, one of Ptolemy's southern constellations. Sirius is its leading star. The next to it in brightness,  $\beta$  Canis Majoris precedes it in rising by twenty-two minutes.  $R$  Canis Majoris is a variable star, undergoing partial eclipses once in twenty-seven hours.

**Canis Minor**, an ancient constellation representing the Dog of Icarus, is situated northward of Canis Major. Procyon is its chief star.

**Canister Shot.** See AMMUNITION.

**Canitz**, FRIEDRICH RUDOLF LUDWIG VON (1654-99), German poet, born at Berlin; opponent of the mannerisms and extravagance of the second Silesian school, and the champion of simplicity, elegance, and sound sense, taking Horace and Boileau as his models. The first collected edition of his poems, *Nebenstunden unterschiedener Gedichte*, appeared anonymously in 1700; a complete edition, with name and biography, in 1727. He wrote mainly occasional verse, odes, and satires, sometimes with genuine feeling. He sometimes uses the *Knittelvers* of Hans Sachs for light, humorous verse. See Lutz's *Canitz* (1887).



**Canker**, in horses. See HORSE—*Diseases*.

**Canker**, in plants, any disease of fruit-trees of which a prominent symptom is the splitting and death of part of the bark. Among the commoner causes of this condition may be mentioned careless pruning, planting in undrained soil, and excessive autumnal growth; but much the most important form of canker is that caused by the growth of a fungus called the canker fungus, *Nectria ditissima*, which, effecting an entrance through some small wound of the bark, spreads rapidly, destroying the bark in its course. Around the wound thus formed the bark grows abnormally, and presents an areola of thick, warty excrescence. Canker often first begins at the point of junction of two branches. The Board of Agriculture has prepared a useful leaflet dealing with canker. In early autumn the fruits of the fungus may be seen, in the form of white specks, in crevices of the overgrown bark surrounding the wounds. In the spring another form of fruit, consisting of tiny reddish balls, may be seen in the same situation. Cox's orange pippin, the Ribston pippin, and the golden pippin are especially liable to canker. Young branches that are attacked should be cut off. When thick branches are affected, all the wounded parts should be cut away, and the cut surfaces luted with clay or protected with a coat of gas-tar. Grafts should not be taken from diseased trees, as parts that appear to be sound may contain the fungus in their tissues. The white stage of the fungus can be killed by applying with a brush a solution of sulphate of iron, one pound to a gallon of water.

**Cankerworm**, two destructive caterpillars—the spring cankerworm (*Paleacrita vernata*) and the autumn cankerworm (*Also-*

*phila pometaria*)—found in the United States from Maine to Texas. The eggs are laid on fruit and shade trees, and the larvæ frequently destroy the foliage of whole orchards in a few days.

**Canmore**. See MALCOLM III.

**Canna**, or INDIAN SHOT, belonging to the order Scitamineæ, unbranched plants with ornamental leaves. They are natives of tropical and subtropical countries, and are therefore not hardy in the climate of the British Isles. But in the warmer districts of the south of England they are grown in the open during the summer months. Propagation is by division of the roots or by seeds. The latter are so hard that it is desirable to file through their outer coats and soak them in water for twenty-four hours previous to sowing. The seeds are best sown in heat in February, and the young plants should be planted out and still kept under glass till May, when they may be planted in the open air at a distance of one to two feet. Division of the roots should be performed in March. In autumn the outdoor plants must be lifted and placed in a greenhouse or cellar, preferably being covered with a little dry soil. The old tall-growing plants with inconspicuous flowers are now almost replaced by the large-flowered dwarfish plants known as Crozy's hybrids.

**Cannabis**, a genus of plants belonging to the order Urticaceæ, contains a single species, *C. sativa*, the common hemp. This is an annual plant of from three to ten feet in height, covered with fine hairs. The leaves are digitate, composed of from five to seven narrow leaflets. It is believed to be a native of India and Persia, but is now widely grown as a fibre plant. Herodotus referred to the cannabis as a Scythian plant. It

has long been known as an intoxicant, and has also long been used in medicine. It is the essential ingredient in the Indian intoxicant known as bhang. The *Cannabis indica* of the British pharmacopœia consists of the dried flowering tops of the female plants, and from these an extract and tincture are prepared. Its uncertainty of action has, however, led to its being almost abandoned by most modern physicians. See HEMP.

**Cannæ**, anc. vil. of Italy, in Apulia, 9 m. s.w. of Barletta, prov. Bari; was in 216 B.C. the scene of a victory gained by Hannibal over the Romans.

**Canna Island**, in par. of Small Isles, Inverness-shire, Scotland, 7 m. s.w. of Skye. It measures  $4\frac{1}{2}$  m. by 1 m. Pop. 50.

**Cannanore**, seapt., India. See KANANUR.

**Cannel Coal**. See COAL.

**Cannelons** are little channelled rolls of paste containing minced meats, the whole being fried or baked. They are sometimes made without paste—a mixture of minced uncooked meats, with spices, herbs, and minced bacon, being bound together with beaten egg, rolled into cylindrical shape, tied in greased paper, and baked. Sweet cannelons may be made by forming rolls of puff paste.

**Cannes**, seaside resort on the French Riviera, dep. Alpes-Maritimes, 20 m. s.w. of Nice, on main line from Marseilles. As a winter resort Cannes has few rivals; its climate is one of the most equable of Europe. The Rade de Cannes, limited on the east by the Isles de Lérins, the sheltered position, the gentle slopes of the hills on the north between Cannes and Le Cannet now being gradually built over with villas hidden in luxuriant vegetation, secure for Cannes its special advantages. There is some industry in perfumes and soap, glasswork, and fishing. Pop.

30,000. See *Cannes and its Surroundings*, by Amy M. Benecke (1908).

**Cannibalism**. Many early tribes were addicted to this practice—*e.g.* the prototypes of the Homeric Polyphemus, whose Cyclopes have been localized in Thrace, as well as in Sicily. In the British Isles, Strabo points out that certain tribes in Ireland were reported to be cannibals, while St. Jerome asserts that the Attacotti of Argyllshire and Dumbartonshire delighted in the taste of human flesh. The frequent recurrence of human bones among the animal remains in the kitchen-midden of Skerrabrae, in Orkney, has been held to testify to the cannibal proclivities of the dwellers there. Of the early Huns it has also been asserted by a Hungarian writer that they 'abstained not from the flesh of the slain.' During the 17th century a belief was current in France that the Samoyedes were cannibals; the belief, however, appears to have little or no warrant. Of occasional manifestations of cannibalism, in almost modern times, Scotland furnishes several instances. Pitscottie records the undoubted existence of a family of cave-dwellers at St. Vigeans, in Forfarshire, during the 14th century, who devoured those unfortunates who fell into their hands. An exactly similar instance is localized in Galloway, in the 15th century; and even later still is the case of 'Christie of the Cleek,' who dragged his victims from their horses by means of a hooked weapon or Lochaber axe.

A modified form of cannibalism, based upon vastly higher instincts than the savage promptings of famine, has been developed by the belief that one may acquire the dominant qualities of a man or an animal by eating a portion of the dead body, notably the heart, an important stipulation

being that it should be eaten raw, with all its virtue unimpaired. A classical instance is that of the Issedones mentioned by Herodotus (iv. 26). Indeed, it is this belief in the connection between body and spirit, and the possibility of thus acquiring something of the virtues of the hero or divinity, that forms the root idea of the eucharist, although no doubt in a mystic sense. What may be called the religious phases of cannibalism are still active among many primitive races, such as the Australian aborigines, and affect the intertribal life in various complex ways.

*Endophagy*, or *endocannibalism*—i.e. the eating of one's own kinsfolk—was practised as a pious funeral rite by the ancient Egyptians and Libyans, as appears from the discoveries of Flinders Petrie. In such cases the act of cannibalism was not preceded by murder, but was, on the contrary, intended as a reverent method of disposing of the corpse of one's relative who had died a natural death. On this subject, see 'Endocannibalisme,' in *Le Tour du Monde*, 1896, p. 416; and 'La Piété des Cannibales,' by E. Laccordaire, in the *Revue des Revues*, 1897, p. 49.

In the *ghouls* of Oriental folklore, who feast by night upon the bodies of the dead, may be detected the memory of a cannibal caste, surviving in a higher civilization. Even so recently as the crusades, indeed, such a type was represented by the 'Thafurs' who followed the crusading army, and who 'were held in great horror, from the general persuasion that they fed on the dead bodies of their enemies—a report which was occasionally justified' (G. P. R. James's *History of Chivalry*, 1830, p. 178; new ed. 1842).

Of living races who practise cannibalism the natives of New Guinea and some Central Afri-

can tribes (Mangbatu, A-Zandeh, Fans) are the most conspicuous. The Maoris of New Zealand and the Fiji Islanders have, however, now quite relinquished this practice, once so widespread among them—the last recorded case amongst the former having occurred in 1843. Although ceremonious cannibalism was common in Mexico, the practice was never prevalent in N. America. But it was general in the south, where the Caribs have supplied a new synonym (cannibals) for *anthropophagi*. See Bergemann's *Die Verbreitung der Anthropophagie über die Erde* (1893), and R. S. Steinmetz's *Endocannibalismus* (1896). See LYCANTHROPY.

**Canning.** The possibility of preserving meat for long periods of time in sealed tins depends on the fact that the bacteria which promote decomposition may be killed by prolonged heat, and do not again arise *de novo*. Whatever meat is required to be canned is freed from bone and placed in tin cases, which are surrounded either by boiling water or by a boiling solution of calcium chloride, which boils at a higher temperature than that of boiling water. Spice, gelatin, salt, and other condiments are sometimes added to the meat. When the heating has been sufficient to destroy the bacteria and to expel the air, the tins are hermetically sealed. Certain foods, such as sardines and pilchards, are merely preserved in oil, the tins being sealed as soon as they are filled with oil. Fruit of all kinds may be canned if properly heated before being sealed. Vegetables also may be canned in tins or bottles, and preserved for a long time. The best vegetables for preserving are peas, French beans, broad beans, young carrots, cauliflower, and asparagus. In 1906 a book, *The Jungle*, by Mr. Upton Sinclair, directed public attention to the

conditions under which the canning of food was carried on in Chicago. The revelations there made were almost unhesitatingly accepted as true alike throughout the United States and in Europe, and the result to the meat canning industry of Chicago was disastrous, the exports falling from 5,232,797 lbs. in July 1905 to 1,039,852 lbs. in July 1906. President Roosevelt appointed a commission of inquiry, who reported that insanitary conditions did exist, and legislative action was at once taken with the view of ensuring greater care and cleanliness in the packing of the meat. The government also insisted on the labelling of cans with the date of canning and inspection.

**Canning, CHARLES JOHN, EARL CANNING** (1812-62), governor-general of India, the third son of George Canning. He first showed his great administrative abilities as Postmaster-general in Lord Aberdeen's cabinet (1853). In 1856 he was selected by Palmerston to succeed Lord Dalhousie as governor-general of India. The difficulties created by recent extensive annexations, the complications with Persia, the relations with the Ameer of Afghanistan, and the proposal to alter the conditions of service in the native army of Bengal, were the official legacy bequeathed to the new governor. In the management of all these difficulties he showed courage and firmness. Although he failed at first to realize the dangers of the mutiny (1857), his mistake was shared by every Englishman in India. When peace was secured, he set himself to reorganize the army, to re-establish the finances, and to formulate the legislative and administrative system which was afterwards embodied in the Indian Council Act of 1861. He was created an earl in 1859. See *Life* by Sir H. S. Cunningham

(1892), and Hare's *Story of Two Noble Lives* (1893).

**Canning, GEORGE** (1770-1827), British statesman, born in London, and entered Parliament for Newport (1794). He proved himself a brilliant debater; while in the *Anti-Jacobin* (1797-8), a journal started in conjunction with Ellis and Frere, his powers of ridicule and satire were made effective weapons of offence against the so-called 'revolutionaries.' He became under-secretary for foreign affairs (1796-9), member of the Indian Board (1799-1800), paymaster-general (1800-1), and treasurer of the navy (1804-6); refused office in the ministry of 'All the Talents' (1806), but became Foreign Secretary in the Tory administration which succeeded it (1807). Throwing himself with energy into the war against Napoleon, he planned the capture of the Danish fleet (1807), which established England's maritime supremacy, and advocated vigorous action in the Spanish Peninsula (1808). The failure of the expedition to Walcheren (1809) led to a duel between him and Castlereagh, the Secretary for War; and as Canning refused to work with Castlereagh, he did not again hold prominent office until 1822. He was M.P. for Liverpool (1812-22), and was appointed ambassador - extraordinary at Lisbon (1814), and president of the Indian Board, with a seat in the cabinet (1816-21), where he supported the coercive domestic policy of the government. Succeeding Castlereagh as Foreign Secretary in 1822, his policy was to hold the balance between continental liberalism and the absolutists of the 'Holy Alliance.' Hence he asserted the principle of non-interference in the internal affairs of foreign states, and recognized the independence of Spain's American colonies (1823). In his famous

phrase he 'brought in the New World to redress the balance of the old,' and may be said to be one of the originators of the Monroe doctrine. He protected Portugal from Spanish intervention (1826), and so far admitted the claims of Greek independence as to propose the alliance of England, France, and Russia, which resulted (after his death) in the battle of Navarino. The retirement of Lord Liverpool in 1827 placed Canning at the head of the government, but he did not retain the support of Wellington, Peel, and the more unbending Tories. His premiership lasted only four months, a severe chill aggravated by mental anxiety causing his death on August 8, 1827. He was buried in Westminster Abbey. His Reciprocity Act of 1823, and his measure to modify the corn laws—defeated by Wellington in the Lords (1827)—were a development of the free-trade policy of Pitt, and an anticipation of that of Peel; while his efforts to secure Catholic emancipation in the bills passed by him through the House of Commons (1812 and 1825) made possible the Emancipation Act of 1829. His speeches are open to the charge of over-elaboration and excessive polish; otherwise their cogency and wit constitute them models of parliamentary eloquence. See his *Poems* (1823), and *Memoirs of Canning* (2 vols. 1828; 2nd ed. 1829); Stapleton's *Political Life of Canning* (1831), and *Canning and his Times* (1859); R. Bell's *Life of Canning* (1845); Memoir by Therry, prefixed to ed. of *Speeches* (1828); Marriott's *George Canning and his Times* (1903); Temperley's *Life of Canning* (1905); and Bagot's *George Canning and his Friends* (1909).

**Canning, SIR SAMUEL** (1823-1908), English civil engineer, a native of Wiltshire, is chiefly re-

membered for the manufacture and successful laying of submarine cables in the Atlantic and Mediterranean, notably in connection with the Atlantic cable expeditions of 1865-6 and 1869. He was knighted in 1866.

**Cannizzaro, STANISLAO** (1826-1910), was born at Palermo, and became professor of chemistry at Alessandria in 1851, at the University of Genoa in 1855, in Palermo in 1861, and finally in Rome in 1871. Cannizzaro's chief work was that of amplifying and applying Avogadro's hypothesis, which he cleared up and placed in such a position that it affords the strongest confirmation of the atomic theory of the structure of matter.

**Cannock, par. and tn., Staffordshire, England, 8 m. N.W. of Walsall.** Tile-making and edge-tool manufacturing are carried on, and coal is mined. Pop. 27,000.—**CANNOCK CHASE**, lying between Lichfield and Stafford, was originally a wooded district devoted to hunting, but is now a heath, with coal measures, and with ironstone beds beneath the coal.

**Cannon.** See GUNS.

**Cannon-ball Tree** (*Couropita guianensis*), a S. American tree belonging to the order Myrtaceæ. It bears round fruit contained in large cups, which are used as drinking-cups by the natives.

**Cannon-bone**, the single bone formed in many artiodactyle ungulates by the fusion of the third and fourth metacarpals or third and fourth metatarsals, the fusion producing a single strong bone, with a complicated method of articulation to the two digits below. This bone gives length and rigidity to the limb, and is a mark of specialization in the animals in which it occurs.

**Cannon Pinion**, in watchmaking, the small cogged wheel to

which the minute hand of a watch is attached.

**Cannstatt**, or KANNSTATT, tn., Würtemberg, Germany, stands on the Neckar, 2 m. E. of Stuttgart; has hot saline springs and baths (water 62.5°-66° F.), is a growing industrial place, manufacturing machinery, zinc wares, electrical apparatus, Daimler motors, cloth, bricks, and has iron works and railway repairing shops. Good fruit and wine are produced. The waters were known to the Romans. The French defeated the Austrians in the vicinity in 1796. Pop. 33,000.

**Cannula**, a small tube, through which any abnormal collection of fluid is drawn from the body, used in surgery.

**Cano**, ALONZO (1601-67), Spanish painter, sculptor, and architect. Born at Granada, he studied painting under Pacheco at Seville, and sculpture under Juan Martinez Montañes. He painted in Seville, Madrid, and in Granada, where he founded a school. Philip IV. nominated him 'painter to the king' and royal architect. His work is characterized by boldness of design, facility of handling, a knowledge of chiaroscuro, and purity of flesh-tints. Most of his paintings are at Seville, others in the Prado Museum at Madrid, a Madonna in the cathedral at Malaga, and the *Apostle Paul* in the Dresden Gallery. His best statue is the *Madonna and Child* in the church of Nebrissa. Sir Francis Cook at Richmond has a large altarpiece, *The Assumption of the Virgin*; and *The Vision of St. John the Evangelist* is in the Wallace Collection, London.

**Cano**, JUAN SEBASTIAN DEL (c. 1460-1526), Spanish navigator, who took part in Magellan's voyage round Cape Horn (1519), and on the death of his leader in the Philippines (1521) assumed command of the expedition. In the

sole surviving ship of the fleet he returned, by the Cape of Good Hope, to Spain (1522), and was thus the first circumnavigator of the globe. Cano was lost while on an expedition to the W. Indies.

**Canoe** is distinguished by 'Rob Roy' MacGregor from other craft by the absence of any fixed fulcrum in the boat to assist the user of the paddle by which the canoe is usually propelled. The canoeist, accordingly, always sits with his face to the bow. Canoes are constructed of a considerable diversity of materials, and in a great variety of shapes. In their simplest form canoes are lengths of tree trunks rudely shaped and hollowed out. 'Dug-outs' of this description were used by the early inhabitants of Britain. The form is still to be seen in the *kistis* floating on out-of-the-way Indian tanks. In the Greenland waters the canoe is flat-bottomed and flat-sided, but the ordinary Eskimo canoe has a curved whalebone framework, with seal or walrus hide stretched over it. Some native canoes have decks, others are fitted with outriggers; some are barely large enough for a single occupant, while others, especially the 'war canoes' of the Pacific Islanders, will carry from forty to fifty persons.

A well-known and efficient type is the Canadian birch-bark canoe, a modified pattern of which is often seen on British inland waters. It is sharp at each end, and has no keel; a single blade or half-paddle is used to propel it.

'Rob Roy' canoes, in which the late Mr. J. MacGregor made several notable voyages, are from 12 to 15 ft. long, with a beam of from 26 to 30 in., and a depth of from 10 to 16 in. The paddle is usually double-bladed, 7 ft. long, with 6 in. of breadth in the blade. A mast with a light sail can be hoisted if desired. An ordinary travelling 'Rob Roy' canoe weighs

about 70 lbs., and will float with its paddle and 10 lbs. of luggage in 5 in. of water. The 'Rob Roy' is generally built of oak, with a cedar deck.

A later type of canoe is the 'Nautilus,' which was brought to notice by Mr. W. Baden-Powell's travels on the Baltic and in Sweden during 1870-1. In this design the head of the boat is raised, and its shoulder broadened; and in modern cruising canoes of this type there are two sails of considerable size, while a metal centre-board and a deep rudder are also sometimes added.

In 1866 the Royal Canoe Club was founded, with its headquarters at Kingston-on-Thames, and of late has thrown open its races to members of all other recognized clubs and to gentlemen amateurs. Three types of canoes are recognized for racing purposes—the canoe-yawl, the cruising canoe, and the sailing canoe—the principal distinction between them being in the matter of size. The idea of the canoe-yawl is that it shall be able to do all the sea-going work that can be done by a small yacht up to three or four tons, while its construction enables it to enter shallow creeks and ascend rivers in which a yacht would be useless. The British Canoe Association devotes itself to cruising.

For ordinary river work Mr. Baden-Powell recommends the Thames pattern, which is of varnished cedar or mahogany, built up 'rib-band-carvel' fashion. Canoes constructed in this way are strong enough for any but the roughest work. For rough, knockabout work the Macatawa sheathed canoe of North American model is highly spoken of. This is a wooden built and planked canoe, sheathed with a tough prepared fabric, cemented over the outside, and finished with repeated coats of paint. See MacGregor's

*A Thousand Miles in the Rob Roy Canoe* (1866), *Rob Roy on the Baltic* (1867), and *Rob Roy on the Jordan* (6th ed. 1880). Baden-Powell's *Canoe Travelling* (1871) is a standard book on the subject. Of American books may be mentioned Vaux's *Canoe Handling* (1888), *Canoeing in Kanuckia*, by Norton and Habberton (1878), and S. E. White's *The Forest* (1904).

**Cañon**, sometimes also **CANYON**, a name signifying 'a gorge,' and applied originally to the profound narrow gorges which many rivers of the Colorado district of western N. America have cut through the solid rock. The Grand Cañon of the Colorado, one of the most sublime of natural objects, is in places 6,000 ft. deep, and not over a mile in width, with walls of sandstone and limestone of varied colours, bare and naked, sculptured into niches, buttresses, and terraces by the action of the atmosphere. The causes which have produced these remarkable gorges are, in addition to the cutting action of the streams, firstly, a process of continuous uplift, which has maintained the rapid flow of the river, and counteracted its deepening action; and, secondly, the arid climate, which has prevented the disintegration of the rocky walls by frost and springs, and maintained their vertical character. See **COLORADO RIVER**; J. W. Powell's *The Romance of the Colorado River* (1902); Captain C. E. Dutton's *Tertiary History of the Grand Cañon* (monograph ii. of United States Geological Survey, 1882); J. W. Powell's *Exploration of the Colorado River of the West* (1875).

**Canon**, a term used as early as the 3rd century for the rule of faith and practice which grew out of the accumulated dicta of the church. The various councils of the church have put forth canons which are both statements of doc-

trine and rules for the conduct of life. Those of the first six, the Œcumenical Councils, were received by the whole church.

**CANON OF SCRIPTURE.** See BIBLE.

**CANONS, APOSTOLIC,** a collection of eighty-five precepts and rules, usually appended to the eighth book of the *Apostolic Constitutions*, and translated by Dionysius Exiguus about 500 A.D. Though none of the canons is of apostolic authorship, the oldest possibly dates back to the 2nd century of our era, the latest to the age of Dionysius. The Apostolic Canons were officially repudiated by the Eastern Church at the Council of Trullo (692 A.D.) or Constantinople; while the Western Church admitted the authority of about fifty of them, in so far as they bore on church ritual and usage. They were edited and translated by Rev. J. MacNally (1867).

**CANONS OF HIPPOLYTUS,** either bishop of Portus or rival bishop of Rome (martyred c. 236), author of the *Canon Paschalis*, a demonstration of the time of Easter, but best known as the author of *Omnium Hæresium Refutatio* (Bunsen, *Hippolytus and his Age*, 1852). A series of canons which throw light on the constitution of the church at the beginning of the 3rd century are ascribed to him by Dr. Achelis, who has published a critical edition of them in vol. vi. of *Texte und Untersuchungen* (1891). Lightfoot assigned to him the celebrated Muratorian Canon.

**CANONS OF THE CHURCH OF ENGLAND.** The 141 canons of 1603-4 were framed at the Hampton Court Conference. After being passed by the Synod of the Province of Canterbury, they were ratified by royal letters-patent, but were not brought before Parliament. When not opposed to the statute or common law, they

are still binding on the clergy. In 1640 these canons were revised by Convocation, which enacted 17 new canons, also ratified by the king. Whether these later canons are binding in ecclesiastical matters is a disputed question. The latest rule of church order and discipline is the Book of Common Prayer, as revised in 1661 by the authority of the Convocations of the two provinces of Canterbury and York, and legalized by the Act of Uniformity 13 and 14 Charles II. c. 4. The canons must therefore be interpreted by the rubrics of the Book of Common Prayer wherever they may appear to be in conflict.

**CANONS, BOOK OF** (Scottish), a code of canons issued to the bishops in Scotland under mandate of Charles I. After being revised by Archbishop Laud and confirmed by letters-patent under the Great Seal (1635), they were published at Aberdeen in 1636. This code limited the power of the church courts so far as to make their findings subject to the bishop's ratification, while it also asserted the king's supremacy in matters ecclesiastical.

**Canon,** an ecclesiastical term, formerly applicable to all the clergy of any large church. In the 8th century, however, Chrodegang, bishop of Metz, organized the clergy of his cathedral into a semi-monastic community, living under a rule as clearly defined, although not so strict, as that of monks. This system not only extended to other cathedrals, but, after the council which was held at Aix-la-Chapelle in 816 had formulated a rule for canons in general, it became a common practice for large and important churches (not cathedrals) to adopt an organization similar to that of the cathedral chapter. Such churches were therefore termed



'collegiate churches.' Papal edicts were consequently issued in 1059 and 1063, binding them to a community life and the renunciation of private property. This rule was eagerly adopted by certain bodies of regular canons unconnected with any cathedral or collegiate church, who formed (1067) what was practically a new monastic order, living in 'houses' of their own. Owing to their strict adherence to the teaching of St. Augustine, these became known as canons of St. Austin, or Augustinian canons. In the British Isles, at the Reformation, they possessed nearly two hundred and sixty houses in Ireland, over two hundred in England, and twenty-five in Scotland. The canons attached to wealthy cathedrals and collegiate churches had by the 11th century, and indeed considerably earlier, given themselves up to lives of dignified ease. Many, indeed, were simply men of good family (*e.g.* at Strassburg), to whom canonries were allocated for the sake of what they yielded to the holder. Moreover, ever since the church attained to wealth and power, canons have often been chosen for their administrative abilities; and even after the decay of the canons regular, canons secular were still deemed necessary for the administration of church property, not only in the Roman Catholic Church, but also in the Protestant Episcopal churches. See also CHAPTER.

**Canon**, in music, is a species of composition written strictly according to rule—whence the name. A canon may be composed in two, three, or more parts, and invariably consists of a melody executed by one part, and imitated, note for note, by another part, beginning some beats later at either the same or a different pitch. More 'canons' than one

may be maintained at the same time, and they are applicable to both vocal and instrumental music. Canonic imitation first appeared in the compositions of the 12th century. For examples, see Purcell's *Gloria Patri* in his Collection; also Ouseley's *Treatise on Counterpoint, Canon, and Fugue* (1869).

**Cañon City**, cap. of Fremont co., Colorado, U.S.A., on riv. Arkansas, 90 m. s. by w. of Denver. It has rich coal mines in the neighbourhood. Copper, coal, petroleum, iron, and limestone are also abundant, and its zinc-lead smelting works are among the largest in the world. Its hot mineral springs and mild climate make it an important health resort. Pop. 4,000.

**Canoness**. From a very early period the Roman Catholic Church permitted and encouraged women to associate themselves under rules somewhat akin to those dictated to canons; and like these, also, canonesses became divided into two great sections of regular and secular canonesses, of whom the former practised a life of austerity and poverty. In its incipient stages this order was, however, to all intents and purposes, secular. Canonesses were allowed to possess property to an unlimited extent, and their duties consisted merely in instructing young girls in such accomplishments as the arts of illuminating missals and working ecclesiastical embroidery. Indeed, from the time of its inception, during the reign of Louis le Débonnaire (778-840), down to the Reformation, this order has been for the most part rather a retreat for women of good birth than anything truly conventual. Many chapters of the secular canonesses became Protestant at the Reformation (*e.g.* those of Gandersheim and Quedlinburg in

Germany), and continued to exist with little alteration from their former life.

**Canonical Hours.** The canonical hours of prayer, originated early in the church's history, being mentioned by Clement Alexandrinus, Tertullian, Jerome, etc., were eventually arranged as follows:—*Prime*, 6 a.m.; *Tierce*, 9 a.m.; *Sext*, at noon; *None*, 2 or 3 p.m.; *Vespers*, about 4 p.m.; *Compline*, 7 p.m.; *Matins* and *Lauds*, at midnight or daybreak. The offices for each will be found under **BREVIARY**.

**Canonicals.** See **VESTMENTS**.

**Canonization**, the formal process by which the Roman Catholic Church decrees that a recognized servant of God, previously declared 'blessed,' shall be enrolled on the list of the saints—the *Canon Sanctorum*. At the present day no name is submitted for this honour unless at least fifty years have elapsed since the death of the beatified one. But this period may be abridged, by a special dispensation, in a case of extreme urgency. The limitation as to time is, however, of comparatively modern date; for the earlier history of the church reveals no indication of a desire to observe strictness in this respect. Before a beatified person can be advanced to the higher dignity of saintship, it is necessary to prove that, *subsequent to beatification*, his (or her) intercession has effected at least two miracles.

Prior to the 17th century considerable laxity attended both the acceptance of candidates for canonization and the observances connected with the function itself; but all such irregularities were removed by Pope Urban VIII., who, by his edicts of 1625 and 1634, formulated a series of regulations to be strictly observed in relation to this solemn-

nity. At the same time, he declared that these provisions do not affect the church's attitude towards existing saints.

The miracles alleged to have been wrought through the intercession of the beatified one are subjected to the keenest scrutiny, and any doubt attaching to them is dwelt upon by the *promotor fidei* (popularly known as *advocatus diaboli*, 'the devil's advocate'). The question is then considered by three successive 'congregations' over the last of which the Pope presides; and a form of decree is drawn up authorizing the crowning act of canonization. This high ceremonial is proceeded with in St. Peter's, in the presence of the Pope, the Sacred College, other dignitaries of the church, and the clergy and people. A day is also fixed for the annual commemoration of the saint. The standard work on this subject is Lambertini's *De Beatificatione... et Canonizatione Beatorum* (1766); and see the *Acta Sanctorum* of the Bollandists (1643-1903).

**Canon Law**, a body of law applicable to the government of the church. Though canon law forms a large part of the ecclesiastical law of England, the general canon law originated in opinions of the Latin fathers, decrees of general councils, and papal decrees; these, in England, being supplemented by (1) legislative constitutions (laws passed by synods presided over by papal legates), and (2) provincial constitutions (decrees of the provincial synods of Canterbury and York). At the Reformation a statute was passed (25 Henry VIII. c. 19) which directed a review of the canon law, but provided that until this was done—and it never has been done—the canons then in force so far as not repugnant to the general law of the realm or the king's prerogative, should still

have force. The same statute further declared that no canons made thereafter should be binding except with royal assent. In 1603 a large number of canons were enacted in Convocation, but never having been confirmed by Parliament they do not bind the laity, or even the clergy so far as their temporalities are concerned. See W. G. F. Phillimore's *Ecclesiastical Law* (1895); Galante's *Fontes Juris Canonici Selecti*; and Maitland's *Canon Law in the Church of England* (1898).

**Canopus** =  $\alpha$  Argûs, a lustrous southern star, about half a magnitude fainter than Sirius. It is immeasurably remote, and must accordingly be of prodigious real magnitude. Its spectrum is of early solar type.

**Canopus**, an ancient town in Egypt, about 15 m. N.E. of Alexandria; it was near the modern Aboukir and the westernmost mouth of the Nile, hence called the Canopic mouth. The town was famous for a temple of Serapis, and for its prosperity and luxury. Canopic vases, with tops shaped like human heads, were here manufactured to hold the viscera of embalmed bodies.

**Canopus**, a British first-class battleship (12,950 tons) launched in 1898. The name was introduced into the British navy in 1798, and has been since associated with the action off San Domingo (1806) and the passage of the Dardanelles (1807).

**Canopy**, the protecting covering held over the heads of monarchs and other dignitaries, or the covering suspended over a bed. In architecture it implies the stone 'awning' erected over a tomb or seat, the roof-like ornament surmounting a niche, or the decorative mouldings over a door or window.

**Canosa**, tn., prov. Bari, Italy, 16 m. s.w. of Barletta. As ancient

Canusium it was in early times one of the chief commercial towns of Italy. Pop. 24,000.

**Canossa**, vil., prov. Reggio nell' Emilia, Italy, 14 m. s.w. of Reggio; famous for its castle (now in ruins), where the Emperor Henry IV. humiliated himself before Pope Gregory VII. in 1077.

**Canova**, ANTONIO (1757-1822), the great Italian who revived the art of classic sculpture. He was born at Possagno, near Venice. The greatest work of his novitiate was *Dædalus and Icarus*. In 1780 he went to Rome, where he applied himself to the antique, and produced *Theseus vanquishing the Minotaur*, and *Psyche and the Butterfly*. In 1798 troubles in Rome drove him to Possagno, where he spent a year in painting. On his return to Rome he produced *Perseus with the Head of Medusa* (Vatican). In 1802, at Paris, he modelled a statue of Napoleon, and in 1815 obtained the restoration of the Italian treasures removed by the latter; afterwards visiting London, and executing works for the royal family. In 1816 he received the title of Marquis of Ischia, and a pension of 3,000 scudi. After 1819 he executed some of his greatest works—*Mars and Venus*, the colossal *Pius VI.*, *St. John*, and *The Recumbent Magdalen*. The group of *Hercules and Lichas* ranks as his most sublime achievement; *Hebe*, of which he made three replicas, his most graceful work; and the monument to the Archduchess Maria Christina his finest. The Louvre in Paris has his celebrated *Cupid and Psyche*.

**Canovas del Castillo**, ANTONIO (1828-97), Spanish statesman and historian, born at Malaga; became a member of the Cortes (1854), minister of the interior (1860-4), premier (1875-81), and at intervals until 1897, six times in all. Canovas del Castillo, who was a leader of the Conservatives, was killed

by an anarchist at Santa Agueda. He was a member of the Spanish Academy from 1867, and from 1890 onwards edited and directed the publication of the co-operative *Historia General de España*. Among his works are *Estudios Literarios* (1868), *Problemas Contemporáneos* (1884), *Estudios del Reinado de Filipe IV.* (3 vols. 1888-90). See Creux's *Antonio Canovas* (1898), and Pons y Humbert's *C. del Castillo* (1901).

**Canrobert**, FRANÇOIS CERTAIN (1809-95), marshal of France, was born at St. Céré, in dep. Lot. He distinguished himself in the Algerian wars (1835 and 1841-51), and aided Louis Napoleon in the *coup d'état* of 1851. On the outbreak of the Crimean war he commanded the first division of the French army, and on the death of Marshal St. Arnaud became the French commander-in-chief. He was twice wounded at the battle of the Alma, and again at Inkerman, but he completed the lines of investment at Sebastopol. Owing, however, to differences with Lord Raglan, he resigned his command in May 1855. In the Italian war he was present at Magenta and Solferino (1859), and in the Franco-German war (1870) commanded the Sixth Army Corps, sustaining the disastrous defeats of Wörth and Gravelotte. Besieged in Metz with Bazaine, he shared in the surrender, and was imprisoned in Germany. See *Biographies*, in French, by Martin (1895) and Bapst (1898-1902).

**Canso.** (1.) CAPE, N.E. extremity of mainland of Nova Scotia, on s. side of Chedabucto Bay. (2.) GUT OF, strait (17 m. long) connecting Northumberland Str. with the Atlantic, between Nova Scotia and Cape Breton I.

**Cant**, generally a corner, angle, or niche. In architecture, it indicates the corner of a square cut off octagonally. In building, a cant brick is one cut on the splay.

In nautical language, it describes a tilt or inclination, or a ship's timber near the bow or stern, lying obliquely to the keel.

**Cant**, ANDREW (? 1590-1663), Scottish Covenanted leader and preacher, became minister of Pittsligo, Aberdeenshire, in 1633; of Newbattle, Midlothian, in 1638, and of Aberdeen, in 1640. He was one of the commissioners appointed in July 1638 to convert the people of the north to Presbyterianism. In November of the same year he took part in the famous Glasgow assembly.

**Cantab.** (*Cantabrigiensis*), of Cambridge.

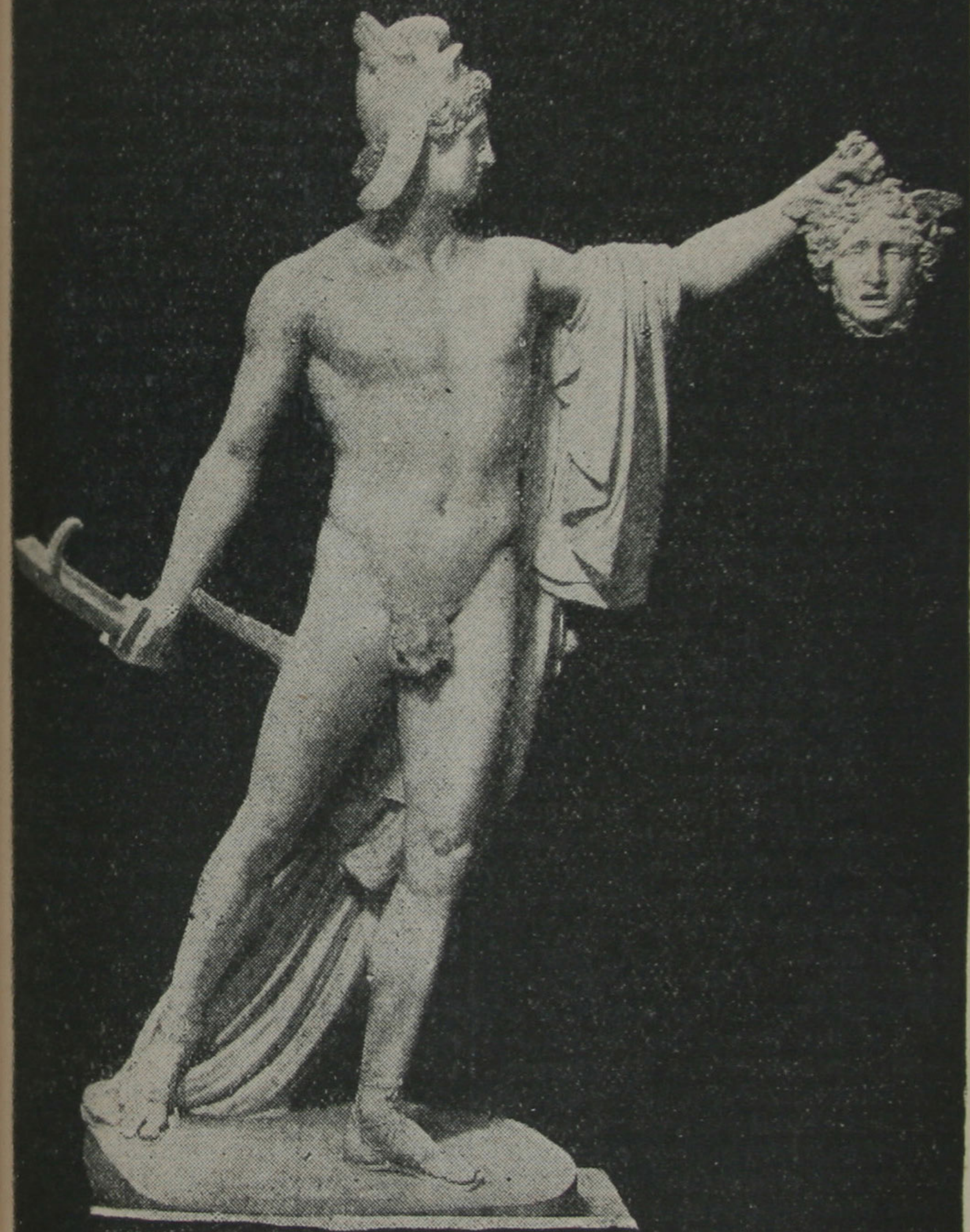
**Cantabile** and **Cantilena** are terms used in music to denote a smooth-flowing, sustained method of performance, as contrasted with the interchange of *fortissimo* and *pianissimo* passages.

**Cantabrian Mountains**, a mountain range to the w. of the Pyrenees, extending over 300 m. across the N. of Spain. Coal and iron are mined.

**Cantabrians**, or CANTABELL, the name applied in ancient geography to the inhabitants of the part of Spain lying to the south of the Bay of Biscay (the *Mare Cantabricum* of that people), and corresponding more or less to the modern provinces of Asturias, Santander, Viscaya, and Guipuzcoa, but it was latterly restricted to Asturias and Santander. Though compelled to acknowledge the supremacy of Augustus (25 B.C.) and defeated by Agrippa, they were never completely subjugated. The Basques are proud of their reputed descent from this brave people.

**Cantabricum Mare.** See BISCAY, BAY OF.

**Cantacuzenus** (b. c. 1292), John V., emperor of the East. He was prime minister of Andronicus the younger in 1328, and in 1341 became regent for John Palæologus, but subsequently



*Perseus with the Head of Medusa. (Vatican Museum.)  
Statue by Canova.*

seized the throne (1342). After six years of civil war, he was recognized as joint-emperor with Palæologus. Cantacuzenus, forced to resign (1354), retired to a monastery, where he wrote the history of the empire from 1320 to 1360.—His son MATTHIAS (d. 1383) continued the war against Palæologus, by whom he was defeated (1357), when, like his father, he retired to a monastery.

**Cantal**, dep. of Central France, in the former prov. of Auvergne; cap. Aurillac, 270 m. s. of Paris. The centre is occupied by a large volcanic mass, the culminating point being Plomb du Cantal (6,200 ft.). From this mass flow, north and west, the rivers Dordogne and Truyère. The north-east of the department (one-fifth of its area) is drained to the Loire basin. The area is 2,229 sq. m. The chief products are rye, buckwheat, potatoes, and chestnuts. The natural beauties and the numerous mineral springs attract many tourists. Coal and antimony are found. Pop. 228,000.

**Cantarini**, SIMONE (1612-48), known also as SIMONE DA PESARO, an Italian painter and engraver, born near Pesaro. He was a pupil of Guido, whose style he imitated so closely that his works have been sometimes attributed to his master. His paintings deal chiefly with Scriptural subjects, but a fine portrait of Guido by him hangs in the Bologna Gallery.

**Cantata**, a form of musical composition which was originally a short story set to music, sung by a single performer to the accompaniment of one instrument. The term is now applied to certain forms of choral works, both sacred and secular, which bear affinity to the oratorio among the former class of compositions, and to the dramatic lyric among the latter.

**Canteen**. A canteen forms a part of every regimental institute, its purpose being to supply

troops with articles at the lowest prices consistent with good quality. The canteen is (since 1857) under the control of a committee of three officers, who manage the affairs of the institute, and is divided into a beer bar, grocery shop, and coffee room. In the last named men can obtain non-alcoholic drinks and such cooked food as eggs, bacon, fish, etc. Only officers and soldiers, with their wives and servants, are permitted to purchase articles from the grocery shop. No intoxicating liquor is sold in the 'wet canteen' before noon or after tattoo, except in cavalry barracks for a quarter of an hour before midday stables. Many canteens are now managed by civilian contractors on the following conditions: The price list is controlled by a committee of officers, and, in addition, the contractor pays a monthly rebate to each unit using the premises at the rate of 2s. to 4s. per head. Such rebate is expended by the unit for the benefit of the men. A committee which sat in 1902 issued a report in favour of the formation of a Soldiers' Central Co-operative Society, to take over the control of the canteens and regimental institutes; but so far nothing has been done in the matter. The canteen of the United States army resembles the British, except that the sale of intoxicants is prohibited, a fact which has led to the establishment of low grog-shops in the neighbouring towns, and a great increase of drunkenness and crime.

**Cantemir**, ANTIOCHUS DIMITRIEVITCH (1709-44), a Russian satirist and diplomatist, born at Constantinople. In 1730 he was appointed Russian ambassador to London, and in 1738 to Paris. He wrote several poems of a pungently satirical type, translated into Russian the *Satires* of Boi-

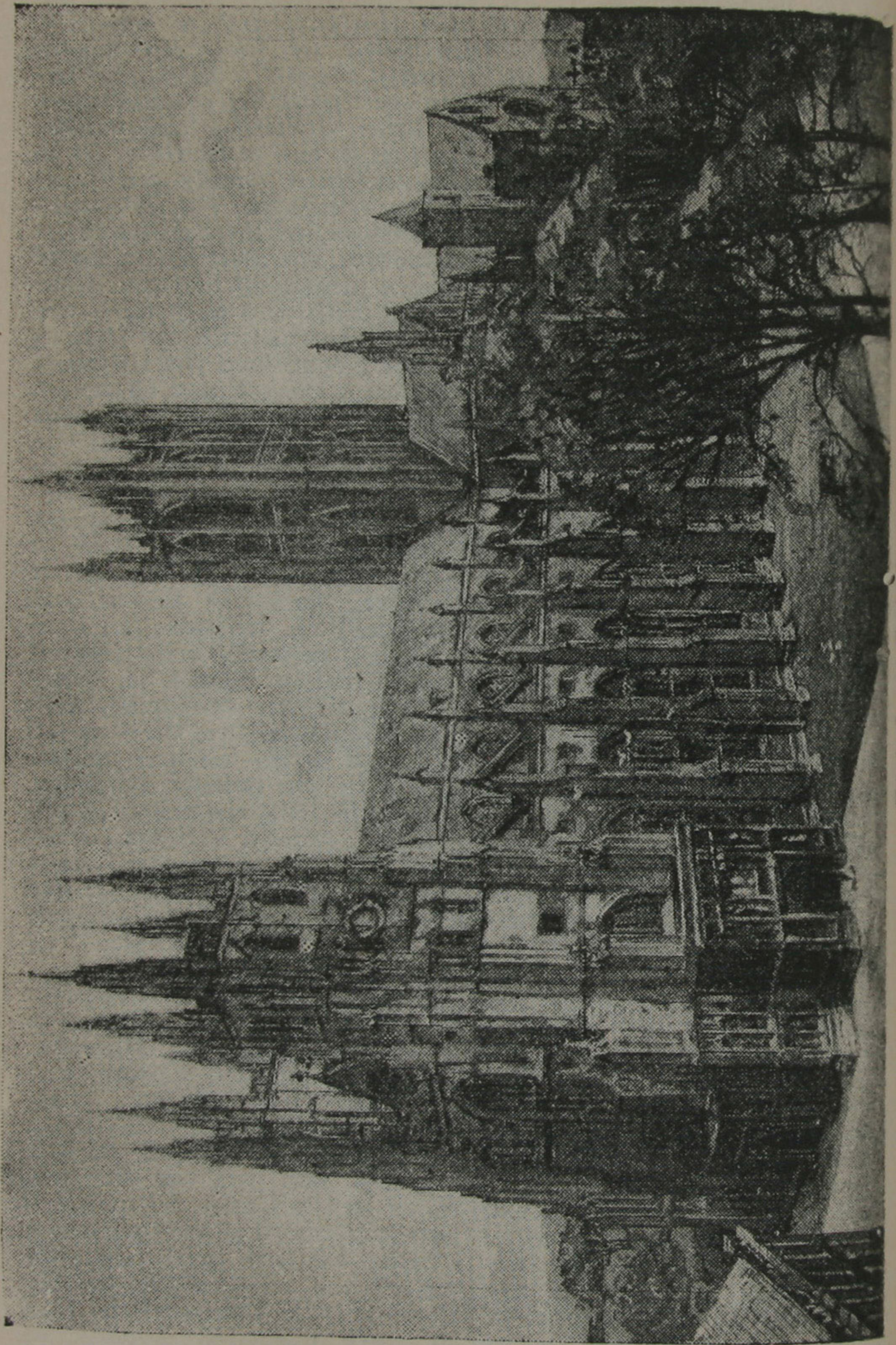
leau, Montesquieu's *Lettres Persanes*, and many classical works, and may be considered to have introduced the pseudo-classical spirit and ideals into Russian literature. See *Life* by the Abbé Guasco, who translated Cantemir's satires and poems into French (1750); a new edition of his works, with biography, by Stojunin (2 vols. 1867).

**Cantemir, DIMITRIE** (1673-1723), prince of Moldavia, and Roumanian historian. Being sent in 1687 as a hostage to Constantinople, he seized the opportunity to learn the chief Oriental languages (Turkish, Arabic, Persian), and to study Turkish history. In 1710 he was nominated prince of Moldavia, in view of the approaching war with Peter the Great of Russia. But Cantemir concluded an alliance with Russia (1711) to free his country from the Turks. The disastrous defeat of Peter the Great at the Pruth (1711) forced him to fly to Russia. Among his numerous works, written in Roumanian, Latin, Greek, and Turkish, are *History of the Growth and Decay of the Othman Empire* (Eng. trans. by N. Tindal, 1756), *Moldavia Descriptio* (1769), and *Cronica Moldo-Valachiei* (1837). His works were published (Roumanian) in 7 vols. (1872-83), among them being *The Ancient and Modern History of Dacia*. See Gaster's *Geschichte der Rumänischen Literatur* (1898).

**Canterbury.** (1.) A city, munic., parl., and co. bor. in Kent, England, 55 m. by road E. by s. of London, and 16 m. N.W. of Dover, pleasantly situated in a valley through which flows the Stour; is famous as the ecclesiastical metropolis of England. The cathedral is built on the site of the ancient monastery church of St. Augustine (burnt down 1067). It was begun by Lanfranc (1070); his successor,

Anselm, built the eastern part, and Prior Conrad the choir. In 1174 the cathedral was partly destroyed by fire, and subsequently rebuilt with additions. The erection of the central tower by Prior Goldstone about 1495 completed the cathedral. It is a magnificent doubly cruciform edifice, presenting fine examples of Norman and later styles of architecture, the Bell Harry tower being a prominent feature. Connected with the east nave are several chapels: Trinity Chapel formerly contained the shrine of Thomas à Becket, and at the extreme east is the chapel known as Becket's Crown, containing the ancient stone chair on which the archbishops are enthroned. There are numerous interesting ancient monuments, including those of Henry IV. and his queen, Joan of Navarre, the Black Prince, and Cardinal Pole. A handsome monument has recently been erected to Archbishop Benson (d. 1896). St. Augustine's missionary college occupies some of the restored buildings of the ancient monastery. In the Beane Institute, opened in 1899, are installed the museum, library, and art collections. Canterbury is an important military station. The cavalry school and riding establishment of the army is situated here. The city returns one M.P.

A settlement or town appears to have existed here previous to the Roman invasion. Here St. Augustine founded a priory and an abbey (605). Being designated archbishop, he established his seat at Canterbury. In 843, 852, 918, and 1011 the city was taken by the Danes, when 43,000 persons are said to have perished. Canute assisted in the rebuilding of the city, which at the time of the Conquest is said to have exceeded London in importance. The most notable event in the history of the city





and of the cathedral was the murder of Archbishop Becket in 1170, and the subsequent penance performed here by Henry II. The shrine of Becket long continued to be visited by pilgrims from distant parts (see *Canterbury Tales*). In the reign of Queen Elizabeth, Walloons settled in the city, and introduced silk-weaving; and on the revocation of the Edict of Nantes, in 1685, they were joined by French Huguenots. Pop. 27,000. See Dean Stanley's *Historical Memorials of Canterbury* (1855; 10th ed. 1883); R. Withers's *The Cathedral Church of Canterbury* (1901), in Bell's Cathedral Series; R. Willis's *The Architectural Hist. of Canterbury Cathedral* (1845).

(2.) Munic. dist. on Cook's R., 6 m. s. of Sydney, New South Wales. Pop. 4,300.

(3.) Provincial dist., occupies the centre of the South I., New Zealand. Area, 14,040 sq. m., of which 3,900 sq. m. form the Canterbury Plains, sloping gently from the mountains to the coast. These plains (about 100 m. by 30 m.) are the chief wheat and sheep district of the colony; Canterbury mutton and lamb have a high reputation in the English market. On Banks Peninsula—a hilly, volcanic district with rich soil—dairy-farming, cheese-making, and cocksfoot grass seeding are the chief industries. Capital, Christchurch: N. port, Lyttelton; s., Timaru. Chief products: wool, grain, frozen and preserved meat, skins, hides, leather, butter, and cheese. Founded in 1850 as a Church of England settlement. Pop. 160,000.

**Canterbury**, ARCHBISHOP OF. See ARCHBISHOP.

**Canterbury Bells**. See CAMPANULA.

**Canth**, MINNA (1844-1900), Finnish dramatist and novelist, one of the most talented and enlightened writers of her country,

was the wife of a schoolmaster, and wrote (in Finnish), taking her subjects chiefly from peasant life, the plays *The Burglary* (1882), *At Roinila Farm* (1885), *The Workman's Wife* (1886), *Children of Misfortune* (1883), *The Pastor's Family*, etc. Her most characteristic novels include *Hanna* (1886), *Poor People*, *Sunken Rocks*, and *Sylvi* (1893).

**Cantharides**, zoologically the name of a sub-family of the Cantharidæ, or blister beetles, to which *Cantharis* or *Lytta vesicatoria*, the 'Spanish fly,' belongs. The blister beetles are remarkable not only for the vesicating properties of the substance which can be extracted from their bodies, but also on account of their life-history, which is singularly complicated. Thus, an American cantharid, *Epicauta vittata*, which lives on the eggs of locusts, displays no less than eight stages in development, including two pupal. In Britain species of the genus *Meloë* are common, the larvæ feeding on bees' eggs, and later on honey. The blistering fluid apparently protects the beetles from the attacks of insect-eating animals. The Telini 'fly' of India is another species which produces cantharides.

The drug is prepared from the beetle *C. vesicatoria*, which is collected chiefly in Hungary, killed in vinegar, dried, and pounded. There are several officinal preparations in the form of ointment, plaster, etc.; but those most commonly in use are the emplastrum cantharidis, or fly blister, and the liquor epispasticus, or blistering fluid, both for external application; and the tincture of cantharides, for internal use. Cantharides is chiefly used for blistering purposes, as a counter-irritant in neuralgia, or to relieve congestion in pleurisy, pericarditis, meningitis, etc. Taken in-

ternally, in any but small medicinal doses, cantharides sets up intense irritation and inflammation in all the passages. The kidneys are violently irritated, as is also the bladder, and poisoning ends by death through asphyxia. Symptoms of poisoning, though in a minor degree, may also come on after too free blistering. The tincture is occasionally used in medicinal doses for skin diseases, enuresis in children, and as a diuretic. The blister must be used with great caution where there is kidney disease, or for children and the infirm and aged.

**Cantho.** (1.) Arr. in Lower Cochin-China, on the Mekong, 830 sq. m. in area. Produces chiefly rice. Pop. 140,000, mostly Annamites. (2.) Cap. of the arr., on the W. arm of the Mekong, 43 m. from its mouth.

**Canticles**, a short book of the Hebrew Scriptures, one of the five Megilloth, or Rolls, commonly called the Song of Solomon, or Song of Songs. Apparently an erotic lyric, its admission into the Hebrew canon of Scripture was secured only after much controversy as to its real meaning, and to this day its interpretation is a bone of contention among critics. The Jewish rabbis and the early Christian exegetes (*e.g.* Origen) generally regarded it as an allegory, intended to express Jehovah's love to Israel or Christ's to the church ('the bride') in the language of human affection. (See the chapter headings in the A.V.) This view has still its adherents. At present, however, the literal interpretation holds the field, but in two forms: (1) the dramatic, according to which either *two* main characters, Solomon and the Shulamite maiden, or *three* (the shepherd lover being added), are represented—held by Delitzsch and Ewald respectively; and (2) the lyrical, developed mainly by Karl Budde

(see '*Die fünf Megillot, Das Hohelied*' (1898) in Marti's *Kurzer Hand-Commentar zum Alten Testament*, pt. xvii.), who understands the Song as a collection of nuptial lyrics, like those found among the Syrian peasantry at the present day: the married pair are king and queen for the time. The former hypothesis, emphasizing the dignity and value of true and chaste love, leaves the booklet a legitimate place in the canon. Many passages are of extraordinary poetic beauty, *e.g.* ch. 8:6, 7. The presence of foreign words in the Song indicates a date not earlier than the 3rd century B.C. See Driver, *Introd. to Lit. of O.T.* (1891; full account of dramatic hypothesis in both forms); Cheyne, in *Encyc. Biblica*, i., subject 'Canticles' (lyrical theory); J. W. Rothstein, in Hastings's *Dict. of the Bible*, iv., subject 'Song of Songs' (an attempt to combine the two theories).

**Cantilan**, pueblo, Surigao prov., Mindanao, Philippines, 47 m. S.E. of Surigao, on the N.E. coast. Pop. 7,500.

**Cantilena.** See CANTABILE.

**Cantilever**, essentially a bracket, or structure extending horizontally from a fixed base, by which alone it is supported. In architecture the cantilever is largely used for the support of balconies and other projecting portions of a building, filling often an important place also in the ornamental system of the structure. In modern railway stations the roofing of island platforms is frequently carried on light steel cantilevers, which obviates the use of pillars outside the buildings, or other supports on the platforms. Some of the earliest known bridges, of a span too great to be crossed by a single log, were constructed on the cantilever principle, examples of this type existing at the present day in

India and Japan. The method of constructing these was to lay on each bank a balk of timber projecting over the stream, their upward ends being securely embedded in banks of earth or walls of masonry. A third timber rested on the free ends of each, connecting them and forming with them a bridge. In modern engineering practice the cantilever principle is adopted in bridging spans too great to be conveniently crossed by girders alone, and for which the suspension system would not be suitable. In the well-known example of the Forth Bridge, Scotland, each pier supports two cantilevers, which stretch out horizontally on either side and balance each the weight of the other, the outer ends being connected by short girders at the centre of every span. The bridge over the Indus at Sukkur, on the other hand, reverts more in principle to ancient forms of design, its cantilevers extending from either bank, and depending for their stability on holding-down chains to the ground behind. See BRIDGE—*Cantilever Bridges*.

**Cantire.** See KINTYRE.

**Cantlie, JAMES** (1851), lecturer on anatomy at Charing Cross Hospital, London, born at Keithmore, Banffshire. He went to Egypt during the cholera outbreak in 1883, and to China in 1887, where he held the appointment of dean of the College of Medicine for the Chinese (1889-96). He has published several works on surgery in its relation to tropical diseases—*Degeneration amongst Londoners* (1885), *Physical Efficiency* (1906), etc.

**Canto Fermo.** See PLAIN SONG.

**Canton.** (1.) In Switzerland, a geographical administrative area or state having its own laws and a local government which deals with domestic affairs, such as taxation, expenditure of public money,

etc., while the control of the army, foreign policy, the settling of disputes between the various cantons, the management of the police, post, etc., are left to the central government at Bern. (2.) In France the term signifies a subdivision of the *arrondissement* under the jurisdiction of a justice of the peace.

**Canton** (Chinese, *Kwang-chau-fu* or *Sheng-cheng*), port and cap. of prov. Kwang-tung, in the south-east of China, the first Chinese port that was opened to European trade, is situated on the Canton R., 70 m. from its entrance into the China Sea. It has communication with the interior provinces by the navigable rivers Si-kiang, Pe-kiang, and Tung-kiang, and by canals. The city is enclosed by a wall 6 m. in circumference, and is divided by an inner wall into a new and an old city. Among the buildings are two pagodas—one a Mohammedan mosque, erected in the 10th century; the other an octagonal pagoda, erected in the 6th century—over one hundred and twenty temples, a beautiful English church, two missionary hospitals (English and American), etc. A special feature of the city is the great number of the native population who live in boats on the river. The climate of Canton is healthy, the average temperature varying between 42° and 96° F. The average annual rainfall is about 70 in. Canton is a manufacturing centre, especially for silk, fireworks, and wood and iron wares. Its trade, which has suffered through the opening of Shanghai and the Yang-tse valley, is still very large, Canton being the second port in China. The exports are chiefly silk, tea, chinaware, matting, cassia, bristles, and palm-leaf fans. The annual value of the trade is about £15,000,000; the tonnage entering the port aggregates 2½

million tons per annum. Waterworks, built at a cost of £300,000, were opened in 1908. Pop. estimated at about 1,000,000. There are about 500 foreign residents. Kwang-chau dates back to the 8th century B.C., when it was known as Yang-cheng ('city of rams'). The East India Company, following in the wake of Portuguese, Spanish, and Dutch trade, visited it in 1684, and soon afterwards established a factory, which lasted until 1834. In 1842, by the Nanking treaty, Canton was formally declared to be one of the five ports open to foreign trade generally. Canton was attacked by the British in 1841, and again in 1856. On the first occasion it was ransomed; on the second, the forts were taken and the walls breached. In consequence of non-compliance with terms of treaty, the city was again attacked in 1857 by Franco-English forces, and occupied until October 1861. See Mrs. Gray's *Fourteen Months in Canton* (1880), and Allgood's *China War of 1860* (1901).

**Canton.** (1.) City, Ohio, U.S.A., co. seat of Stark co., 52 m. S.S.E. of Cleveland, with a large variety of manufactures. It was the home of President William M'Kinley, to whom a monument has been erected. Potter's clay, coal, and limestone are exported. Pop. 50,000. (2.) Town, Fulton co., Illinois, U.S.A., 24 m. W.S.W. of Peoria, in a coal district; has tobacco factories and flour mills, and manufacture of agricultural implements. Pop. 6,600. (3.) County seat of St. Lawrence co., New York, U.S.A., 18 m. S.E. of Ogdenburg, on La Grasse riv. Here is situated St. Lawrence University. Butter and cheese are produced, and small boats and launches are built. Pop. 6,500.

**Canton, JOHN** (1718-72), English electrician, born at Stroud. In 1750 he read a paper before the

Royal Society on the 'Method of making Artificial Magnets without the use of Natural Ones' (*Phil. Trans.*, xlvi.), and was the first in Britain to successfully repeat the experiment by which Franklin proved the identity of lightning and electricity. He invented an electroscope and an electrometer, and made several advances in the application of electricity. He prepared a phosphorescent mixture from calcined shells mixed with sulphur which is still known as 'Canton's phosphorus.' See *Philosophical Transactions*, vol. 46 ff., and Wild's *History of the Royal Society*.

**Cantonments.** On service, troops are said to be in cantonments when they are quartered in and round the houses of towns, villages, etc. In India, cantonments are simply permanent barracks, containing quarters for the white and native regiments, etc. They are, in fact, small military towns, situated, as a rule, a mile or two outside the city, chiefly for sanitary and disciplinary reasons. Lord Kitchener's reorganization scheme has abolished many of the smaller cantonments and substituted large military centres.

**Canton River** (Chin. *Chu-kiang*, 'pearl river') is an arm of the delta of the Si-kiang, prov. of Kwang-tung, China. It is the lower part of the Pe-kiang R. About 45 m. below Canton the river receives the name of Boca Tigris (Tiger's Mouth); the entrance to this part is guarded by the Bogue Forts, taken by the British in 1841 and 1856. The estuary of the river south of Boca Tigris is called the 'Outer Waters.' On the islands large quantities of rice are grown.

**Cantor.** See PRECENTOR.

**Cantor, MORITZ** (1829), German mathematician, born at Mannheim; became in 1863 professor at the Heidelberg Univer-

sity. Among his authoritative works are *Mathematische Beiträge zum Kulturleben der Völker* (1863), *Euklid und sein Jahrhundert* (1868), and his standard achievement, *Vorlesungen über Geschichte der Mathematik* (1880-92; 2nd ed. 3 vols. 1894-1908). He was also editor of the *Zeitschrift für Mathematik und Physik* (1859-96).

**Cantu**, comm., Lombardy, Italy, 5 m. s.s.e. of Como. Produces silk and cereals. Pop. 11,000.

**Cantù, CESARE** (1807-95), Italian historian and novelist, was born at Brivio, near Milan, and was for a short time professor of the Italian language and literature at Sondrio, Como, and Milan. For strictures passed on the policy of the Austrian government, in his *Ragionamenti sulla Storia Lombarda nel Secolo XVII.* (1832-3), he was imprisoned, and during his detention wrote the historical novel, *Margherita Pusterla* (1838). His chief work, however, is his monumental *Storia Universale* (1836-42), in 35 vols., which brought its author about £12,000 in royalties. It is of great polemic and literary value. Among his other works are *Storia degli Italiani* (6 vols. 1855-7), *Italiani Illustri, Ritratti* (3 vols. 1870-2), *Caratteri Storici* (1882), *Lord Byron and his Works* (1883), *A. Manzoni, Reminiscenze* (1883), and the widely-read books for the young, *Lecture Giovanili*, *Il Galantuomo*, etc. See Bertolini's edition of his works (1895).

**Cantuar.** (*Cantuarensis*), of Canterbury.

**Canuck**, a nickname in North America for a Canadian; 'probably an Indian word modified' (C. G. Leland).

**Canusium**, Italy. See CANOSA.

**Canute**, called THE GREAT, king of England, Denmark, and Norway (995-1035), son of Sweyn of Denmark, followed his father

on his expedition to England in 1013, and his bitter struggle with Edmund Ironside ended in a partition of the country between them in 1016. On the death of Edmund, Canute was proclaimed king of all England. On the death of his brother Harold he also became king of Denmark (1019). He conciliated the higher clergy by his liberality, and secured his position still further by the creation of a standing army. The union with England was very beneficial to Denmark, which borrowed clerks, scholars, and architects from the more civilized land to build churches and found schools. Canute overawed and partially subjugated the Wendish pirates; and when the kings of Norway and Sweden, profiting by his absence in England, invaded Denmark, Canute, hastening back, checked them at the battle of Helgeaa (1026). In 1027 he made a pilgrimage to Rome, and in 1028 invaded Norway, and added it to his dominions. Canute died at Shaftesbury in England, and was buried at Winchester.

**Canute IV.**, called THE SAINT, king of Denmark (d. 1086), was elected king in 1080. He built many churches, including the cathedrals of Roskilde and Lund, and conferred many privileges upon the clergy. Foreign scholars were introduced to spread learning and culture, and he endeavoured to abolish serfdom. His rigorous rule finally provoked a popular rising, and he was murdered in St. Alban's Church, Odense. He was canonized on April 19, 1101.

**Canvas**, a strong, heavy cloth, made of flax, hemp, or jute. The fibres are spun and woven in the same way as linen. Though canvas for sailcloth is sometimes woven from hemp and other fibres, the finest and strongest kinds

are made from flax, generally in widths of 24 in., though 18 in. width is sometimes adopted for smaller sails. A piece or bolt is 40 yds. in length. There are several kinds of canvas, varying according to weight. The sails of racing yachts are occasionally made of cotton-duck. Artists' canvas, the principal ground for oil paintings, is one of the finest varieties made.

**Canvas-back Duck** (*Aythya vallisneria*), a N. American bird, greatly prized for its delicate flavour. It belongs to the same genus as the British pochard, and probably owes its gastronomic value to the fact that it feeds chiefly on the water-plant known as *Zostera vallisneria*, locally called celery. It breeds in Canada, and spends the winter in the United States, near the great lakes, in the Mississippi valley, and is enormously abundant on the Chesapeake. For its habits and general character, see POCHARD. See Elliott's *Wild Fowl of N. America* (1898).

**Canvassing**, the term used for soliciting votes at a popular election. Treating, undue influence, personation, and aiding, abetting, counselling, and procuring personation by canvassers for votes at an election, are corrupt practices within the meaning of the act. (See ELECTIONS—*Corrupt and Illegal Practices*.) To meet possible allegations, two or more canvassers in company should visit voters. A paid election clerk may canvass, but only voluntarily and apart from the duties of his office.

**Canzone**, Italian and Provençal form of poetry, used chiefly for love themes, though religious and other subjects were not entirely excluded. The earliest Provençal specimens date from the 12th century, those in Italian from the 13th. The number of stanzas varied, five or six being

the most common, and the last stanza was invariably shorter than the others. The Provençals, though by no means invariably, carried the same set of rhymes through all the stanzas; but the Italians mostly introduced fresh rhymes into each stanza. Dante, Petrarch, Tasso, and Leopardi all wrote in this *genre*. Examples of the canzone in English literature may be found in the works of Drummond of Hawthornden. See Rajna's *Le Origini dell' Epopea Francese* (1884) p. 515, etc.; and Lisio's *Studio sulla Forma Metrica della Canzone Ital. nel Sec. XIII.* (1895).

**Cao-Bang**. (1.) Circle, Tongking. Area, 3,000 sq. m. The country is mountainous. Sulphate of tin, galena, and iron are worked, and there are rich forests. Pop. 70,000, half being Annamites. (2.) Capital of the above circle, 72 m. N.N.W. of Langson. Rice, maize, sugarcane, betel, etc., are grown. Pop. 6,000.

**Caoutchouc**. See INDIA-RUBBER.

**Capacity**, in electricity. See ELECTROSTATICS.

**Capacity**, in law, ability, power, qualification, or competency of persons for the performance of civil acts, depending on their state or condition as defined or fixed by law—capacity to make a contract. Hence lunatics are said to have no legal capacity, and infants and married women have a restricted capacity.

**Capaneus**, Greek hero who took part in the first expedition of the Seven against Thebes. He was struck by lightning by Zeus when attempting to scale the walls. See Æschylus's *Seven against Thebes*, and Euripides's *Phœnissæ*.

**Cape Agulhas, Blanco, Clear, etc.** See AGULHAS, CAPE, etc.

**Cape Ant-eater**, or CAPE AARD-VARK (*Orycteropus afra*), a

an African mammal usually placed in the order Edentata, but it shows few, if any, obvious affinities with the typical members of that order. It is a nocturnal burrowing animal, feeding on termites and ants. The teeth are numerous and complex, and are quite unlike those of any other mammal. There are four toes on the fore feet and five on the hind. The mouth is elongated and tubular, the tongue vermiform. A few bristly hairs are scattered over the surface of the body; the ears are large and erect, the tail much elongated. Another species of the same genus occurs in N.E. Africa, and extends into Egypt.

**Cape Breton**, isl. at E. extremity of the province of Nova Scotia, of which it politically forms a part; is separated from the mainland by the Gut of Canso. Its greatest length from N. to S. is 110 m., its breadth 85 m., and its area 3,120 sq. m. The surface of the island is broken by several ranges of low hills, rising to an elevated plateau (1,200 ft.) in the N. Triangular in form, the island is deeply indented by bays and harbours. The Bras d'Or ('Arm of Gold') Lake is really an arm of the sea, entering from the E. coast, and penetrating to within 1 m. of the Gut or Strait of Canso, with which it is connected by St. Peter's Canal. The beautiful scenery round the shores of this lake, and the salubrity of the climate, have made Cape Breton a favourite tourist resort. Pop. 100,000—mainly of Scottish Highland descent (emigration mainly from 1800-25), and largely Roman Catholic by religion. Gaelic is spoken all over the island. Cape Breton is an area of great industrial activity, and is a centre of the cod fisheries. In the Sydney and N. Sydney districts there are immense deposits of coal and iron; it has harbours

open all the year round. See NOVA SCOTIA.

Cape Breton was assigned to France by the peace of St. Germain (1654). After the loss of Acadia (1713) the town and harbour of Louisburg were elaborately fortified, and became the headquarters of the French operations against the English colonies. (See LOUISBURG.) The island became British in 1763 (treaty of Paris). At first it formed part of Nova Scotia, but was erected into a separate colony; it was again annexed to Nova Scotia in 1819. See J. M. Gow's *Cape Breton Illustrated* (1893), R. Brown's *Hist. of Cape Breton* (1869), and Sir J. G. Bourinot's *Historical and Descriptive Account of the Island of Cape Breton* (1892).

**Cape Coast**. See GOLD COAST.

**Cape Coast Castle**, tn., W. Africa, in the British colony of Gold Coast, formerly its capital, situated on the coast in about 1° 10' W. Pop. 30,000.

**Cape Colony**. See CAPE OF GOOD HOPE.

**Capefigue**, JEAN BAPTISTE HONORÉ RAYMOND (1802-72), French historian, antiquary, and politician, was born at Marseilles. His works—which, though neither very accurate nor profound, are still read for their picturesque and piquant style—extend to nearly 100 vols., and include *Histoire de Philippe Auguste* (1829); *Histoire de la Restauration* (1831-33); *Richelieu, Mazarin, et la Fronde* (1835-6); *Philippe d'Orléans, Régent de France* (1838); and *La Ligue* (3rd ed. 1843).

**Cape Haitien**, tn. in republic of Haiti, and an episc. see, is situated on a commodious harbour on the N. coast, and 5 m. N. of Port au Prince. Under the rule of the French it was the capital of the colony. It was the scene of a terrible earthquake in 1842. The town suffered from bombardment by the British in 1865. The

city is connected by cable with France, San Domingo, and South America. Pop. estimated at 30,000.

**Cape Henry, ACTION OFF.** In 1781 the British occupied Portsmouth, on the James R., s. of Chesapeake Bay, N. America; and Commodore des Touches, who commanded a French squadron at Newport, Rhode I., proceeded thither. Vice-admiral Marriot Arbuthnot found him off Cape Henry, 20 m. E.N.E., on March 16. An indecisive action followed, the French losing more heavily than their opponents. The result of the encounter was that the British regained command of Chesapeake Bay.

**Cape Hunting Dog** (*Lycaon pictus*), a handsome member of the family Canidæ, widely distributed throughout Africa. In appearance it resembles a mastiff, but is brightly coloured, with variable white and yellow spots outlined in black. It resembles the hyæna in having only four toes on each foot, but is doglike in habit, hunting in packs, which often commit great depredations on sheep farms in S. Africa.

**Capel, THOMAS JOHN** (1836), Roman Catholic clergyman, one of the founders and vice-principal of St. Mary's Normal College, Hammersmith, then (1874-8) rector of Roman Catholic University, Kensington. He is an eloquent preacher, and is delineated in Disraeli's *Lothair* under the character of Catesby. He has written *Great Britain and Rome* (1881), *The Pope the Head of the Church* (1885), etc. Has been resident in California for some years.

**Capel Curig**, picturesque hamlet and dist., Arfon div., Carnarvonshire, N. Wales, on the way from Bettws-y-Coed to Snowdon.

**Capelin** (*Mallotus villosus*), a small fish belonging to the salmon family. It occurs on the Arctic coasts of America and Kam-

chatka, and though it does not exceed nine inches in length, is of importance as a food fish on account of its vast abundance.

**Capell, EDWARD** (1713-81), Shakespearean commentator, was born at Throston, near Bury St. Edmunds. Appointed deputy-inspector of plays in 1737, he devoted himself to the study of Shakespeare, transcribing his works, it is stated, ten times. In 1768 appeared an edition of Shakespeare in 10 vols., which cost Capell twenty years' labour. The first part of the commentary was issued in 1774, and in 1783, two years after his decease, the complete work. As a textual critic Capell was singularly acute. See Halliwell's *Defence of Capell* (1861).

**Capella** (=  $\alpha$  Aurigæ), one of the three brightest stars in the northern hemisphere (photometric magnitude 0.21). It was discovered by Professor Campbell and Mr. Newall, in 1899, to be a spectroscopic binary, composed of two sunlike bodies, revolving in a period of 104 days. The fainter member of the pair gives light of a somewhat less 'advanced' spectral type than the primary. Its actual light-power must centuple that of our sun. Its parallax of 0".09 corresponds to a distance of 36 light years, and it is receding from the sun at the rate of 15 m. a second.

**Capella, MARTIANUS MINEUS FELIX**, a Roman writer of the 5th century. His *Satyricon*, an encyclopædic compilation drawing its material mostly from Pliny and Varro, was used as a school book in the middle ages. New edition by Eyssenhardt (1866).

**Capelle, JAN VAN DER** (fl. c. 1650-80), Dutch painter of Amsterdam, of whose life little is known. His sea and river pieces and winter landscapes are painted with great delicacy and simplicity, and are much prized. Among



his pictures are *Fishing-Boats* (Rotterdam Museum); river and shipping pieces in the Berlin and Amsterdam museums and Vienna galleries; and several examples in the National Gallery, London, and at South Kensington.

**Cape of Good Hope**, formerly CAPE COLONY, prov. of the Union of South Africa. It is so named from the promontory on its s.w. coast, which in 1488 was called by its discoverer, Bartolomeo Diaz, the 'Cape of Storms,' but was re-named by the king of Portugal the 'Cape of Good Hope.' Its coast boundary begins at the mouth of the Orange or Gariiep R. ( $16^{\circ} 27'$  E.), and follows the s. and s.e. shore of Africa to Umtamvuna R., in Pondoland ( $30^{\circ} 10'$  E.). The N. limit is roughly the Orange R. from source to mouth, though the province of Griqualand West and British Bechuanaland lie N. of the river.

The interior may be described as a series of terraces rising like steps from the sea—(1) the coastal terrace, up to 1,000 ft.; (2) the intermediate districts, up to 3,000 ft.; and (3) the high plateaus of the interior. These gradations are more marked on the s. and e. than on the w. coast. The coast is low, flat, and sandy on the w., but bolder on the s., beginning with the well-known flat-topped Table Mountain. The main watershed is roughly indicated by a line parallel to the coast some 150 m. inland. The chief mountain chains are the Hantams and the Bokkeveld, N. of Cape Town towards the interior; the Roggeveld, the Nieuweveld, and Compassberg (7,800 ft.), midway between the e. and w. coasts, the line being continued e. by the Boschberg, the Stormberg, and the clearly-defined range of the Quathlamba or Kwathlamba or Drakenberg, which forms the inner rampart of the prov.; culminating points are Giant's Castle (9,657 ft.), Champagne

Castle (10,357 ft.), and Mont aux Sources (11,150 ft.). Nearer the sea are the Olifants River Mts. (w. coast), the Hex River Mts., the Zwartebergen, the Cockscomb Mts., the Zuurberg, etc.

The rivers of S. Africa have been of little use for the purposes of trade and settlement. Their mouths are generally blocked with sand-bars. The bays, like Algoa Bay, Mossel Bay, St. Sebastian Bay, St. Helena Bay, are merely open roadsteads. Table Bay has been improved by harbour works; so has Port Elizabeth. Knysna is a landlocked harbour, but can be used only by ships of light draught. There is no tidal river suited to navigation. The S. African rivers have deep channels walled in by cliffs and escarpments, but few are perennial, and they are subject to violent floods and long periods of drought, broken by sudden and torrential thunderstorms. This is as true of the Orange or the Gariiep as of the Olifants or Elephants, the Sunday, the Great Fish, Great Kei, and Umzimvulu—the three last draining into the Indian Ocean.

A large part of the surface of the Cape of Good Hope consists of flat and level plains termed 'karroos.' The Great Karroo extends from Karroo Poort (*poort*, 'gorge' or 'pass'), on the w., to the spurs of the Boschberg, on the e., a distance of 350 m. It is about 50 m. broad.

The best-known forest is the Knysna, in the s. of the Cape prov., where grow the tall yellow woods (*Podocarpus*), the black iron woods (*Olea laurifolia*), and the valuable stink wood or laurel wood (*Oreodaphne bullata*). The karroos of the interior are generally bare-looking. The prevailing shrub is the mimosa or acacia, with its yellow ball-like blossom. Bulbous plants are found in large numbers. The

'karroo bush' is very common, and is admirably adapted as a food for sheep. The wild animals of the S. African veld have been nearly all destroyed. The former home of the elephant, rhinoceros, zebra, and wildebeest knows them no more. A few elephants and buffalo are preserved in the Knysna Forest; there are some bontebok near Cape Agulhas, a few boschbok in the eastern districts, and a few springbok. Some of the smaller buck, such as the steenbok, survive.

Cape of Good Hope prov. presents many varieties of climate. The most important factor is the rainfall. The quantity decreases, generally speaking, from east to west. At Cape Town the rainfall is about 25 inches; the maximum temp. being about 100° F., and the minimum 37° F. The alternations of heat and cold have a wide daily range on the thermometer, and the hour of sundown is the most critical. The skies of S. Africa are generally cloudless and the atmosphere clear, with a very heavy dew in the morning. In Cape Town the south-east trade-wind blows continuously during the summer months. In the eastern provinces a peculiar wind is the north-west or 'Kalahari Desert wind,' very dry, and charged with electricity. Generally speaking, the climate of the Cape prov. is very healthy, and is suited to the European constitution. From its excessive dryness it is beneficial to invalids suffering from chest complaints. The great dangers to health come from the sudden changes of temperature.

At the census of 1904 the total pop. of the Cape prov. was 2,409,804 (579,741 Europeans). English is the language spoken officially throughout S. Africa, and is the language of education and commerce. But Dutch, or rather the peculiar S. Afri-

can variety of Dutch known as the 'Afrikander Taal' (see TAAL), has been in vogue hitherto in the Orange Free State and also in the Transvaal. It has also been spoken in the Cape Parliament. The favourite language of the half-castes and Hottentots is a mongrel patois called 'kitchen Dutch.' In the early days of the Cape, when ruled by the Netherlands East India Company, Dutch was the sole official tongue. Some time after the French Huguenot immigration of 1685-90 the French language was prohibited by several Dutch edicts.

Since the census of 1891 British Bechuanaland has been added. Its chief towns are Vryburg and Mafeking. Pondoland was annexed to the Cape, Sept. 25, 1894. The total area of the Cape of Good Hope is now stated officially as 276,995 sq. m.

The native population may be divided into—(1) the Bushmen, the earliest aboriginal race, now almost extinct; (2) the Hottentots, chiefly in the western provinces; and (3) the great Bantu race, living in the east and north-east of the colony, and known as Kaffirs. (See BUSHMEN, HOTTENTOT, and KAFFIRS.) In addition, there are Malay immigrants and descendants of Buginese imported originally as slaves by the old Dutch E. India government.

The Cape prov. produces diamonds, copper ore, wool, Angora hair, ostrich feathers, skins, wine, and preserved fruits. The diamond mines at Kimberley were first discovered in 1867. The value of diamonds exported from 1867 to 1909 is approximately £160,000,000. Other minerals found in the colony include copper ore, in large quantities in Little Namaqualand, especially in the mines of Ookiep, near Springbokfontein. Manganese ore, lead ore, and iron ore are also met with. Agriculture, how-

ever, is the mainstay of the Cape. The best wine farms are found at Constantia, on the slopes of Table Mt., at the Paarl, at Robertson Montagu, and in the valleys of the south-west portions of the Cape. In 1904 the vines yielded 8,750,000 gallons of wine and 1,534,069 gallons of brandy. In 1909 the wine yield was only 3,494,656 gallons. The best corn farms are found at Malmesbury and Piquetberg, not far from Cape Town. Sheep do well in many places, and especially on the Great Karroo and round Beaufort West. The mohair industry is profitable. Ostrich-farming has been greatly developed in recent years, the

United Kingdom, £8,202,029; from the British possessions, £3,966,742; from foreign countries, £3,802,442. The most formidable trade rivals are the United States and Germany. The exports for 1908 were thus distributed: To the United Kingdom, £40,298,809; to British possessions, £164,618; to foreign countries, £1,468,491. The principal articles of export were: diamonds, £4,796,655; raw gold (Transvaal and Rhodesia), £30,969,024; wool, £2,105,219; ostrich feathers, £1,738,389; copper ore, £418,250; Angora hair, £666,722; hides, £627,306.

Cape Town, the capital, on the shores of Table Bay, is

*Area and Population of Cape of Good Hope.*

	Area, Square Miles (1904).	Population (1904).			Per Square Mile.
		European or White.	Coloured.	Total.	
Colony Proper..	206,860	554,199	932,062	1,486,261	7.18
East Griqualand	7,594	5,868	216,591	222,459	29.29
Tembuland.....	4,117	8,057	223,094	231,151	56.14
Transkei.....	2,552	1,704	175,943	177,647	69.61
Walfish Bay....	430	145	870	1,015	2.36
Pondoland.....	3,918	1,131	201,678	202,809	51.76
Bechuanaland..	51,524	9,276	74,934	84,210	1.63
Total.....	276,995	580,380	1,825,172	2,405,552	8.68

feathers constituting one of the chief items of export. There are mills, wool-washing establishments, wagon-making industries, etc.; but almost all articles of use—apparel, implements, etc.—are imported. The Malays carry on the fishing industry along the coasts, and there is a small colony of Scottish fishermen from Granton, near Edinburgh, settled at Port Elizabeth.

The imports for 1890 amounted to £10,106,466, and for 1908 to £16,131,262; and the exports for the same periods to £9,910,370 and £42,118,728 respectively. The imports in 1908 were distributed as follows: From the

the head of the railway system. At the end of 1908 there were 3,757 m. of line open to traffic, of which 3,265 m. were owned and worked by the government. The Cape railways link on to the Natal, Orange Free State, Transvaal, and Rhodesia lines, with a uniform gauge. It is possible to send a cablegram from Cape Town to Europe by way of Durban and the east coast or by way of Port Nolloth and the west coast.

The Cape before the Union was under 'responsible' government of the kind which prevails in Canada, Australia, and New Zealand. The history of responsible government in Cape of Good Hope

is as follows:—(1.) From 1806-25 the governor, nominated at home, ruled absolutely. (2.) From 1825-34 the governor ruled with the help of a nominated council of six officers. (3.) From 1834-50 two councils were in existence, the one executive and the other legislative. (4.) In 1850, during the administration of Sir Harry Smith, a constitution was authorized, consisting of a governor, Legislative Council, and a House of Assembly, both of them elected by the people, and with power to appropriate their own revenue, and came into force in 1853. (5.) In 1872, during the governorship of Sir Henry Barkly, full responsible government was conceded.

Under the provisions of the South Africa Act (1909) of the Imperial Parliament, the colony of the Cape of Good Hope became an original province of the Union of S. Africa. The chief executive officer is an administrator appointed for five years by the Governor-General in Council. There is also a Provincial Council of 51 members popularly elected. The seat of the Provincial Government is Cape Town. All the members are paid for their services.

In the old days of Dutch rule, Roman law formed the basis of the system in vogue, except in so far as it was modified by use and custom. With the advent of the British the law of England formed another groundwork. In addition, there are in the native districts the unwritten laws and customs of the Kaffirs, in accordance with which justice is administered.

The Cape is amply defended against invasion by sea. The fortified towns include Simon's Town and Port Elizabeth, and there is a strong garrison at Cape Town. Local defence is represented by the Cape Mounted Riflemen (over 700) and the

Cape Mounted Police (over 1,600) and there are numerous volunteer corps.

The revenue for 1890-1 was £4,143,876; for 1909, £10,058,811. The expenditure for the same periods was £7,308,741 and £7,676,796 respectively. The public debt (end of 1908) was £48,424,502.

The educational system of the Cape includes all classes, European and native, and admits of a gradual progress from the third class undenominational schools through second and first class schools and colleges (five, with 809 students in 1907-8) to the Cape University (1873). There exists also an agricultural college at Elsenberg, near Stellenbosch. For the natives there are a Kaffir college at Zonnebloem, near Cape Town, also institutions at Grahamstown. Missionary colleges are Ginadendale (Vale of Grace), Lovedale, and a Wesleyan centre.

The Dutch East India Company took possession of the Cape in 1652, but pursued a policy of exclusiveness. Under British occupation, first in 1795 and then finally in 1806, the colony began to grow. In 1814 the colony of the Cape of Good Hope was ceded in perpetuity to the British crown, as an equivalent for the sum of £6,000,000 advanced by the British government for the defence of the Low Countries in the Napoleonic wars. At that time the area was only about 120,000 sq. m., and the population a little over 60,000. In 1820 the Eastern Province was founded by British colonists known as the 'Albany settlers.'

In 1834 the emancipation of slaves took place in Cape Colony, a measure which provoked great discontent among the Dutch farmers (Boers), and in 1836 about 5,000 Dutch, under the leadership of Pieter Retief, founded the inde-

pendent republic of Natal, which, however, was occupied by the British in 1842. In 1848 a rebellion broke out amongst the Boers between the Orange and Vaal rivers, under the leadership of Pretorius. Being defeated by the governor of the Cape, Sir H. Smith, at Boomplaats, Pretorius crossed the Vaal, and founded the Transvaal republic. Meanwhile the advance of the British northward, and the continual raids on the colonists' cattle made by the Kaffirs, resulted in what is known as the Kaffir wars, nine in number. The first took place in 1811, the second in 1819, when the colony was extended to the river Keiskamma. In 1834 occurred the third war, when the boundary was advanced to the river Kei. The fifth broke out in 1850, and was of a very serious nature, as the Hottentots, who had hitherto sided with the British, now revolted also. The war was only ended in 1853, through the energy of General Cathcart. The result was the formation of British Kaffraria, between the Keiskamma and the Kei, as a crown colony and a native reserve for the Kaffirs. But in 1865 this was incorporated with Cape Colony. In 1877 took place the ninth and last of the Kaffir wars: it resulted in the annexation of the Transkei.

An event which gave a new impetus to the development of Cape Colony was the discovery of diamonds in the districts north of the Orange R. in 1867, which also led to the annexation of the territory known as the Diamond Fields in 1871. The four richest diamond mines in the world were discovered in 1870 (Dutoitspan and Bultfontein) and 1871 (Kimberley and De Beers). In 1869 took place the incorporation of Basutoland; in 1874, of East Griqualand; in

1876, of Fingoland and No Man's Land; in 1877, of West Griqualand; in 1885, of Tembuland, Galekaland, and Bomvanaland. Pondoland was annexed in 1894, and British Bechuanaland in 1895; while, towards the west, Walfish Bay, in Great Namaqualand, became part of the colony in 1884. In 1881 took place the first Boer war: one of its principal results was the formation of the Afrikaner Bond, whose leading spirit in Cape Colony was Mr. Hofmeyr. Among the more recent events which have influenced the political life of Cape Colony have been the Jameson raid of 1895, and the Boer war of 1899-1902. Cecil Rhodes played an important part in the history of the colony, and was prime minister from 1890-6. In 1903 the Cape Parliament accepted the African Customs Convention, with a view of forming a S. African Customs Union, which was joined by Natal, Orange River Colony, and Bechuanaland Protectorate. A Redistribution Bill and a measure for excluding Chinese indentured labour from the colony were passed in 1904. In 1905 the British Association met at Cape Town. In 1908 the Assembly passed a resolution in favour of federation with other colonies, and this was arranged during 1909; and from May 31, 1910, Cape Colony became the Cape of Good Hope prov. in the Union of South Africa. See SOUTH AFRICA; also Theal's *Hist. of S. Africa* (5 vols. 1888-93), and *S. Africa* (5th ed. 1899); H. A. Bryden's *Hist. of S. Africa* (1904); Trotter's *Old Cape Colony* (1903); Noble's *Official Handbook* (1897); Lucas's *A Historical Geography of the British Colonies* (vol. iv. 1899); Bryce's *Impressions of S. Africa* (1899); Theal's *Records of Cape Colony* (23 vols. 1897-1904; 3rd ed. in progress); and Cory's *Rise of S. Africa* (1910).

**Caper**, the pickled flower-bud of a low-growing deciduous shrub, *Capparis spinosa*, which is a native of the south of Europe. It is often grown in English greenhouses, but in warm districts it may be planted in the open garden. It was introduced into Britain about four hundred years ago. In its native home the caper bush flowers from May to December, and the buds are gathered daily and thrown into a mixture of salt and vinegar. They are subsequently removed from this liquid and placed in pure vinegar. Other caper trees are sometimes grown in glass houses: such are *C. amygdalina*, a W. Indian species bearing white flowers, and the violet-flowered *C. odoratissima*.

**Capercaillie**, CAPERCAILLIE, WOOD GROUSE, or COCK OF THE WOODS (*Tetrao urogallus*), a member of the order Galliformes, or game-birds, was found native in Scotland till about 1770. It was then exterminated both there and in Ireland, but was reintroduced into Perthshire in 1838, and has since thriven well. It occurs widely distributed throughout Europe, in the hilly pine forests for which it is naturally adapted, but is especially plentiful in Sweden. The male is an almost uniform blackish-gray above, and black beneath, except for the greenish chest; the female is mottled. As in the allied forms, the males execute an elaborate love dance before the females, and also fight fiercely with one another. The diet consists of young pine shoots, berries, insects, and worms. See J. H. Harvie-Brown's *Capercaillie in Scotland* (1879).

**Cape River**. See COCO.

**Capern**, EDWARD (1819-94), English poet, born at Tiverton, Devonshire. Under the pseudonym of 'the Rural Postman of Bideford,' he published *Poems* (1856), *Ballads and Songs* (1858),

*Devonshire Melodist*, with music (1862), *Wayside Warbles* (1865), *Sun Gleams and Shadow Pearls* (1881), etc., which obtained some appreciative recognition from Landor, Dickens, Kingsley, and Tennyson. See Ormond's *Recollections of Edward Capern* (1860).

**Capernaum**, city on the Sea of Galilee, Palestine, is called Christ's 'own city' (Matt. 9:11). By some writers the city is identified with Tell Hum, on the shore of Gennesaret, by others with Minieh, 6 m. S.W. of Tell Hum.

**Capes**, BERNARD, novelist. Chief works: *The Lake of Wind* (1898); *Adventures of the Comte de la Muette* (1898); *From Door to Door* (1900); *A Castle in Spain*; *The Secret in the Hill* (1903); *Diana Please* (1904); *A Rogue's Tragedy* (1906); and *The Green Parrot* (1908).

**Cape Sable Island**, at the S. extremity of Nova Scotia. Its most southerly point is Cape Sable.

**Capesterre**, LA OR LE MARI-GOT, tn., Guadeloupe, French West Indies, on E. coast of S. division, 12 m. E.N.E. of Basse Terre. Pop. 8,000.

**Capet**, the family name of the third Frankish dynasty, which ruled France in the direct line from 989 to 1328, and through the collateral branches of Valois and Bourbon till the Revolution (1789). See FRANCE—*History of*.

**Capet**, HUGH (c. 938-996), King of France, son of Hugh the Great, Duke of Francia and Count of Paris. The origin of the Capetian house is obscure. It may probably be traced to a Teutonic stock. The Capetians had for long identified themselves with the Western or French portion of the Caroling empire, in particular with Paris and the Ile de France. The defence of Paris against the Northmen in the famous siege of 885 had been the work of

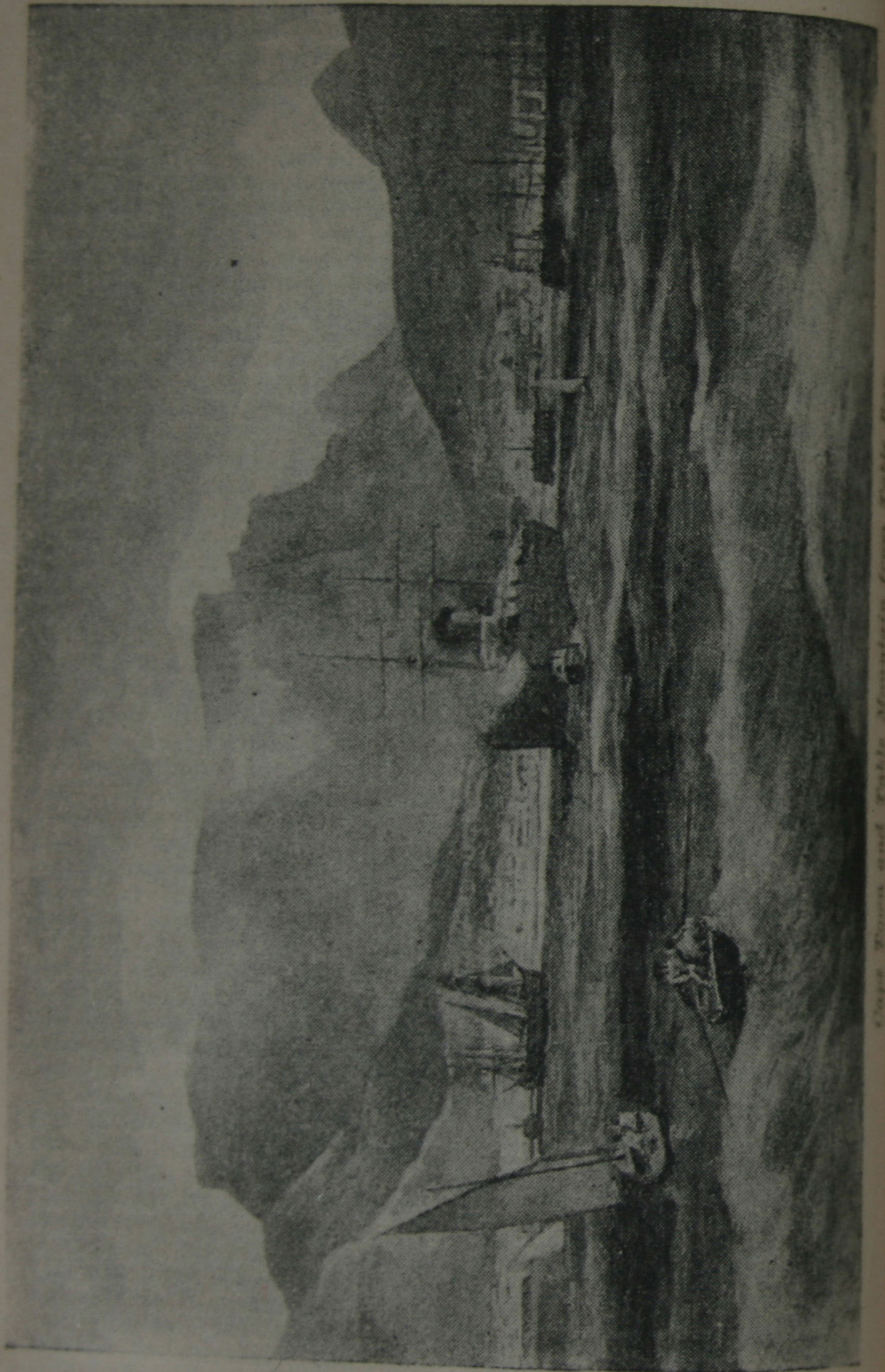
Odo, great-grandfather of Hugh. Hence in the break up of the Caroling empire it was natural that the Western Franks should look to the Capetians for leadership. In his early years Duke Hugh was a kind of mayor of the palace to the Caroling kings; but in 987, on the death of the Caroling Lothair, he was elected king.

Hugh's reign was not remarkable. He married Roxale, widow of the Count of Flanders, and held the emperor and the Church at arm's length; but he was obliged to pay for the support of his feudal neighbours by large gifts of royal domain. He laid, however, the foundations of a dynasty which endured uninter-ruptedly for more than 800 years.

**Cape to Cairo Railway.** The author of this scheme was Cecil J. Rhodes, who conceived the idea of a transcontinental railway which should run as far as possible through British territory, and serve as a link to bind together the various sections of British Africa. The economic value of the line will probably depend almost wholly on the branching side systems. The direct distance between Cairo and Cape Town is about 5,700 m. By the end of 1910 the railhead from the north, but for the river gap between Assouan and Wadi Halfa, was at Sennar (about 1,500 m.). From Cape Town the S. African section had in June 1906 reached Broken Hill (2,017 m.). From this point it is proposed to carry the main line to Lake Tanganyika, while another line into Congo territory is also being constructed. The first through passenger train reached Victoria Falls on June 22, 1904. At these falls the Zambezi is spanned by a cantilever steel bridge, which is the highest bridge in the world (380 ft. above flood

water), the next highest being the Viaduct du Viar, France (375 ft.). It is 650 ft. long, and weighs 1,600 tons. See *Engineering Wonders of the World*, vol. ii. (1909).

**Cape Town**, cap. of the Cape of Good Hope prov. and metropolis of S. Africa, is beautifully situated at the base of Table Mountain, and on the shores of Table Bay. The mist frequently hangs like a tablecloth from the flat summit of Table Mt. Cape Town lies to the N. of the Cape peninsula, which stretches due s. for 18 m. to Cape Point lighthouse. It has a mean annual temperature of 63° F., a maximum of about 100° (January) is sometimes reached, and a minimum of about 34° (July). The yearly rainfall is about 25 inches. The neck of the peninsula is known by the name of the 'Cape Flats,' a sandy, bushy tract, capable, however, of cultivation. On the N. side of the neck lies Table Bay; on the s. the large curve of False Bay, with its minor anchorages of Simon's Bay and Kalk Bay, the latter used especially by Malay fishermen. Table Bay is a bad natural harbour, exposed to the north and north-west gales of winter; but at the expenditure of about five millions of money a good harbour and dock have been constructed. Shipping in the bay is sheltered by a breakwater (3,640 ft. long), and there are wet docks, a dry dock, and a government patent slip. An outer harbour, with minimum depth of 27 ft., is under construction. The town was laid out in the Dutch fashion. Cape Town, which is an episcopalsee, has fine government buildings, an English cathedral, the S. African College, the museum, the library, especially the Grey library, the botanic gardens, and Government House buildings. The university (1873)



*Coast Town and Fells Mountains from Fells Bay*



is only an examining body, with affiliated colleges (809 students in 1908). The observatory (1820) is the finest in the southern hemisphere. There are many and populous suburban districts, such as Woodstock, Maitland, Mowbray, Rosebank, Rondebosch (famed for its college), Newlands, Claremont, and Wynberg on the s., and Green Point and Sea Point on the n. Pop. 80,000, or with suburbs, 170,000.

Cape Town is the seat of the legislature of the Union of South Africa, of the provincial government, and of the provincial division of the Supreme Court of South Africa.

**Cape Verde Islands.** This group lies 320 miles w. of Cape Verde, on the coast of Africa, between  $17^{\circ} 12'$  and  $14^{\circ} 46'$  N. and  $22^{\circ} 40'$  and  $25^{\circ} 22'$  W. Towards the N.E. are Santo Antão (Anthony), São Vicente, Santa Luzia, São Nicolão, Boa Vista, and Sal; while the leeward group, lying E.S.E. by W.S.W., includes Maio, São Thiago (Santiago), Fogo, and Brava. The area is 1,480 sq. m. The islands are in general volcanic, and are separated from one another by deep passages. Seen from the sea they present an arid and uninviting appearance; but the inland valleys, especially in years of abundant rainfall, are clothed with verdure. From November to July the north-east wind renders the atmosphere fresh and the climate healthy; from August to October is the rainy season. The harattan blows chiefly during January and February. Fogo, São Thiago, and Santo Antão are the most mountainous, the first rising to 9,500 ft. São Vicente owes its importance to its fine harbour of Porto Grande, which is used as a coaling station. São Thiago is the largest island, and the most important. Coffee is the chief crop, and hardly less

important is the physic nut (*Jatropha curcas*) and millet. The native industries are the making of straw hats, lace, and embroidery.

Discovered by Cadamosto in 1456, and colonized by Prince Ferdinand, to whom they were granted in 1562, the Cape Verde Islands still belong to the Portuguese crown, and are administered by a governor residing at Porto Praia, in São Thiago. The inhabitants are chiefly mulattoes and negroes, with a sprinkling of Portuguese. Pop. 150,000.

**Capgrave, JOHN** (1393-1464), English theologian, historian, and Augustinian friar, born at Lynn. His works in Latin include *Bible Commentaries*, the *Nova Legenda Angliæ* (1516), *Vita Humfredi Ducis Glocestriæ*; and in English, *A Chronicle of England from the Creation to A.D. 1417*, also a metrical *Life of St. Katharine* (Early English Text Society 1893). See 'Rolls Series' (1858).

**Capias** (lit. 'thou mayest seize'), the short name of several writs directed to the sheriff requiring him to arrest the person named therein. They have been superseded for most purposes by the writ of attachment.

**Capillaries**, the most minute of the blood-vessels, receive their name from their hair's-breadth diameters. They are the channels connecting arteries with veins. Their walls are of fine, nucleated epithelial cells, placed edge to edge. The blood moves at its slowest in the capillaries, and in the case of inflammation of any part the white blood corpuscles pass through their walls. See CIRCULATION OF THE BLOOD.

**Capillarity.** Inside a wide tube water rises practically to the same level as it attains outside. In a narrow tube it rises to a different level. Phenomena of this kind are called capillary phenomena, since they are evident in narrow,

hairlike tubes only. This seems to be in contradiction to hydrostatical principles, but the contradiction is only apparent. The explanation lies in the existence of tension in the surface layers of a liquid. Many facts make the existence of this tension evident, notably the spontaneous contraction of liquid films, such as soap films. Now, any film which tends to contract tends to become plane if free to do so; and if kept curved, it presses towards the concave side. This explains the tendency of a drop of liquid to become spherical. The surface becomes as small as possible consistent with the condition of holding a given amount of liquid, and the sphere is the smallest surface enclosing a given volume. Again, a liquid which rises in a capillary tube is observed to be always concave upwards. Hence there is less pressure in the interior of the liquid immediately below the surface than there is above. That is to say, the pressure just below is less than the atmospheric pressure; and the atmospheric pressure is reached *inside the tube* only at some distance below the surface. But outside the tube, at the surface of the liquid the pressure is atmospheric. Hence, by hydrostatic principles, the liquid must rise in the tube until the hydrostatic condition is satisfied.

The reason for the water climbing up the sides of a glass tube, so as to make the surface concave upwards, lies in the greater attraction of water to glass than of water to water. If in any liquid the attraction of liquid for liquid exceeded that of liquid for solid, the surface would become concave downwards, and the liquid would not rise so high inside as outside the tube. This occurs, for example, in the case of mercury in a glass tube.

For further information see *Soap-Bubbles, and the Forces*

*which Mould Them* (1890), by C. V. Boys; the chapter on capillarity in J. C. Maxwell's *Theory of Heat* (1870); and the chapter on cohesion and capillarity in Tait's *Properties of Matter* (1885), should be consulted.

**Capistrano, GIOVANNI** (1385-1456), Italian Franciscan preacher, born at Capistrano in the Abruzzi, entered the Franciscan order in 1416. He preached against the Fratricelli and other heretical orders in Italy, and, along with Bernhardin of Siena, helped to reform his order. Twice vicar-general, his eloquence won back to the church many Hussites of Moravia, to which country he was sent as papal legate in 1451. In Silesia he incited a persecution of the Jews, several of whom were burned. After the capture of Constantinople he preached a crusade against the Turks. In 1456 he conducted 40,000 Christians to Belgrade, to the assistance of John Hunyady, and largely contributed to deliver that town from the Turks. He was canonized (1724). His chief work is a treatise on the *Authority of Pope and Council* (1580). See E. Jacob's *Johannes von Capistrano* (1903).

**Capital**, in architecture. See COLUMN.

**Capital**, in economics, has been defined as that portion of a man's wealth from which he derives, or expects to derive, an income. But economists employ the term with an attempt at greater precision. It is generally agreed that the conception of capital involves an element, as it has been called, of *prospectiveness*, and also an element of *productivity*. Different writers have laid special stress on the one or the other of these characteristics. A regard for the future rather than the immediate present obviously leads to the accumulation and employment of capital; an increase of wealth is no less mani-

festly the result of such action. Capital has sometimes been classified as *fixed* and *circulating*. Fixed capital is embodied in a more permanent form, and fulfils its functions by repeated use. Circulating capital, on the contrary, is continually changing its shape or ownership. Machinery furnishes a conspicuous example of the first kind; materials transformed into manufactured goods are a typical illustration of the second. The distinction is one of degree rather than kind: for the most durable capital perishes in time; and, to some extent at least, all capital is continually being consumed and reproduced. Another classification of capital has been based on the fact that it may be found in a form to satisfy wants either directly or indirectly. It may be what has been called *consumption* capital, or what has been termed *auxiliary* capital. When goods are made in anticipation of demand, when elaborate machinery is used to produce a great variety of distinct patterns, when a large number of workers of different degrees of skill and strength are collected in one building, the work of organization and direction grows more arduous and prominent; and the employer to whom this special duty falls has been separated by recent economists from the capitalist, who, whether distinct from or identical with him, furnishes the capital needed. Yet the development of the scale and the increasing elaboration and diversity of the methods of production have augmented greatly the utility and importance of capital; and, although socialist writers have tended to ignore the separate work and depreciate the distinct influence of the employer, they have not been wrong in associating the rise of the factory system with the greater dominance of capital. They have

rightly maintained that, divorced from the possession or command of capital, the labourer is, under modern conditions, helpless in the production of wealth; they have wrongly regarded the capitalist as led by forces—which as an individual he cannot resist—to deprive the labourer of more than the bare pittance of wages needed to sustain life, and to secure for himself an increasing product not due to his own action. Not content, therefore, with nationalizing land, modern socialists (or collectivists) would also abolish individual property in the instruments of production (or, in other words, in capital). But it is none the less true that capital and labour cannot, under modern conditions, dispense with the services of each other, and that they are jointly interested in increasing the total amount of wealth produced, from which their shares, be they respectively larger or smaller, must ultimately come.

The Austrian economist E. von Böhm-Bawerk has examined with great detail the history of the term, in his *Capital and Interest* (1890) and his *Positive Theory of Capital* (1891), both translated into English. Karl Marx's *Capital* (trans. 1887) is an elaborate account of the supposed exploitation of labour by capital. He has been criticized by Böhm-Bawerk, and, among others, by J. Rae, in his *Contemporary Socialism* (1901). See also Clarke's *Distribution of Wealth* (1902); Cunningham's *Use and Abuse of Money* (1891); Giffen's *Growth of Capital* (1889); Smart's *Distribution of Income* (1899); and Mallock's *Critical Examination of Socialism* (1908).

In 1903 Sir Robert Giffen estimated the capital of the United Kingdom at £15,000,000,000. For detailed and comparative tables of national wealth, see WEALTH. See also under TRUSTS.

I.—*Joint-Stock Companies registered in the United Kingdom  
1862-1909.*

Year.	Total Number of Companies.	Total Nominal Share-Capital. Millions of £.	Average Share Capital per Company.
1862 (Oct. 3-Dec. 31)	165	57·0	£345,450
1865	1,034	205·4	200,000
1869	475	*41·3	87,000
Annual Average			
1870-4	1,001	100·7	100,600
1880-4	1,564	188·0	120,000
1890-4	2,734	138·3	50,500
1900	4,966	221·8	44,600
1901	3,433	144·7	42,000
1902	3,929	157·0	40,000
1903	4,075	126·6	31,000
1904	3,831	92·5	24,000
1905	4,358	119·2	27,343
1906	4,840	136·7	28,252
1907	5,265	137·9	26,953
1908	5,024	104·4	20,788
1909	6,373	141·6	22,223

\* Excluding a company floated with a registered capital of £100,000,000, of which the paid-up capital never appears to have exceeded £200.

II.—*Number and paid-up capital (including amounts considered as paid on vendors' shares) of registered companies believed to be carrying on business at the undermentioned dates.*

Year.	Number of Companies.	Paid-up Capital.	Increase of Capital during previous Year.
April 1885	9,344	£494,900,000	...
„ 1890	13,323	775,100,000	£103,200,000
„ 1891	14,873	891,500,000	116,400,000
„ 1895	19,430	1,062,700,000	27,700,000
„ 1896	21,223	1,145,400,000	82,700,000
„ 1900	29,730	1,622,600,000	110,500,000
„ 1901	31,429	1,725,900,000	103,300,000
„ 1902	33,259	1,805,100,000	79,200,000
„ 1903	35,965	1,849,500,000	44,400,000
„ 1904	37,287	1,899,600,000	40,100,000
„ 1905	39,616	1,954,300,000	54,700,000
„ 1906	40,995	2,003,400,000	49,100,000
„ 1907	43,038	2,061,000,000	57,600,000
„ 1908	45,304	2,123,500,000	62,500,000
„ 1909	46,474	2,163,100,000	39,600,000