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THE ENCYCLOPÆDIA BRITANNICA

A DICTIONARY OF ARTS, SCIENCES, LITERATURE AND GENERAL INFORMATION

ELEVENTH EDITION

VOLUME V SLICE I

Calhoun to Camoens

Articles in This Slice

CALHOUN, JOHN CALDWELL (1782-1850), American statesman and parliamentarian, was born, of Scottish-Irish descent, in Abbeville District, South Carolina, on the 18th of March 1782. His father, Patrick Calhoun, is said to have been born in Donegal, in North Ireland, but to have left Ireland when a mere child. The family seems to have emigrated first to Pennsylvania, whence they removed, after Braddock's defeat, to Western Virginia. From Virginia they removed in 1756 to South Carolina and settled on Long Cane Creek, in Granville (now Abbeville) county. Patrick Calhoun attained some prominence in the colony, serving in the colonial legislature, and afterwards in the state legislature, and taking part in the War of Independence. In 1770 he had married Martha Caldwell, the daughter of another Scottish-Irish settler.

The opportunities for obtaining a liberal education in the remote districts of South Carolina at that time were scanty. Fortunately, young Calhoun had the opportunity, although late, of studying under his brother-in-law, the Rev. Moses Waddell (1770-1840), a Presbyterian minister, who afterwards, from 1819 to 1829, was president of the University of Georgia. In 1802 Calhoun entered the junior class in Yale College, and graduated with distinction in 1804. He then studied first at the famous law school in Litchfield, Conn., and afterwards in a law office in Charleston, S.C., and in 1807 was admitted to the bar. He began practice in his native Abbeville District, and soon took a leading place in his profession. In 1808 and 1809 he was a member of the South Carolina legislature, and from 1811 to 1817 was a member of the national House of Representatives.

When he entered the latter body the strained relations between Great Britain and the United States formed the most important question for the deliberation of Congress. Henry Clay, the Speaker of the House, being eager for war and knowing Calhoun's hostility to Great Britain, gave him the second place on the committee of foreign affairs, of which he soon became the actual head. In less than three weeks the committee reported resolutions, evidently written by Calhoun, recommending preparations for a struggle with Great Britain; and in the following June Calhoun submitted a second report urging a formal declaration of war. Both sets of resolutions the House adopted. Clay and Calhoun did more, probably, than any other two men in Congress to force the reluctant president into beginning hostilities.

In 1816 Calhoun delivered in favour of a protective tariff a speech that was ever after held up by his opponents as evidence of his inconsistency in the tariff controversy. The embargo and the war had crippled American commerce, but had stimulated manufactures. With the end of the Napoleonic wars in Europe the industries of the old world revived, and Americans began to feel their competition. In the consequent distress in the new industrial centres there arose a cry for protection. Calhoun, believing that there was a natural tendency in the United States towards the development of manufactures, supported the Tariff Bill of 1816, which laid on certain foreign commodities duties higher than were necessary for the purposes of revenue. He believed that the South would share in the general industrial development, not having perceived as yet that slavery was an insuperable obstacle. His opposition to protection in later years resulted from an honest change of convictions. He always denied that in supporting this bill he had been inconsistent, and insisted that it was one for revenue.

From 1817 to 1825 Calhoun was secretary of war under President Monroe. To him is due the fostering and the reformation of the National Military Academy at West Point, which he found in disorder, but left in a most efficient state. Calhoun was vice-president of the United States from 1825 to 1832, during the administration of John Quincy Adams, and during most of the first administration of Andrew Jackson. This period was for Calhoun a time of reflection. His faith in a strong nationalistic policy was gradually undermined, and he finally became the foremost champion of particularism and the recognized leader of what is generally known as the "States Rights" or "Strict Construction" party.

In 1824 there was a very large increase in protective duties. In 1828 a still higher tariff act, the so-called "Bill of Abominations," was passed, avowedly for the purpose of protection. The passage of these acts caused great discontent, especially among the Southern states, which were strictly agricultural. They felt that the great burden of this increased tariff fell on them, as they consumed, but did not produce, manufactured articles. Under such conditions the Southern states questioned the constitutionality of the imposition. Calhoun himself now perceived that the North and the South represented diverse tendencies. The North was outstripping the South in population and wealth, and already by the tariff acts was, as he believed, selfishly levying taxes for its sole benefit. The minority must, he insisted, be protected from "the tyranny of the majority." In his first important political essay, "The South Carolina Exposition," prepared by him in the summer of 1828, he showed how this should be done. To him it was clear that the Federal Constitution was a limited instrument, by which the sovereign states had delegated to the Federal government certain general powers. The states could not, without violating the constitutional compact, interfere with the activities of the Federal government so long as the government confined itself to its proper sphere; but the attempt of Congress, or any other department of the Federal government, to exercise any power which might alter the nature of the instrument would be an act of usurpation. The right of judging such an infraction belonged to the state, being an attribute of sovereignty of which the state could not be deprived without being reduced to a wholly subordinate condition. As a remedy for such a breach of compact the state might resort to nullification (*q.v.*), or, as a last resort, to secession from the Union. Such doctrines were not original with Calhoun, but had been held in various parts of the Union from time to time. It remained for him, however, to submit them to a rigid analysis and reduce them to a logical form.

Meantime the friendship between Calhoun and Jackson had come to an end. While a member of President Monroe's cabinet, Calhoun had favoured the reprimanding of General Jackson (*q.v.*) for his high-handed course in Florida in 1818, during the first Seminole War. In 1831 W.H. Crawford, who had been a member of this cabinet, desiring to ruin Calhoun politically by turning Jackson's hostility against him, revealed to Jackson what had taken place thirteen years before. Jackson could brook no criticism from one whom he had considered a friend; Calhoun, moreover, angered the president still further by his evident sanction of the social proscription of Mrs Eaton (*q.v.*); the political views of the two men, furthermore, were becoming more and more divergent, and the rupture between the two became complete.

The failure of the Jackson administration to reduce the Tariff of 1828 drew from Calhoun his "Address to the People of South Carolina" in 1831, in which he elaborated his views of the nature of the Union as given in the "Exposition." In 1832 a new tariff act was passed, which removed the "abominations" of 1828 but left the principle of protection intact. The people of South Carolina were not satisfied, and Calhoun in a third political tract, in the form of a letter to Governor James Hamilton (1786-1857) of South Carolina, gave his doctrines their final form, but without altering the fundamental principles that have already been stated.

In 1832 South Carolina, acting in substantial accordance with Calhoun's theories, "nullified" the tariff acts passed by Congress in 1828 and 1832 (see Nullification; South Carolina; and United States). On the 28th of December 1832 Calhoun resigned as vice-president, and on the 4th of January 1833 took his seat in the Senate. President Jackson had, in a special message, taken strong ground against the action of South Carolina, and a bill was introduced to extend the jurisdiction of the courts of the United States and clothe the president with additional powers, with the avowed object of meeting the situation in South Carolina. Calhoun, in turn, introduced resolutions upholding the doctrine held by South Carolina, and it was in the debate on the first-named measure, termed the "Force Bill," and on these resolutions, that the first intellectual duel took place between Daniel Webster and Calhoun. Webster declared that the Federal government through the Supreme Court was the ultimate expounder and interpreter of its own powers, while Calhoun championed the rights of the individual state under a written contract which reserved to each state its sovereignty.

The practical result of the conflict over the tariff was a compromise. Congress passed an act gradually reducing the duties to a revenue basis, and South Carolina repealed her nullification measures. As the result of the conflict, Calhoun was greatly strengthened in his position as the leader of his party in the South. Southern leaders generally were now beginning to perceive, as Calhoun had already seen, that there was a permanent conflict between the North and the South, not only a divergence of interests between manufacturing and agricultural sections, but an inevitable struggle between free and slave labour. Should enough free states be

admitted into the Union to destroy the balance of power, the North would naturally gain a preponderance in the Senate, as it had in the House, and might, within constitutional limits, legislate as it pleased. The Southern minority recognized, therefore, that they must henceforth direct the policy of the government in all questions affecting their peculiar interests, or their section would undergo a social and economic revolution. The Constitution, if strictly interpreted according to Calhoun's views, would secure this control to the minority, and prevent an industrial upheaval.

An element of bitterness was now injected into the struggle. The Northern Abolitionists, to whom no contract or agreement was sacred that involved the continuance of slavery, regarded the clauses in the Federal Constitution which maintained the property rights of the slave-owners as treaties with evil, binding on no one, and bitterly attacked the slave-holders and the South generally. Their attacks may be said to have destroyed the moderate party in that section. Any criticism of their peculiar institution now came to be highly offensive to Southern leaders, and Calhoun, who always took the most advanced stand in behalf of Southern rights, urged (but in vain) that the Senate refuse to receive abolitionist petitions. He also advocated the exclusion of abolitionist literature from the mails.

Indeed from 1832 until his death Calhoun may be said to have devoted his life to the protection of Southern interests. He became the exponent, the very embodiment, of an idea. It is a mistake, however, to characterize him as an enemy to the Union. His contention was that its preservation depended on the recognition of the rights guaranteed to the states by the Constitution, and that aggression by one section could only end in disruption. Secession, he contended, was the only final remedy left to the weaker. Calhoun was re-elected to the Senate in 1834 and in 1840, serving until 1843. From 1832 to 1837 he was a man without a party. He attacked the "spoils system" inaugurated by President Jackson, opposed the removal of the government deposits from the Bank of the United States, and in general was a severe critic of Jackson's administration. In this period he usually voted with the Whigs, but in 1837 he went over to the Democrats and supported the "independent treasury" scheme of President Van Buren. He was spoken of for the presidency in 1844, but declined to become a candidate, and was appointed as secretary of state in the cabinet of President Tyler, serving from the 1st of April 1844, throughout the remainder of the term, until the 10th of March 1845. While holding this office he devoted his energies chiefly to the acquisition of Texas, in order to preserve the equilibrium between the South and the constantly growing North. One of his last acts as secretary of state was to send a despatch, on the 3rd of March 1845, inviting Texas to accept the terms proposed by Congress. Calhoun was once more elected to the Senate in 1845. The period of his subsequent service covered the settlement of the Oregon dispute with Great Britain and the Mexican War. On the 19th of February 1847 he introduced in the Senate a series of resolutions concerning the territory about to be acquired from Mexico, which marked the most advanced stand as yet taken by the pro-slavery party. The purport of these resolutions was to deny to Congress the power to prohibit slavery in the territories and to declare all previous enactments to this effect unconstitutional.

In 1850 the Union seemed in imminent danger of dissolution. California was applying for admission to the Union as a state under a constitution which did not permit slavery. Her admission with two Senators would have placed the slave-holding states in the minority. In the midst of the debate on this application Calhoun died, on the 31st of March 1850, in Washington.

Calhoun is most often compared with Webster and Clay. The three constitute the trio upon whom the attention of students at this period naturally rests. Calhoun possessed neither Webster's brilliant rhetoric nor his easy versatility, but he surpassed him in the ordered method and logical sequence of his mind. He never equalled Clay in the latter's magnetism of impulse and inspiration of affection, but he far surpassed him in clearness and directness and in tenacity of will. He surpassed them both in the distinctness with which he saw results, and in the boldness with which he formulated and followed his conclusions.

Calhoun in person was tall and slender, and in his later years was emaciated. His features were angular and somewhat harsh, but with a striking face and very fine eyes of a brilliant dark blue. To his slaves he was just and kind. He lived the modest, unassuming life of a country planter when at his home, and at Washington lived as unostentatiously as possible, consistent with his public duties and position. His character in other respects was always of stainless integrity.

Bibliography.—A collected edition of Calhoun's *Works* (6 vols., New York, 1853-1855) has been edited by Richard K. Crallé. The most important speeches and papers are:—*The South Carolina Exposition* (1828); *Speech on the Force Bill* (1833); *Reply to Webster* (1833); *Speech on the Reception of Abolitionist Petitions* (1836), *and on the Veto Power* (1842); a *Disquisition on Government,* and a *Discourse on the Constitution and Government of the United States* (1849-1850)—the last two, written a short time before his death, defend with great ability the rights of a minority under a government such as that of the United States. Calhoun's *Correspondence*, edited by J. Franklin Jameson, has been published by the American Historical Association (see *Report* for 1899, vol. ii.). The biography of Calhoun by Dr Hermann von Holst in the "American Statesmen Series" (Boston, 1882) is a condensed study of the political questions of Calhoun's time. Gustavus M. Pinckney's *Life of John C. Calhoun* (Charleston, 1903) gives a sympathetic Southern view. Gaillard Hunt's *John C. Calhoun* (Philadelphia, 1908) is a valuable work.

(H. A. M. S.)

CALI, an inland town of the department of Cauca, Colombia, South America, about 180 m. S.W. of Bogotá and 50 m. S.E. of the port of Buenaventura, on the Rio Cali, a small branch of the Cauca. Pop. (1906 estimate) 16,000. Cali stands 3327 ft. above sea-level on the western side of the Cauca valley, one of the healthiest regions of Colombia. The land-locked character of this region greatly restricts the city's trade and development; but it is considered the most important town in the department. It has a bridge across the Cali, and a number of religious and public edifices. A railway from Buenaventura will give Cali and the valley behind it, with which it is connected by over 200 m. of river navigation, a good outlet on the Pacific coast. Coal deposits exist in the immediate vicinity of the town.

CALIBRATION, a term primarily signifying the determination of the “calibre” or bore of a gun. The word *calibre* was introduced through the French from the Italian *calibro*, together with other terms of gunnery and warfare, about the 16th century. The origin of the Italian equivalent appears to be uncertain. It will readily be understood that the calibre of a gun requires accurate adjustment to the standard size, and further, that the bore must be straight and of uniform diameter throughout. The term was subsequently applied to the accurate measurement and testing of the bore of any kind of tube, especially those of thermometers.

In modern scientific language, by a natural process of transition, the term “calibration” has come to denote the accurate comparison of any measuring instrument with a standard, and more particularly the determination of the errors of its scale. It is seldom possible in the process of manufacture to make an instrument so perfect that no error can be discovered by the most delicate tests, and it would rarely be worth while to attempt to do so even if it were possible. The cost of manufacture would in many cases be greatly increased without adding materially to the utility of the apparatus. The scientific method, in all cases which admit of the subsequent determination and correction of errors, is to economize time and labour in production by taking pains in the subsequent verification or calibration. This process of calibration is particularly important in laboratory research, where the observer has frequently to make his own apparatus, and cannot afford the time or outlay required to make special tools for fine work, but is already provided with apparatus and methods of accurate testing. For non-scientific purposes it is generally possible to construct instruments to measure with sufficient precision without further correction. The present article will therefore be restricted to the scientific use and application of methods of accurate testing.

General Methods and Principles.—The process of calibration of any measuring instrument is frequently divisible into two parts, which differ greatly in importance in different cases, and of which one or the other may often be omitted. (1) The determination of the value of the unit to which the measurements are referred by comparison with a standard unit of the same kind. This is often described as the *Standardization* of the instrument, or the determination of the *Reduction factor*. (2) The verification of the accuracy of the subdivision of the scale of the instrument. This may be termed calibration of the scale, and does not necessarily involve the comparison of the instrument with any independent standard, but merely the verification of the accuracy of the relative values of its indications. In many cases the process of calibration adopted consists in the comparison of the instrument to be tested with a standard over the whole range of its indications, the relative values of the subdivisions of the standard itself having been previously tested. In this case the distinction of two parts in the process is unnecessary, and the term calibration is for this reason frequently employed to include both. In some cases it is employed to denote the first part only, but for greater clearness and convenience of description we shall restrict the term as far as possible to the second meaning.

The methods of standardization or calibration employed have much in common even in the cases that appear most diverse. They are all founded on the axiom that “things which are equal to the same thing are equal to one another.” Whether it is a question of comparing a scale with a standard, or of testing the equality of two parts of the same scale, the process is essentially one of interchanging or substituting one for the other, the two things to be compared. In addition to the things to be tested there is usually required some form of balance, or comparator, or gauge, by which the equality may be tested. The simplest of such comparators is the instrument known as the *callipers*, from the same root as calibre, which is in constant use in the workshop for testing equality of linear dimensions, or uniformity of diameter of tubes or rods. The more complicated forms of optical comparators or measuring machines with scales and screw adjustments are essentially similar in principle, being finely adjustable gauges to which the things to be compared can be successively fitted. A still simpler and more accurate comparison is that of volume or capacity, using a given mass of liquid as the gauge or test of equality, which is the basis of many of the most accurate and most important methods of calibration. The common balance for testing equality of mass or weight is so delicate and so easily tested that the process of calibration may frequently with advantage be reduced to a series of weighings, as for instance in the calibration of a burette or measure-glass by weighing the quantities of mercury required to fill it to different marks. The balance may, however, be regarded more broadly as the type of a general method capable of the widest application in accurate testing. It is possible, for instance, to balance two electromotive forces or two electrical resistances against each other, or to measure the refractivity of a gas by balancing it against a column of air adjusted to produce the same retardation in a beam of light. These “equilibrium,” or “null,” or “balance” methods of comparison afford the most accurate measurements, and are generally selected if possible as the basis of any process of calibration. In spite of the great diversity in the nature of things to be compared, the fundamental principles of the methods employed are so essentially similar that it is possible, for instance, to describe the testing of a set of weights, or the calibration of an electrical resistance-box, in almost the same terms, and to represent the calibration correction of a mercury thermometer or of an ammeter by precisely similar curves.

Method of Substitution.—In comparing two units of the same kind and of nearly equal magnitude, some variety of the general method of substitution is invariably adopted. The same method in a more elaborate form is employed in the calibration of a series of multiples or submultiples of any unit. The details of the method depend on the system of subdivision adopted, which is to some extent a matter of taste. The simplest method of subdivision is that on the binary scale, proceeding by multiples of 2. With a pair of submultiples of the smallest denomination and one of each of the rest, thus 1, 1, 2, 4, 8, 16, &c., each weight or multiple is equal to the sum of all the smaller weights, which may be substituted for it, and the small difference, if any, observed. If we call the weights A, B, C, &c., where each is approximately double the following weight, and if we write a for observed excess of A over the rest of the weights, b for that of B over C + D + &c., and so on, the observations by the method of substitution give the series of equations,

$$A - \text{rest} = a,\ B - \text{rest} = b,\ C - \text{rest} = c,\ \&c. \qquad (1)$$

Subtracting the second from the first, the third from the second, and so on, we obtain at once the value of each weight in terms of the preceding, so that all may be expressed in terms of the largest, which is most conveniently taken as the standard

$$B = A/2 + (b - a)/2,\ C = B/2 + (c - b)2,\ \&c. \qquad (2)$$

The advantages of this method of subdivision and comparison, in addition to its extreme simplicity, are (1) that there is only one possible combination to represent any given weight within the range of the series; (2) that the least possible number of weights is required to cover any given range; (3) that the smallest number of

substitutions is required for the complete calibration. These advantages are important in cases where the accuracy of calibration is limited by the constancy of the conditions of observation, as in the case of an electrical resistance-box, but the reverse may be the case when it is a question of accuracy of estimation by an observer.

In the majority of cases the ease of numeration afforded by familiarity with the decimal system is the most important consideration. The most convenient arrangement on the decimal system for purposes of calibration is to have the units, tens, hundreds, &c., arranged in groups of four adjusted in the proportion of the numbers 1, 2, 3, 4. The relative values of the weights in each group of four can then be determined by substitution independently of the others, and the total of each group of four, making ten times the unit of the group, can be compared with the smallest weight in the group above. This gives a sufficient number of equations to determine the errors of all the weights by the method of substitution in a very simple manner. A number of other equations can be obtained by combining the different groups in other ways, and the whole system of equations may then be solved by the method of least squares; but the equations so obtained are not all of equal value, and it may be doubted whether any real advantage is gained in many cases by the multiplication of comparisons, since it is not possible in this manner to eliminate constant errors or personal equation, which are generally aggravated by prolonging the observations. A common arrangement of the weights in each group on the decimal system is 5, 2, 1, 1, or 5, 2, 2, 1. These do not admit of the independent calibration of each group by substitution. The arrangement 5, 2, 1, 1, 1, or 5, 2, 2, 1, 1, permits independent calibration, but involves a larger number of weights and observations than the 1, 2, 3, 4, grouping. The arrangement of ten equal weights in each group, which is adopted in “dial” resistance-boxes, and in some forms of chemical balances where the weights are mechanically applied by turning a handle, presents great advantages in point of quickness of manipulation and ease of numeration, but the complete calibration of such an arrangement is tedious, and in the case of a resistance-box it is difficult to make the necessary connexions. In all cases where the same total can be made up in a variety of ways, it is necessary in accurate work to make sure that the same weights are always used for a given combination, or else to record the actual weights used on each occasion. In many investigations where time enters as one of the factors, this is a serious drawback, and it is better to avoid the more complicated arrangements. The accurate adjustment of a set of weights is so simple a matter that it is often possible to neglect the errors of a well-made set, and no calibration is of any value without the most scrupulous attention to details of manipulation, and particularly to the correction for the air displaced in comparing weights of different materials. Electrical resistances are much more difficult to adjust owing to the change of resistance with temperature, and the calibration of a resistance-box can seldom be neglected on account of the changes of resistance which are liable to occur after adjustment from imperfect annealing. It is also necessary to remember that the order of accuracy required, and the actual values of the smaller resistances, depend to some extent on the method of connexion, and that the box must be calibrated with due regard to the conditions under which it is to be used. Otherwise the method of procedure is much the same as in the case of a box of weights, but it is necessary to pay more attention to the constancy and uniformity of the temperature conditions of the observing-room.

Method of Equal Steps.—In calibrating a continuous scale divided into a number of divisions of equal length, such as a metre scale divided in millimetres, or a thermometer tube divided in degrees of temperature, or an electrical slide-wire, it is usual to proceed by a method of equal steps. The simplest method is that known as the method of Gay Lussac in the calibration of mercurial thermometers or tubes of small bore. It is essentially a method of substitution employing a column of mercury of constant volume as the gauge for comparing the capacities of different parts of the tube. A precisely similar method, employing a pair of microscopes at a fixed distance apart as a standard of length, is applicable to the calibration of a divided scale. The interval to be calibrated is divided into a whole number of equal steps or sections, the points of division at which the corrections are to be determined are called *points of calibration.*

Calibration of a Mercury Thermometer.—To facilitate description, we will take the case of a fine-bore tube, such as that of a thermometer, to be calibrated with a thread of mercury. The bore of such a tube will generally vary considerably even in the best standard instruments, the tubes of which have been specially drawn and selected. The correction for inequality of bore may amount to a quarter or half a degree, and is seldom less than a tenth. In ordinary chemical thermometers it is usual to make allowance for variations of bore in graduating the scale, but such instruments present discontinuities of division, and cannot be used for accurate work, in which a finely-divided scale of equal parts is essential. The calibration of a mercury thermometer intended for work of precision is best effected after it has been sealed. A thread of mercury of the desired length is separated from the column. The exact adjustment of the length of the thread requires a little manipulation. The thermometer is inverted and tapped to make the mercury run down to the top of the tube, thus collecting a trace of residual gas at the end of the bulb. By quickly reversing the thermometer the bubble passes to the neck of the bulb. If the instrument is again inverted and tapped, the thread will probably break off at the neck of the bulb, which should be previously cooled or warmed so as to obtain in this manner, if possible, a thread of the desired length. If the thread so obtained is too long or not accurate enough, it is removed to the other end of the tube, and the bulb further warmed till the mercury reaches some easily recognized division. At this point the broken thread is rejoined to the mercury column from the bulb, and a microscopic bubble of gas is condensed which generally suffices to determine the subsequent breaking of the mercury column at the same point of the tube. The bulb is then allowed to cool till the length of the thread above the point of separation is equal to the desired length, when a slight tap suffices to separate the thread. This method is difficult to work with short threads owing to deficient inertia, especially if the tube is very perfectly evacuated. A thread can always be separated by local heating with a small flame, but this is dangerous to the thermometer, it is difficult to adjust the thread exactly to the required length, and the mercury does not run easily past a point of the tube which has been locally heated in this manner.

Having separated a thread of the required length, the thermometer is mounted in a horizontal position on a suitable support, preferably with a screw adjustment in the direction of its length. By tilting or tapping the instrument the thread is brought into position corresponding to the steps of the calibration successively, and its length in each position is carefully observed with a pair of reading microscopes fixed at a suitable distance apart. Assuming that the temperature remains constant, the variations of length of the thread are inversely as the variations of cross-section of the tube. If the length of the thread is very nearly equal to one step, and if the tube is nearly uniform, the average of the observed lengths of the thread, taking all the steps throughout the interval, is equal to the length which the thread should have occupied in each position had the bore been uniform throughout and all the divisions equal. The error of each step is therefore found by subtracting the average length from the observed length in each position. Assuming that the ends of the interval itself are correct, the correction to be applied at any point of calibration to reduce the readings to a uniform tube and scale, is found by taking the sum of the errors of the steps up to the point considered with the sign reversed.

TABLE I.—*Calibration by Method of Gay Lussac.*

No. of Step.	1	2	3	4	5	6	7	8	9	10
Ends of thread. {	+.010	−.016	−.020	−.031	+.016	+.008	+.013	+.017	+.004	−.088
	+.038	+.017	−.003	−.022	+.010	+.005	+.033	+.018	+.013	−.003
Excess-Length	−.028	−.033	−.017	−.009	+.006	−.003	−.020	−.001	−.004	+.005
Error of step.	−17.6	−22.6	− 6.6	+ 1.4	+16.4	+ 7.4	− 9.6	+ 9.4	+ 6.4	+15.4
Correction.	+17.6	+40.2	+46.8	+45.4	+29.0	+21.6	+31.2	+21.8	+15.4	0

In the preceding example of the method an interval of ten degrees is taken, divided into ten steps of 1° each. The distances of the ends of the thread from the nearest degree divisions are estimated by the aid of micrometers to the thousandth of a degree. The error of any one of these readings probably does not exceed half a thousandth, but they are given to the nearest thousandth only. The excess length of the thread in each position over the corresponding degree is obtained by subtracting the second reading from the first. Taking the average of the numbers in this line, the mean excess-length is -10.4 thousandths. The error of each step is found by subtracting this mean from each of the numbers in the previous line. Finally, the corrections at each degree are obtained by adding up the errors of the steps and changing the sign. The errors and corrections are given in thousandths of 1°.

Complete Calibration.—The simple method of Gay Lussac does very well for short intervals when the number of steps is not excessive, but it would not be satisfactory for a large range owing to the accumulation of small errors of estimation, and the variation of the personal equation. The observer might, for instance, consistently over-estimate the length of the thread in one half of the tube, and under-estimate it in the other. The errors near the middle of the range would probably be large. It is evident that the correction at the middle point of the interval could be much more accurately determined by using a thread equal to half the length of the interval. To minimize the effect of these errors of estimation, it is usual to employ threads of different lengths in calibrating the same interval, and to divide up the fundamental interval of the thermometer into a number of subsidiary sections for the purpose of calibration, each of these sections being treated as a step in the calibration of the fundamental interval. The most symmetrical method of calibrating a section, called by C.E. Guillaume a “Complete Calibration,” is to use threads of all possible lengths which are integral multiples of the calibration step. In the example already given nine different threads were used, and the length of each was observed in as many positions as possible. Proceeding in this manner the following numbers were obtained for the excess-length of each thread in thousandths of a degree in different positions, starting in each case with the beginning of the thread at 0°, and moving it on by steps of 1°. The observations in the first column are the excess-lengths of the thread of 1° already given in illustration of the method of Gay Lussac. The other columns give the corresponding observations with the longer threads. The simplest and most symmetrical method of solving these observations, so as to find the errors of each step in terms of the whole interval, is to obtain the differences of the steps in pairs by subtracting each observation from the one above it. This method eliminates the unknown lengths of the threads, and gives each observation approximately its due weight. Subtracting the observations in the second line from those in the first, we obtain a series of numbers, entered in column 1 of the next table, representing the excess of step (1) over each of the other steps. The sum of these differences is ten times the error of the first step, since by hypothesis the sum of the errors of all the steps is zero in terms of the whole interval. The numbers in the second column of Table III. are similarly obtained by subtracting the third line from the second in Table II., each difference being inserted in its appropriate place in the table. Proceeding in this way we find the excess of each interval over those which follow it. The table is completed by a diagonal row of zeros representing the difference of each step from itself, and by repeating the numbers already found in symmetrical positions with their signs changed, since the excess of any step, say 6 over 3, is evidently equal to that of 3 over 6 with the sign changed. The errors of each step having been found by adding the columns, and dividing by 10, the corrections at each point of the calibration are deduced as before.

TABLE II.—*Complete Calibration of Interval of 10° in 10 Steps.*

Lengths of Threads.		1°	2°	3°	4°	5°	6°	7°	8°	9°
Observed excess-lengths	0°	−28	−32	−47	−62	−11	−15	−48	− 2	− 8
of threads, in various	1°	−33	−21	−47	−28	+14	− 8	−22	+21	+24
positions, the beginning	2°	−17	+ 2	− 8	+ 1	+26	+23	+ 6	+58	
of the thread being set	3°	− 9	+26	+ 5	− 3	+41	+36	+28		
near the points.	4°	+ 6	+31	− 7	+ 4	+45	+49			
	5°	− 3	+ 5	−15	− 6	+43				
	6°	−20	+ 7	−16	+ 2					
	7°	− 1	+23	+10						
	8°	− 4	+29							
	9°	+ 5								

TABLE III.—*Solution of Complete Calibration.*

Step No.	1	2	3	4	5	6	7	8	9	10
1	0	− 5	+11	+20	+34	+25	+ 7	+26	+23	+32
2	+ 5	0	+16	+23	+39	+29	+12	+31	+28	+37
3	−11	−16	0	+ 8	+24	+13	− 4	+15	+13	+22
4	−20	−23	− 8	0	+15	+ 5	−12	+ 7	+ 4	+13
5	−34	−39	−24	−15	0	− 9	−26	− 8	−10	− 2
6	−25	−29	−13	− 5	+ 9	0	−17	+ 2	− 1	+ 8
7	− 7	−12	+ 4	+12	+26	+17	0	+19	+16	+26
8	−26	−31	−15	− 7	+ 8	− 2	−19	0	− 3	+ 6
9	−23	−28	−13	− 4	+10	+ 1	−16	+ 3	0	+ 9
10	−32	−37	−22	−13	+ 2	− 8	−26	− 6	− 9	0
Error of step.	−17.3	−22.0	− 6.4	+ 1.9	+16.7	+ 7.1	−10.1	+ 8.9	+ 6.1	+15.1
Corrections.	+17.3	+39.3	+45.7	+43.8	+27.1	+20.0	+30.1	+21.2	+15.1	0

The advantages of this method are the simplicity and symmetry of the work of reduction, and the accuracy of the result, which exceeds that of the Gay Lussac method in consequence of the much larger number of independent observations. It may be noticed, for instance, that the correction at point 5 is 27.1 thousandths by the complete calibration, which is 2 thousandths less than the value 29 obtained by the Gay Lussac method, but agrees well with the value 27 thousandths obtained by taking only the first and last observations with the thread of 5°. The disadvantage of the method lies in the great number of observations required, and in the labour of adjusting so many different threads to suitable lengths. It is probable that sufficiently good results may be obtained with much less trouble by using fewer threads, especially if more care is taken in the micrometric determination of their errors.

The method adopted for dividing up the fundamental interval of any thermometer into sections and steps for calibration may be widely varied, and is necessarily modified in cases where auxiliary bulbs or "ampoules" are employed. The Paris mercury-standards, which read continuously from 0° to 100° C., without intermediate ampoules, were calibrated by Chappuis in five sections of 20° each, to determine the corrections at the points 20°, 40°, 60°, 80°, which may be called the "principal points" of the calibration, in terms of the fundamental interval. Each section of 20° was subsequently calibrated in steps of 2°, the corrections being at first referred, as in the example already given, to the mean degree of the section itself, and being afterwards expressed, by a simple transformation, in terms of the fundamental interval, by means of the corrections already found for the ends of the section. Supposing, for instance, that the corrections at the points 0° and 10° of Table III. are not zero, but C° and C′ respectively, the correction C_n at any intermediate point n will evidently be given by the formula,

$$C_n = C° + c_n + (C′ - C°)n/10 \qquad (3)$$

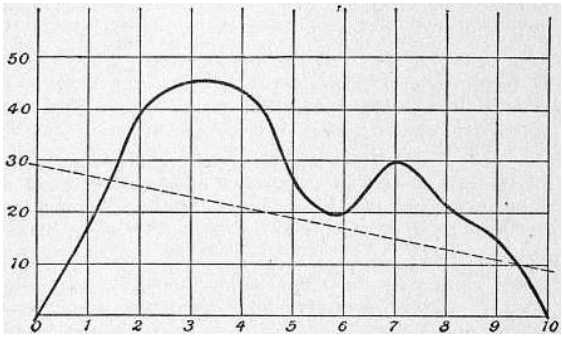
where c_n is the correction already given in the table.

If the corrections are required to the thousandth of a degree, it is necessary to tabulate the results of the calibration at much more frequent intervals than 2°, since the correction, even of a good thermometer, may change by as much as 20 or 30 thousandths in 2°. To save the labour and difficulty of calibrating with shorter threads, the corrections at intermediate points are usually calculated by a formula of interpolation. This leaves much to be desired, as the section of a tube often changes very suddenly and capriciously. It is probable that the graphic method gives equally good results with less labour.

Slide-Wire.—The calibration of an electrical slide-wire into parts of equal resistance is precisely analogous to that of a capillary tube into parts of equal volume. The Carey Foster method, employing short steps of equal resistance, effected by transferring a suitable small resistance from one side of the slide-wire to the other, is exactly analogous to the Gay Lussac method, and suffers from the same defect of the accumulation of small errors unless steps of several different lengths are used. The calibration of a slide-wire, however, is much less troublesome than that of a thermometer tube for several reasons. It is easy to obtain a wire uniform to one part in 500 or even less, and the section is not liable to capricious variations. In all work of precision the slide-wire is supplemented by auxiliary resistances by which the scale may be indefinitely extended. In accurate electrical thermometry, for example, the slide-wire itself would correspond to only 1°, or less, of the whole scale, which is less than a single step in the calibration of a mercury thermometer, so that an accuracy of a thousandth of a degree can generally be obtained without any calibration of the slide-wire. In the rare cases in which it is necessary to employ a long slide-wire, such as the cylinder potentiometer of Latimer Clark, the calibration is best effected by comparison with a standard, such as a Thomson-Varley slide-box.

Graphic Representation of Results.—The results of a calibration are often best represented by means of a correction curve, such as that illustrated in the diagram, which is plotted to represent the corrections found in Table III. The abscissa of such a curve is the reading of the instrument to be corrected. The ordinate is the correction to be added to the observed reading to reduce to a uniform scale. The corrections are plotted in the figure in terms of the whole section, taking the correction to be zero at the beginning and end. As a matter of fact the corrections at these points in terms of the fundamental interval were found to be −29 and −9 thousandths respectively. The correction curve is transformed to give corrections in terms of the fundamental interval by ruling a straight line joining the points +29 and +9 respectively, and reckoning the ordinates from this line instead of from the base-line. Or the curve may be replotted with the new ordinates thus obtained. In drawing the curve from the corrections obtained at the points of calibration, the exact form of the curve is to some extent a matter of taste, but the curve should generally be drawn as smoothly as possible on the assumption that the changes are gradual and continuous.

The ruling of the straight line across the curve to express the corrections in terms of the fundamental interval, corresponds to the first part of the process of calibration mentioned above under the term "Standardization." It effects the reduction of the readings to a common standard, and may be neglected if relative values only are required. A precisely analogous correction occurs in the case of electrical instruments. A potentiometer, for instance, if correctly graduated or calibrated in parts of equal resistance, will give correct relative values of any differences of potential within its range if connected to a constant cell to supply the steady current through the slide-wire. But to determine at any time the actual value of its readings in volts, it is necessary to standardize it, or determine its scale-value or reduction-factor, by comparison with a standard cell.



Calibration Curve.

A very neat use of the calibration curve has been made by Professor W.A. Rogers in the automatic correction of screws of dividing machines or lathes. It is possible by the process of grinding, as applied by Rowland, to make a screw which is practically perfect in point of uniformity, but even in this case errors may be introduced by the method of mounting. In the production of divided scales, and more particularly in the case of optical gratings, it is most important that the errors should be as small as possible, and should be automatically corrected during the process of ruling. With this object a scale is ruled on the machine, and the errors of the uncorrected screw are determined by calibrating the scale. A metal template may then be cut out in the form of the calibration-correction curve on a suitable scale. A lever projecting from the nut which feeds the carriage or the slide-rest is made to follow the contour of the template, and to apply the appropriate correction at each point of the travel, by turning the nut through a small angle on the screw. A small periodic error of the screw, recurring regularly at each revolution, may be similarly corrected by means of a suitable cam or eccentric revolving with the screw and actuating the template. This kind of error is important in optical gratings, but is difficult to determine and correct.

Calibration by Comparison with a Standard.—The commonest and most generally useful process of calibration is the direct comparison of the instrument with a standard over the whole range of its scale. It is necessary that the standard itself should have been already calibrated, or else that the law of its indications should be known. A continuous current ammeter, for instance, can be calibrated, so far as the relative values of its readings are concerned, by comparison with a tangent galvanometer, since it is known that the current in this instrument is proportional to the tangent of the angle of deflection. Similarly an alternating current ammeter can be calibrated by comparison with an electrodynamometer, the reading of which varies as the square of the current. But in either case it is neccessary, in order to obtain the readings in amperes, to standardize the instrument for some particular value of the current by comparison with a voltameter, or in some equivalent manner. Whenever possible, ammeters and voltmeters are calibrated by comparison of their readings with those of a potentiometer, the calibration of which can be reduced to the comparison and adjustment of resistances, which is the most accurate of electrical measurements. The commoner kinds of mercury thermometers are generally calibrated and graduated by comparison with a standard. In many cases this is the most convenient or even the only possible method. A mercury thermometer of limited scale reading between 250° and 400° C., with gas under high pressure to prevent the separation of the mercury column, cannot be calibrated on itself, or by comparison with a mercury standard possessing a fundamental interval, on account of difficulties of stem exposure and scale. The only practical method is to compare its readings every few degrees with those of a platinum thermometer under the conditions for which it is to be used. This method has the advantage of combining all the corrections for fundamental interval, &c., with the calibration correction in a single curve, except the correction for variation of zero which must be tested occasionally at some point of the scale.

AUTHORITIES.—Mercurial Thermometers: Guillaume, *Thermométrie de Précision* (Paris, 1889), gives several examples and references to original memoirs. The best examples of comparison and testing of standards are generally to be found in publications of Standards Offices, such as those of the Bureau International des Poids et Mésures at Paris. Dial Resistance-Box: Griffiths, *Phil. Trans.* A, 1893; Platinum Thermometry-Box: J.A. Harker and P. Chappuis, *Phil. Trans.* A, 1900; Thomson-Varley Potentiometer and Binary Scale Box: Callendar and Barnes, *Phil. Trans.* A, 1901.

(H. L. C.)

CALICO, a general name given to plain cotton cloth. The word was spelt in various forms, including “calicut,” which shows its derivation from the Indian city of Calicut or Kolikod, a seaport in the presidency of Madras, and one of the chief ports of intercourse with Europe in the 16th century, where cotton cloths were made. The name seems to have been applied to all kinds of cotton cloths imported from the East. In England it is now applied particularly to grey or bleached cotton cloth used for domestic purposes, and, generally, to any fairly heavy cotton cloth without a pattern. In the United States there is a special application to printed cloth “of a coarser quality than muslin.” In England “printed calico” is a comprehensive term.

CALICUT, a city of British India, in the Malabar district of Madras; on the coast, 6 m. N. of Beypur. In 1901 the population was 76,981, showing an increase of 14% in the decade. The weaving of cotton, for which the place was at one time so famous that its name became identified with its *calico*, is no longer of any importance. Calicut is of considerable antiquity; and about the 7th century it had its population largely increased by the immigration of the Moplahs, a fanatical race of Mahommedans from Arabia, who entered enthusiastically into commercial life. The Portuguese traveller Pero de Covilham (*q.v.*) visited Calicut in 1487 and described its possibilities for European trade; and in May 1498 Vasco da Gama, the first European navigator to reach India, arrived at Calicut. At that time it was a very flourishing city, and contained several stately buildings, among which was especially mentioned a Brahminical temple, not inferior to the largest monastery in Portugal. Vasco da Gama tried to establish a factory, but he met with persistent hostility from the local chief (*zamorin*), and a similar attempt made by Cabral two years later ended in the destruction of the factory by the Moplahs. In revenge the Portuguese bombarded the town, but no further attempt was made for some years to establish a trading settlement there. In 1509 the marshal Don Fernando Coutinho made an unsuccessful attack on the city; and in the following year it was again assailed by Albuquerque with 3000 troops. On this occasion the palace was plundered and the town burnt; but the Portuguese were finally repulsed, and fled to their ships after heavy loss. In the following year they concluded a peace with the zamorin and were allowed to build a fortified factory on the north bank of the Kallayi river, which was however again, and finally, abandoned in 1525. In 1615 the town was visited by an English expedition under Captain Keeling, who concluded a treaty with the zamorin; but it was not until 1664 that an English trading settlement was established by the East India Company. The French settlement, which still exists, was founded in 1698. The town was taken in 1765 by Hyder Ali, who expelled all the merchants and factors, and

destroyed the cocoa-nut trees, sandal-wood and pepper vines, that the country reduced to ruin might present no temptation to the cupidity of Europeans. In 1782 the troops of Hyder were driven from Calicut by the British; but in 1788 it was taken and destroyed by his son Tippoo, who carried off the inhabitants to Beypur and treated them with great cruelty. In the latter part of 1790 the country was occupied by the British; and under the treaty concluded in 1792, whereby Tippoo was deprived of half his dominions, Calicut fell to the British. After this event the inhabitants returned and rebuilt the town, which in 1800 consisted of 5000 houses.

As the administrative headquarters of the district, Calicut maintains its historical importance. It is served by the Madras railway, and is the chief seaport on the Malabar coast, and the principal exports are coffee, timber and coco-nut products. There are factories for coffee-cleaning, employing several hundred hands; for coir-pressing and timber-cutting. The town has a cotton-mill, a saw-mill, and tile, coffee and oil works. A detachment of European troops is generally stationed here to overawe the fanatical Moplahs.

CALIFORNIA, one of the Pacific Coast states of the United States of America, physically one of the most remarkable, economically one of the more independent, and in history and social life one of the most interesting of the Union. It is bounded N. by Oregon, E. by Nevada and Arizona, from which last it is separated by the Colorado river, and S. by the Mexican province of Lower California. The length of its medial line N. and S. is about 780 m., its breadth varies from 150 to 350 m., and its total area is 158,207 sq. m., of which 2205 are water surface. In size it ranks second among the states of the Union. The coast is bold and rugged and with very few good harbours; San Diego and San Francisco bays being exceptions. The coast line is more than 1000 m. long. There are eight coast islands, all of inconsiderable size, and none of them as yet in any way important.

Physiography.—The physiography of the state is simple; its main features are few and bold: a mountain fringe along the ocean, another mountain system along the east border, between them—closed in at both ends by their junction—a splendid valley of imperial extent, and outside all this a great area of barren, arid lands, belonging partly to the Great Basin and partly to the Open Basin region.

Along the Pacific, and some 20-40 m. in width, runs the mass of the Coast Range, made up of numerous indistinct chains—most of which have localized individual names—that are broken down into innumerable ridges and spurs, and small valleys drained by short streams of rapid fall. The range is cut by numerous fault lines, some of which betray evidence of recent activity; it is probable that movements along these faults cause the earthquake tremors to which the region is subject, all of which seem to be tectonic. The altitudes of the Coast Range vary from about 2000 to 8000 ft.; in the neighbourhood of San Francisco Bay the culminating peaks are about 4000 ft. in height (Mount Diablo, 3856 ft.; Mount St Helena, 4343 ft.), and to the north and south the elevation of the ranges increases. In the east part of the state is the magnificent Sierra Nevada, a great block of the earth’s crust, faulted along its eastern side and tilted up so as to have a gentle back slope to the west and a steep fault escarpment facing east, the finest mountain system of the United States. The Sierra proper, from Lassen’s Peak to Tehachapi Pass in Kern county, is about 430 m. long (from Mt. Shasta in Siskiyou county to Mt. San Jacinto in Riverside county, more than 600 m.). It narrows to the north and the altitude declines in the same direction. Far higher and grander than the Coast Range, the Sierra is much less complicated, being indeed essentially one chain of great simplicity of structure. It is only here and there that a double line of principal summits exists. The slope is everywhere long and gradual on the west, averaging about 200 ft. to the mile. Precipitous gorges or canyons often from 2000 to 5000 ft. in depth become a more and more marked feature of the range as one proceeds northward; over great portions of it they average probably not more than 20 m. apart. Where the volcanic formations were spread uniformly over the flanks of the mountains, the contrast between the canyons and the plain-like region of gentle slope in which they have been excavated is especially marked and characteristic. The eastern slope is very precipitous, due to a great fault which drops the rocks of the Great Basin region abruptly downward several thousand feet. Rare passes cross the chain, opening at the foot of the mountains on the east and the west high on their flanks, 7000-10,000 ft. above the sea. Between 36° 20′ and 38° the lowest gap of any kind is above 9000 ft., and the average height of those actually used is probably not less than 11,000 ft. The Kearsarge, most used of all, is still higher. Very few in the entire Sierra are passable by vehicles. Some forty peaks are catalogued between 5000 and 8000 ft., and there are eleven above 14,000. The highest portion of the system is between the parallels of 36° 30′ and 37° 30′; here the passes are about 12,000 ft. in elevation, and the peaks range from 13,000 ft. upward, Mount Whitney, 14,502 ft., being the highest summit of the United States, excluding Alaska. From this peak northward there is a gradual decline, until at the point where the Central Pacific crosses in lat. 39° 20′ the elevation is only 7000 ft.

Of the mountain scenery the granite pinnacles and domes of the highest Sierra opposite Owen’s Lake, where there is a drop eastward into the valley of about 10,000 ft. in 10 m.; the snowy volcanic cone of Mt Shasta, rising 10,000 ft. above the adjacent plains; and the lovely valleys of the Coast Range, and the south fork of the King river—all these have their charms; but most beautiful of all is the unique scenery of the Yosemite Valley (*q.v.*). Much of the ruggedness and beauty of the mountains is due to the erosive action of many alpine glaciers that once existed on the higher summits, and which have left behind their evidences in valleys and amphitheatres with towering walls, polished rock-expanses, glacial lakes and meadows and tumbling waterfalls. Remnants of these glaciers are still to be seen,—as notably on Mt. Shasta,—though shrunk to small dimensions. Glacial action may be studied well as far south as 36°. The canyons are largely the work of rivers, modified by glaciers that ran through them after the rivers had formed them. All of the Sierra lakes and ponds are of glacial origin and there are some thousands of them. The lower lake line is about 8000 ft.; it is lower to the north than to the south, owing to the different climate, and the different period of glacial retrogression. Of these lakes some are fresh, and some —as those of the north-east counties—alkali. The finest of all is Tahoe, 6225 ft. above the sea, lying between the true Sierras and the Basin Ranges, with peaks on several sides rising 4000-5000 ft. above it. It is 1500 ft. deep and its waters are of extraordinary purity (containing only three grains of solid matter to the gallon). Clear Lake, in the Coast Range, is another beautiful sheet of water. It is estimated by John Muir that on an average “perhaps more than a mile” of degradation took place in the last glacial period; but with regard to the whole subject of glacial action in California as in other fields, there is considerable difference of opinion. The same authority counted 65 small residual glaciers between 36° 30′ and 39°; two-thirds of them lie between 37° and 38°, on some

of the highest peaks in the district of the San Joaquin, Merced, Tuolumne and Owen's rivers. They do not descend, on an average, below 11,000 ft.; the largest of all, on Mt. Shasta, descends to 9500 ft. above the sea.

Volcanic action has likewise left abundant traces, especially in the northern half of the range, whereas the evidences of glacial action are most perfect (though not most abundant) in the south. Lava covers most of the northern half of the range, and there are many craters and ash-cones, some recent and of perfect form. Of these the most remarkable is Mt. Shasta. In Owen's Valley is a fine group of extinct or dormant volcanoes.

Among the other indications of great geological disturbances on the Pacific Coast may also be mentioned the earthquakes to which California like the rest of the coast is liable. From 1850 to 1887 almost 800 were catalogued by Professor E.H. Holden for California, Oregon and Washington. They occur in all seasons, scores of slight tremors being recorded every year by the Weather Bureau; but they are of no importance, and even of these the number affecting any particular locality is small. From 1769 to 1887 there were 10 "destructive" and 24 other "extremely severe" shocks according to the Rossi Forel nomenclatural scale of intensity. In 1812 great destruction was wrought by an earthquake that affected all the southern part of the state; in 1865 the region about San Francisco was violently disturbed; in 1872 the whole Sierra and the state of Nevada were violently shaken; and in 1906 San Francisco (*q.v.*) was in large part destroyed by a shock that caused great damage elsewhere in the state.

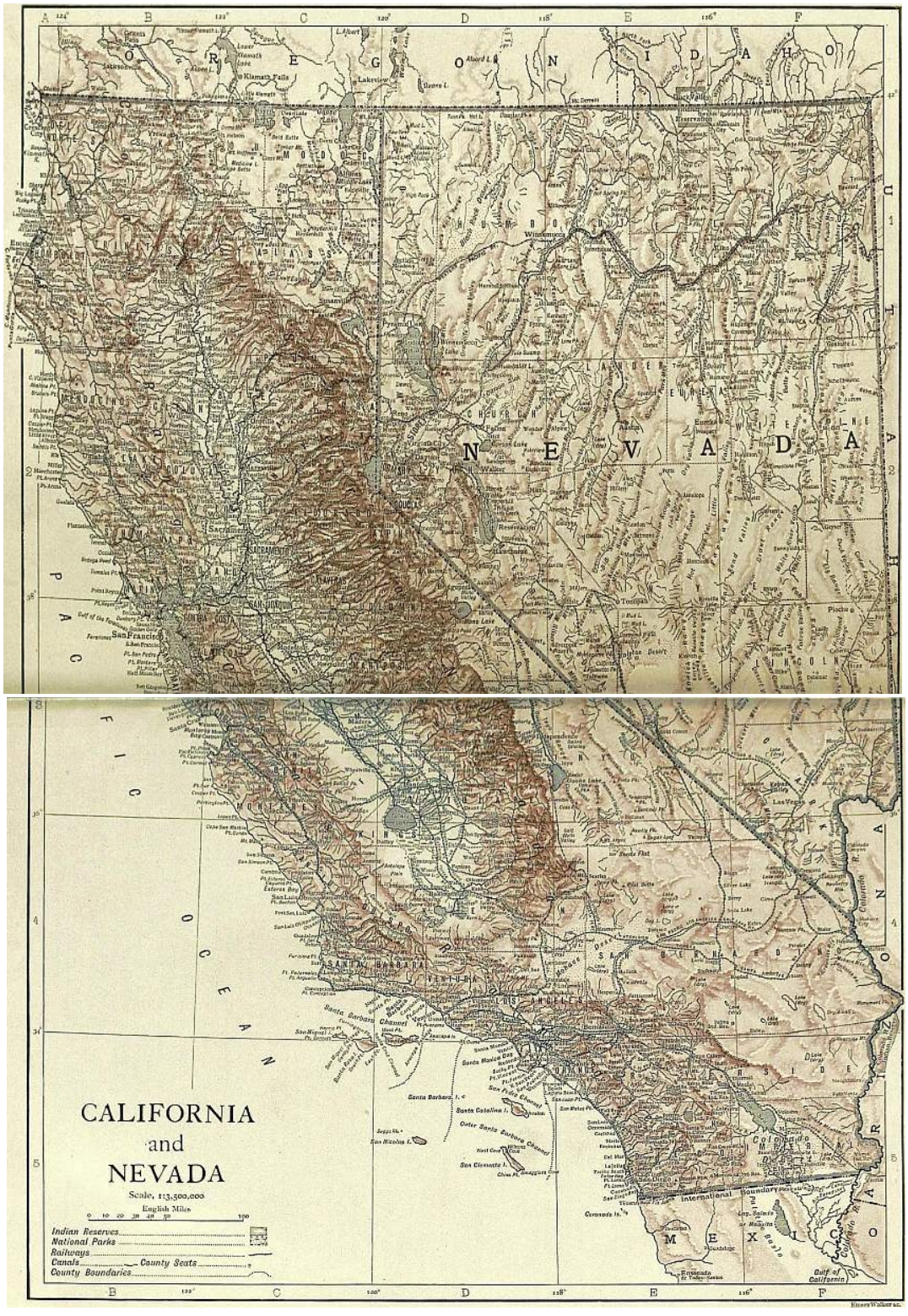
North of 40° N. lat. the Coast Range and Sierra systems unite, forming a country extremely rough. The eastern half of this area is covered chiefly with volcanic plains, very dry and barren, lying between precipitous, although not very lofty, ranges; the western half is magnificently timbered, and toward the coast excessively wet. Between 35° and 36° N. lat. the Sierra at its southern end turns westward toward the coast as the Tehachapi Range. The valley is thus closed to the north and south, and is surrounded by a mountain wall, which is broken down in but a single place, the gap behind the Golden Gate at San Francisco. Through this passes the entire drainage of the interior. The length of the valley is about 450 m., its breadth averages about 40 m. if the lower foothills be included, so that the entire area is about 18,000 sq. m. The drainage basin measured from the water-partings of the enclosing mountains is some three times as great. From the mouth of the Sacramento to Redding, at the northern head of the valley, the rise is 552 ft. in 192 m., and from the mouth of the San Joaquin southward to Kern lake it is 282 ft. in 260 m.

Two great rivers drain this central basin,—the San Joaquin, whose valley comprises more than three-fifths of the entire basin, and the Sacramento, whose valley comprises the remainder. The San Joaquin is a very crooked stream flowing through a low mud-plain, with tule banks; the Sacramento is much less meandering, and its immediate basin, which is of sandy loam, is higher and more attractive than that of the San Joaquin. The eastward flanks of the Coast Range are very scantily forested, and they furnish not a single stream permanent enough to reach either the Sacramento or San Joaquin throughout the dry season. On the eastern side of both rivers are various important tributaries, fed by the more abundant rains and melting snows of the western flank of the Sierra; but these streams also shrink greatly in the dry season. The Feather, emptying into the Sacramento river about 20 m. N. of the city of Sacramento, is the most important tributary of the Sacramento river. A striking feature of the Sacramento system is that for 200 m. north of the Feather it does not receive a single tributary of any importance, though walled in by high mountains. Another peculiar and very general feature of the drainage system of the state is the presence of numerous so-called river "sinks," where the waters disappear, either directly by evaporation or (as in Death Valley) after flowing for a time beneath the surface. These "sinks" are therefore not the true sinks of limestone regions. The popular name is applied to Owen's lake, at the end of Owen's river; to Mono lake, into which flow various streams rising in the Sierra between Mount Dana and Castle Peak; and to Death Valley, which contains the "sink" of the Amargosa river, and evidently was once an extensive lake, although now only a mud-flat in ordinary winters, and a dry, alkaline, desert plain in summer. All these lakes, and the other mountain lakes before referred to, show by the terraces about them that the water stood during the glacial period much higher than it does now. Tulare lake, which with Buena Vista lake and Kern lake receives the drainage of the southern Sierra, shows extreme local variations of shore-line, and is generally believed to have shrunk extremely since 1850, though of this no adequate proof yet exists. In 1900 it was about 200 sq. m. in area. In wet seasons it overflows its banks and becomes greatly extended in area, discharging its surplus waters into the San Joaquin; but in dry seasons the evaporation is so great that there is no such discharge. The drainage of Lassen, Siskiyou and Modoc counties has no outlet to the sea and is collected in a number of great alkaline lakes.

Finally along the sea below Pt. Conception are fertile coastal plains of considerable extent, separated from the interior deserts by various mountain ranges from 5000 to 7000 ft. high, and with peaks much higher (San Bernardino, 11,600; San Jacinto, 10,800; San Antonio, 10,140). Unlike the northern Sierra, the ranges of Southern California are broken down in a number of places. It is over these passes—Soledad, 2822 ft., Cajon, San Gorgonio, 2560 ft.—that the railways cross to the coast. That part of California which lies to the south and east of the southern inosculation of the Coast Range and the Sierra comprises an area of fully 50,000 sq. m., and belongs to the Basin Range region. For the most part it is excessively dry and barren. The Mohave desert—embracing Kern, Los Angeles and San Bernardino, as also a large part of San Diego, Imperial and Riverside counties—belong to the "Great Basin," while a narrow strip along the Colorado river is in the "Open Basin Region." They have no drainage to the sea, save fitfully for slight areas through the Colorado river. The Mohave desert is about 2000 ft. above the sea in general altitude. The southern part of the Great Basin region is vaguely designated the Colorado desert. In San Diego, Imperial and Riverside counties a number of creeks or so-called rivers, with beds that are normally dry, flow centrally toward the desert of Salton Sink or "Sea"; this is the lowest part of a large area that is depressed below the level of the sea,—at Salton 263 ft., and 287 ft. at the lowest point. In 1900 the Colorado river (*q.v.*) was tapped south of the Mexican boundary for water wherewith to irrigate land in the Imperial Valley along the Southern Pacific railway, adjoining Salton Sea. The river enlarged the canal, and finding a steeper gradient than that to its mouth, was diverted into the Colorado desert, flooding Salton Sea;[1] and when the break in this river was closed for the second time in February 1907, though much of its water still escaped through minor channels and by seepage, a lake more than 400 sq. m. in area was left. A permanent 60 ft. masonry dam was completed in July 1907. The region to the east of the Sierra, likewise in the Great Basin province, between the crest of that range and the Nevada boundary, is very mountainous. Owen's river runs through it from north to south for some 180 m. Near Owen's lake the scenery is extremely grand. The valley here is very narrow, and on either side the mountains rise from 7000 to 10,000 ft. above the lake and river. The Inyo range, on the east, is quite bare of timber, and its summits are only occasionally whitened with snow for a few days during the winter,

as almost all precipitation is cut off by the higher ranges to the westward. Still further to the east some 40 m. from the lake is Death Valley (including Lost or Mesquite Valley)—the name a reminder of the fate of a party of “forty-niners” who perished here, by thirst or by starvation and exposure. Death Valley, some 50 m. long and on an average 20-25 m. broad from the crests of the inclosing mountain ranges (or 5-10 m. at their base), constitutes an independent drainage basin. It is below sea level (about 276 ft. according to recent surveys), and altogether is one of the most remarkable physical features of California. The mountains about it are high and bare and brilliant with varied colours. The Amargosa river, entering the valley from Nevada, disappears in the salty basin. Enormous quantities of borax, already exploited, and of nitrate of soda, are known to be present in the surrounding country, the former as almost pure borate of lime in Tertiary lake sediments.

The physiography of the state is the evident determinant of its climate, fauna and flora. California has the highest land and the lowest land of the United States, the greatest variety of temperature and rainfall, and of products of the soil.



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Climate.—The climate is very different from that of the Atlantic coast; and indeed very different from that of any part of the country save that bordering California. Amid great variations of local weather there are some peculiar features that obtain all over the state. In the first place, the climate of the entire Pacific Coast is milder and more uniform in temperature than that of the states in corresponding latitude east of the mountains. Thus we

have to go north as far as Sitka in 57° N. lat. to find the same mean yearly temperature as that of Halifax, Nova Scotia, in latitude 44° 39′. And going south along the coast, we find the mean temperature of San Diego 6° or 7° less than that of Vicksburg, Miss., or Charleston, S.C. The quantity of total annual heat supply at Puget Sound exceeds that at Philadelphia, Pittsburg, Cleveland or Omaha, all more than 500 m. farther south; Cape Flattery, exposed the year round to cold ocean fogs, receives more heat than Eastport, Maine, which is 3° farther south and has a warmer summer. In the second place, the means of winter and summer are much nearer the mean of the year in California than in the east. This condition of things is not so marked as one goes inward from the coast; yet everywhere save in the high mountains the winters are comparatively mild. In the third place, the division of the year into two seasons—a wet one and a dry (and extremely dusty) one—marks this portion of the Pacific Coast in the most decided manner, and this natural climatic area coincides almost exactly in its extension with that of California; being truly characteristic neither of Lower California nor of the greater part of Oregon, though more so of Nevada and Arizona. And finally, in the fourth place, except on the coast the disagreeableness of the heat of summer is greatly lessened by the dryness of the air and the consequent rapidity of evaporation. Among the peculiarities of Californian climate it is not one of the least striking that as one leaves the Sacramento or San Joaquin plains and travels into the mountains it becomes warmer, at least for the first 2000 or 3000 ft. of ascent.

Along both the Coast Range and the Sierra considerable rainfall is certain, although, owing to the slight snow accumulations of the former, its streams are decidedly variable. A heavy rain-belt, with a normal fall of more than 40 in., covers all the northern half of the Sierra and the north-west counties; shading off from this is the region of 10-20 in. fall, which covers all the rest of the state save Inyo, Kern and San Bernardino counties, Imperial county and the eastern portion of Riverside county; the precipitation of this belt is from 0 to 10 in. In excessively dry years the limits of this last division may include all of the state below Fresno and the entire Central Valley as well. In the mountains the precipitation increases with the altitude; above 6000 or 7000 ft. it is almost wholly in the form of snow; and this snow, melting in summer, is of immense importance to the state, supplying water once for placer mining and now for irrigation. The north-west counties are extremely wet; many localities here have normal rainfalls of 60-70 in. and even higher annually, while in extreme seasons as much as 125 in. falls. Along the entire Pacific Coast, but particularly N. of San Francisco, there is a night fog from May to September. It extends but a few miles inland, but within this belt is virtually a prolongation of the rainy season and has a marked effect on vegetation. Below San Francisco the precipitation decreases along the coast, until at San Diego it is only about 10 in. The south-east counties are the driest portions of the United States. At Ogilby, Volcano, Indio and other stations on the Southern Pacific line the normal annual precipitation is from 1.5 to 2.5 in.; and there are localities near Owen’s lake, even on its very edge, that are almost dry. For days in succession when it storms along the Southern California coasts and dense rain clouds blow landwards to the mountains, leaving snow or rain on their summits, it has been observed that within a few miles beyond the ridge the contact of the desert air dissipates the remaining moisture of the clouds into light misty masses, like a steam escape in cold air. The extreme heat of the south-east is tempered by the extremely low humidity characteristic of the Great Basin, which in the interior of the two southernmost counties is very low. The humidity of places such as Fresno, Sacramento and Red Bluff in the valley varies from 48 to 58. Many places in northern, southern, central, mountain and southern coastal California normally have more than 200 perfectly clear days in a year; and many in the mountains and in the south, even on the coast, have more than 250. The extreme variability in the amount of rainfall is remarkable.[2] The effects of a season of drought on the dry portions of the state need not be adverted to; and as there is no rain or snow of any consequence on the mountains during summer, a succession of dry seasons may almost bare the ranges of the accumulated stock of previous winter snows, thus making worse what is already bad.

The Colorado desert (together with the lower Gila Valley of Arizona) is the hottest part of the United States. Along the line of the Southern Pacific the yearly extreme is frequently from 124° to 129° F. (*i.e.* in the shade, which is almost if not quite the greatest heat ever actually recorded in any part of the world). At the other extreme, temperatures of -20° to -36° are recorded yearly on the Central (Southern) Pacific line near Lake Tahoe. The normal annual means of the coldest localities of the state are from 37° to 44° F.; the monthly means from 20° to 65° F. The normal annual means on Indio, Mammoth Tanks, Salton and Volcano Springs are from 73.9° to 78.4 F.; the monthly means from 52.8° to 101.3° (frequently 95° to 98°). The normal trend of the annual isotherms of the state is very simple: a low line of about 40° circles the angle in the Nevada boundary line; 50° normally follows the northern Sierra across the Oregon border; lines of higher temperature enclose the Great Valley; and lines of still higher temperature—usually 60° to 70°, in hotter years 60° to 75°—run transversely across the southern quarter of the state.

Another weather factor is the winds, which are extremely regular in their movements. There are brisk diurnal sea-breezes, and seasonal trades and counter-trades. Along the coast an on-shore breeze blows every summer day; in the evening it is replaced by a night-fog, and the cooler air draws down the mountain sides in opposition to its movement during the day. In the upper air a dry off-shore wind from the Rocky Mountain plateau prevails throughout the summer; and in winter an on-shore rain wind. The last is the counter-trade, the all-year wind of Alaska and Oregon; it prevails in winter even off Southern California.

There is the widest and most startling variety of local climates. At Truckee, for example, lying about 5800 ft. above the sea near Lake Tahoe, the lowest temperature of the year may be -25° F. or colder, when 70 m. westward at Rocklin, which lies in the foothills about 250 ft. above the sea, the mercury does not fall below 28°. Snow never falls at Rocklin, but falls in large quantity at Truckee; ice is the crop of the one, oranges of the other, at the same time. There are points in Southern California where one may actually look from sea to desert and from snow to orange groves. Distance from the ocean, situation with reference to the mountain ranges, and altitude are all important determinants of these climatic differences; but of these the last seems to be most important. At any rate it may be said that generally speaking the maximum, minimum and mean temperatures of points of approximately equal altitude are respectively but slightly different in northern or southern California.[3]

Death Valley surpasses for combined heat and aridity any meteorological stations on earth where regular observations are taken, although for extremes of heat it is exceeded by places in the Colorado desert. The minimum daily temperature in summer is rarely below 70° F. and often above 90° F. (in the shade), while the maximum may for days in succession be as high as 120° F. A record of 6 months (1891) showed an average daily relative humidity of 30.6 in the morning and 15.6 in the evening, and the humidity sometimes falls to 5. Yet the surrounding country is not devoid of vegetation. The hills are very fertile when irrigated, and the wet season

develops a variety of perennial herbs, shrubs and annuals.

Fauna.—California embraces areas of every life-zone of North America: of the boreal, the Hudsonian and Canadian subzones; of the transition, the humid Pacific subzone; of the upper austral, the arid or upper Sonoran subzone; of the lower austral, the arid or lower Sonoran; of the tropical, the "dilute arid" subzone. As will be inferred from the above account of temperature, summer is longer in the north, and localities in the Valley have more hours of heat than do those of south California. Hence that climatic characteristic of the entire Pacific Coast —already referred to and which is of extreme importance in determining the life-zones of California—the great amount of total annual heat supply at comparatively high latitudes. A low summer temperature enables northern species to push far southward, while the high heat total of the year enables southern species to push far north. The resultant intermingling of forms is very marked and characteristic of the Pacific Coast states. The distribution of life-zones is primarily a matter of altitude and corresponds to that of the isotherms. The mountain goat and mountain sheep live in the Sierran upper-land, though long ago well-nigh exterminated. The Douglas red squirrel is ubiquitous in the Sierran forests and their most conspicuous inhabitant. White-tailed deer and especially black-tails are found on the high Sierra; the mule deer, too, although its habitat is now mainly east of the range, on the plateau, is also met with. Grizzly, black, cinnamon and brown bears are all Californian species once common and to-day rare. When Americans began to rule in California elk and antelope herded in great numbers in the Great Valley; the former may to-day sometimes be seen, possibly, in the northern forests, and the latter occasionally cross into the state from Nevada. The sage-hen is abundant on the eastern flank of the Sierra. Grouse, quail, crows and woodpeckers (*Melanerpes formicivorus*) furnish species characteristic of the state. There are various species of ground-squirrels and gophers, which are very abundant. Noteworthy in the animal life of the lower Sonoran and tropic region are a variety of snakes and lizards, desert rats and mice; and, among birds, the cactus wren, desert thrasher, desert sparrow, Texas night-hawk, mocking-bird and ground cuckoo or road runner (*Geococcyx Californianus*). The California vulture, the largest flying bird in North America and fully as large as the Andean condor, is not limited to California but is fairly common there. In the zoology and botany of California as of the rest of the Pacific Coast, the distinctions between the upper austral and humid transition zones are largely obliterated; and as one passes southward into the arid lands, life forms of both these zones intermingle with those of the arid transition.

Fish are abundant. The United States fish commission, and an active state commission established in 1869, have done much to preserve and increase this source of food. In 1904 the yield of the fisheries of the three Pacific Coast states was 168,600,000 lbs, valued at $6,681,000,—nearly half that of the New England states, more than one-third that of the Middle Atlantic states and more than that of the South Atlantic and Gulf states combined. Of the total, California yielded between a quarter and a third. A third of her fish comes from the Sacramento river. Some 230—more or less—marine food fishes are to be found in the market at San Francisco. The exports of fish from that port from 1892-1899 were valued at from $2,000,000 to $2,500,000 annually. Native oysters are small and of peculiar flavour; eastern varieties also are fattened, but not bred in California waters. Shrimp are abundant; the shrimp fishers are Chinese and four-fifths of the catch is exported to China. Sturgeon were once the cheapest fish after salmon; to-day, despite all efforts to increase the supply, they are the dearest. Salmon, once threatened with extinction, have been saved, maintained in good supply, and indeed have probably regained their pristine abundance. Shad and striped bass are both very abundant and cheap. Black bass, flounders, terrapin, sea-turtles, perch, turbot, sole and catfish are also common. Great herds of seals once lay like toll-gatherers off the Golden Gate and other bays of the coast, taking a large share of the salmon and other fish; but they are no longer common. The sea-lions sometimes raid the rivers for 100 m. inland. They have greatly increased since hunting them for their hides and oil ceased to be profitable, and thousands sometimes gather on the Farallones, off the Golden Gate.

Flora.—Inclusiveness of range in the distribution of vegetable life is perhaps more suggestive than the distribution of animal species. The variation is from dwarf mountain pine to giant cactus and dates. The humid transition belt is the habitat of California's magnificent forests. Nut pine, juniper and true sage-brush (*Artemisia tridentata*) characterize the upper Sonoran,—although the latter grows equally in the transition zone. Cereals, orchard fruits and alfalfa are of primary importance in the upper and of secondary importance in the lower Sonoran. In the arid portions of this and the tropic areas the indigenous plants are creosote, mesquite and alfileria bushes, desert acacias, paloverdes, alkali-heath, salt grass, agaves, yuccas (especially the Spanish-bayonet and Joshua tree) and cactuses. Among exotics the Australian saltbush spreads successfully over the worst alkali land. The introduction of other exotics into these zones,—made humid by irrigation, which converts them, the one into true austro-riparian the other into true humid tropical,—has revolutionized the agricultural, and indeed the whole, economy of California. At the two ends of Cajon Pass, only four or five kilometres apart, are the two utterly distinct floras of the Mohave desert and the San Bernardino valley. Despite the presence of the pass, plants do not spread, so great is the difference of climatic conditions. On the desert the same plant will vary in different years from 4 in. to 10 ft. in height when equally mature, according to the rainfall and other conditions of growth. Many mature plants are not taller than 0.4 to 0.8 in. The tree yucca often attains a height of 20 to 25 ft., and a diameter of 1.5 ft. About 600 species of plants were catalogued in desert California in 1891 by a government botanical party. The flora of the coast islands of California is very interesting. On Santa Cruz Professor Joseph Le Conte found 248 species, nearly all of which are distinctively Californian, 48 being peculiar to the surrounding islands and 28 peculiar to Southern California. Various other things indicate a separation of the islands from the mainland in quaternary times; since which, owing to the later southward movement on the continent of northern forms in glacial times, there has been a struggle for existence on the mainland from which the islands have largely escaped.

Forests.—The forests and agricultural crops of the state demand particular notice. In 1900 the woodland was estimated by the United States census at 22% of the state's area, and the total stand at 200,000 million ft. of timber. The variety of forest trees is not great, but some of the California trees are unique, and the forests of the state are, with those of Oregon and Washington, perhaps the most magnificent of the world. At least the coniferous forests which make up nine-tenths of California's woodland surpass all others known in number of species and in the size and beauty of the trees. Forty-six species occur, namely, 32 species of pitch trees (18 pines), 12 species of the cypresses and their allies (2 sequoia), and 2 species of yews or their allies. Peculiar to California are the two species of sequoia (*q.v.*),—the redwood (*S. sempervirens*), and the big-tree (*S. gigantea*), remnants of an earlier age when they were common in other parts of the world. The redwood grows only in a narrow strip on the Coast Range from Southern Oregon (where there are not more than 1000 acres) down nearly to the Golden Gate, in a habitat of heavy rains and heavy fogs. They cover an area of about 2000 sq. m. almost

unmixed with other species. One fine grove stands S. of San Francisco near Santa Cruz. These noble trees attain very often a height of more than 300 ft., frequently of 350 and even more, and a butt diameter of more than 15 to 20 ft., with clean, straight fluted trunks rising 200 ft. below the lowest branches. They grow in a very dense timber stand; single acres have yielded 1,500,000 ft. B.M. of lumber, and single trees have cut as high as 100,000 ft. The total stand in 1900 was estimated by the United States census as 75,000,000,000 ft., and the ordinary stand per acre varies from 25,000 to 150,000 ft., averaging probably 60,000 ft. The redwood is being rapidly used for lumber. There is nowhere any considerable young growth from seed, although this mode of reproduction is not (as often stated) unknown; the tree will reproduce itself more than once from the stump (hence its name). In thirty years a tree has been known to grow to a height of 80 ft. and a diameter of 16 in. The wood contains no pitch and much water, and in a green condition will not burn. To this fact it owes its immunity from the forest fires which wreak frightful havoc among the surrounding forests. As the redwood is limited to the Coast Range, so the big tree is limited wholly to the Sierra Nevada. Unlike the redwood the big tree occurs in scattered groves (ten in all) among other species. Its habitat extends some 200 m., from latitude 36° to 39°, nowhere descending much below an altitude of 5000 ft., nor rising above 8000 ft. The most northerly grove and the nearest to San Francisco is the Calaveras Grove near Stockton; the Mariposa Grove just south of the Yosemite National Park, is a state reservation and easily accessible to tourists. The noblest groves are near Visalia, and are held as a national park. The average height is about 275 ft., and the diameter near the ground 20 ft.; various individuals stand over 300 ft., and a diameter of 25 ft. is not rare. One tree measures 35.7 ft. inside the bark 4 ft. above the ground, 10 ft. at 200 ft. above the ground, and is 325 ft. tall. Specimens have been cut down that were estimated to be 1300 and even 2200 years old; many trees standing are presumably 2500 years old. It is the opinion of John Muir that the big tree would normally live 5000 years or more; that the California groves are still in their prime; that, contrary to general ideas, the big tree was never more widely distributed than now, at least not within the past 8000 or 10,000 years; that it is not a decaying species, but that on the contrary “no tree of all the forest is more enduringly established in concord with climate and soil,” growing like the mountain pine even on granite, and in little danger save from the greed of the lumberman; but other excellent authorities consider it as hardly holding its own, especially in the north. Three main wood belts cover the flanks of the Sierra: the lower or main pine belt, the silver fir belt, and the upper pine belt. The sugar pine, the yellow or silver pine and the Douglas spruce (considerably smaller than in Oregon and Washington), are rivals in stature and nobility, all attaining 200 ft. or more when full grown; and the incense cedar reaches a height of 150 ft. In this belt and the following one of firs the big tree also grows. The white silver fir (*abies concolor*) and the silver or red fir (*ab. magnifica*), standing 200 to 250 ft., make up almost wholly the main forest belt from 5000 to 9000 ft. for some 450 m. Above the firs come the tamarack, constituting the bulk of the lower Alpine forest; the hardy long-lived mountain pine; the red cedar or juniper, growing even on the baldest rocks; the beautiful hemlock spruce; the still higher white pine, nut pine, needle pine; and finally, at 10,000 to 12,000 ft., the dwarf pine, which grows in a tangle on the earth over which one walks, and may not show for a century’s growth more than a foot of height or an inch of girth. The Nevada slope of the mountains below 7500 ft. is covered with the nut pine down to the sage plains. Its nuts are gathered in enormous amounts by the Indians for food; and it is estimated that the yearly harvest of these nuts exceeds in bulk that of all the cereals of California (John Muir). On the Sierra the underbrush is characterized by the pungent manzanita, the California buckeye and the chamiso; the last two growing equally abundantly on the Coast Range. The chamiso and the manzanita, with a variety of shrubby oaks and thorny plants, often grow together in a dense and sometimes quite impenetrable undergrowth, forming what is known as “chaparral”; if the chamiso occurs alone the thicket is a “chamisal.” The elm, the hickory, the beech, the chestnut, and many others of the most characteristic and useful trees of the eastern states were originally entirely wanting in California. Oaks are abundant; they are especially characteristic of the Great Valley, where they grow in magnificent groves. Up to 1910 national forest reserves amounted to 27,968,510 acres. In 1909 Congress created a national forest to include the big tree groves in Calaveras and Tuolumne counties. One of the noblest redwood areas (that of Santa Cruz county) is a state reservation (created in 1901). Even within reservations almost all the merchantable timber is owned by private individuals. In addition to native trees many others—especially ornamental species—have been successfully introduced from various parts of the world.

Soil.—Sand and loams in great variety, grading from mere sand to adobe, make up the soils of the state. The plains of the north-east counties are volcanic, and those of the south-east sandy. It is impossible to say with accuracy what part of the state may properly be classed as tillable. The total farm acreage in 1900 was 28,828,951 acres, of which 41.5% were improved; since 1880 the absolute amount of improved land has remained practically constant, despite the extraordinary progress of the state in these years. Much land is too rough, too elevated or too arid ever to be made agriculturally available; but irrigation, and the work of the state and national agricultural bureaus in introducing new plants and promoting scientific farming, have accomplished much that once seemed impossible. The peculiarities of the climate, especially its division into two seasons, make Californian (and Southern Arizona) agriculture very different from that of the rest of the country. During the winter no shelter is necessary for live-stock, nor, during summer, for the grains that are harvested in June and July, and may lie for weeks or months in the field. The mild, wet winter is the season of planting and growth, and so throughout the year there is a succession of crops. The dangers of drought in the long dry seasons particularly increase the uncertainties of agriculture in regions naturally arid. Irrigation was introduced in Southern California before 1780, but its use was desultory and its spread slow till after 1850. In 1900 almost 1,500,000 acres were irrigated—an increase of 46% since 1890. About half of this total was in San Joaquin Valley. California has the greatest area of irrigated land of any state in the Union, and offers the most complete utilization of resources. In the south artesian wells, and in the Great Valley the rivers of the Sierra slope, are the main source of water-supply. On nearly all lands irrigated some crops will grow in ordinary seasons without irrigation, but it is this that makes possible selection of crops; practically indispensable for all field and orchard culture in the south, save for a few moist coastal areas, it everywhere increases the yield of all crops and is practised generally all over the state. Of the acreage devoted to alfalfa in 1899, 76.2% was irrigated; of that devoted to subtropical fruits, 71.7%. Small fruits, orchard fruits, hay, garden products and grains are decreasingly dependent on irrigation; wheat, which was once California’s great staple, is (for good, but not for best results) comparatively independent of it,—hence its early predominance in Californian agriculture, due to this success on arid lands since taken over for more remunerative irrigated crops.

Agriculture.—The spread of irrigation and of intensive cultivation, and the increase of small farms during the last quarter of the 19th century, have made California what it is to-day. Agriculture had its beginning in wheat-raising on great ranches, from 50,000 even to several hundred thousand acres in extent. A few of these, particularly in the Great Valley, are still worked, but only a few. The average size of farms in 1850 (when the

large Mexican grants were almost the only farms, and these unbroken) was 4466 acres; in 1860 it was 466.4, and in 1900 only 397.4 acres. Stock ranches, tobacco plantations, and hay and grain farms, average from 800 to 530 acres, and counteract the tendency of dairy farms, beet plantations, orchards, vegetable gardens and nurseries to lower the size of the farm unit still further. The renting of large holdings prevails to a greater extent than in any other state except Texas. From 1880 to 1900 the number of farms above 500 and below 1000 acres doubled; half of the total in 1900 were smaller than 100 acres. The most remunerative and most characteristic farming to-day is diversified and intensive and on small holdings. The essential character of California's economic life has been determined by the successive predominance of grass, gold, grain and fruits. Omitting the second it may be truly said that the order of agricultural development has been mainly one of blind experiment or fortuitous circumstances. Staple products have changed with increasing knowledge of climatic conditions, of life-zones and of the fitness of crops; first hides and tallow, then wool, wheat, grapes (which in the early eighteen-nineties were the leading fruit), deciduous orchard fruits, and semi-tropical citrus fruits successively. Prunes were introduced in 1854, but their possibilities were only slightly appreciated for some thirty years. Of various other crops much the same is true. Of late years progress has been very intelligent; in earlier years it was gained through a multitude of experiments and failures, and great pecuniary loss, and progress was a testimonial chiefly to courage and perseverance. The possibilities of the lower Sonoran and tropical areas are still imperfectly known. Nature has been niggard of rain but lavish in soil and sun. Irrigation has shown that with water, arid and barren plains, veritable deserts may be made to bloom with immense wealth of semi-tropical fruits; and irrigation in the tropical area along the Colorado river, which is so arid that it naturally bears only desert vegetation, has made it a true humid-tropical region like Southern Florida, growing true tropical fruits.

In 1900 California ranked eleventh among the states in total value of farm property ($796,527,955) and in 1899 fourteenth in the value of farm products ($131,690,606). The growth of the former from 1890 to 1900 was only 2.5%, one of the smallest increases among all the states.

The pastoral period extended from 1769 to 1848. The live-stock industry was introduced by the Franciscans and flourished exceedingly. In 1834, when the missions had already passed their best days, there were some 486,000 cattle, horses, mules and asses on the ranges, and 325,000 small animals, principally sheep. Throughout the pre-American period stock-raising was the leading industry; it built up the prosperity of the missions, largely supported the government and almost exclusively sustained foreign commerce. Hides and tallow were the sum and substance of Californian economy. Horses were slaughtered wholesale at times to make way for cattle on the ranges. There was almost no dairying; olive oil took the place of butter, and wine of milk, at the missions; and in general indeed the Mexicans were content with water. In the development of the state under the American regime the live-stock industry has been subordinate. A fearful drought in 1862-1864 greatly depressed it, and especially discouraged cattle ranching. Sheep then became of primary importance, until the increase of the flocks threatened ranges and forests with destruction. As late as 1876 there were some 7,000,000 sheep, in 1900 only 2,581,000, and in 1906 only 1,750,000. In the total value of all live stock (5,402,297 head) in 1900 ($65,000,000) the rank of the state was 15th in the Union, and in value of dairy products in 1899 (12.84 million dollars) 12th. The live-stock industry showed a tendency to decline after 1890, and the dairy industry also, despite various things—notably irrigation and alfalfa culture—that have favoured them.

Cereals replaced hides and tallow in importance after 1848. Wheat was long California's greatest crop. Its production steadily increased till about 1884, the production in 1880, the banner year, being more than 54 million bushels (32,537,360 centals). Since 1884 its production has markedly fallen off; in 1905 the wheat crop was 17,542,013 bushels, and in 1906, 26,883,662 bushels (valued at $20,162,746). There has been a general parallelism between the amount of rain and the amount of wheat produced; but as yet irrigation is little used for this crop. In the eighth decade of the 19th century, the value of the wheat product had come to exceed that of the annual output of gold. Barley has always been very important. The acreage given to it in 1899 was one-fourth the total cereal acreage, and San Francisco in 1902-1904 was the shipping point of the larger part of American exported barley, of (roughly) three-quarters in 1902, seven-eighths in 1903 and four-fifths in 1904. In 1906 California produced 38,760,000 bushels of barley, valued at $20,930,400. The great increase in the acreage of barley, which was 22.5% of the country's barley acreage in 1906, and 24.2% in 1905, is one reason for the decreased production of wheat. The level nature of the great grain farms of the valley led to the utilization of machinery of remarkable character. Combined harvesters (which enter a field of standing grain and leave this grain piled in sacks ready for shipment), steam gang-ploughs, and other farm machinery are of truly extraordinary size and efficiency. In 1899 cereals represented more than a third of the total crop acreage and crop product ($93,641,334) of the state. Wheat and other cereals are in part cut for hay, and the hay crop of 1906 was 1,133,465 tons, valued at $12,751,481. California is one of the leading hop-producing states of the Union, the average annual production since 1901 being more than 10,000,000 lb. The product of sugar beets increased between 1888 and 1902 from 1910 to 73,761 tons (according to the state board of trade), and in 1909 (according to the department of agriculture) it was 882,084 tons, from which 254,544,000 lb of sugar was manufactured. In this industry California in 1909 ranked second to Colorado. Truck gardening for export is an assured industry, especially in the north. Great quantities of vegetables, fresh and canned, are shipped yearly, and the same is true on a far larger scale of fruit. Vegetable exports more than doubled between 1894 and 1903. In 1899 hay and grain represented slightly more than a third of the farm acreage and capital and also of the value of all farm products; live-stock and dairy farms represented slightly more than half the acreage, and slightly under 30% of the capital and produce; fruit farms absorbed 6.2% of the acreage and 27% of the capital, and returned 22.5% of the value of farm produce.

Fruit-growing.—Horticulture is now the principal industry, and in this field California has no rival in the United States, although ranking after Florida in the growth of some tropical or semi-tropical fruits,—pineapples, guava, limes, pomeloes or grape-fruit and Japanese persimmons. In 1899 California's output of fruit was more than a fifth of that of the whole Union. The supremacy of the state is established in the growth of oranges, lemons, citrons, olives, figs, almonds, Persian (or English) walnuts, plums and prunes, grapes and raisins, nectarines, apricots and pomegranates; it also leads in pears, and peaches, but here its primacy is not so assured. Southern California by no means monopolizes the warm-zone fruits. Oranges, lemons and walnuts come chiefly from that section, but citrus fruits grow splendidly in the Sierra foothills of the Sacramento Valley, and indeed ripen earlier there than in the southern district. Almonds, as well as peaches, pears, plums, cherries and apricots, come mainly from the north. Over half of the prune crop comes from Santa Clara county, and the bulk of the raisin output from Fresno county. Olives thrive as far north as the head of the Great Valley, growing in all the valleys and foothills up to 1500 or 2000 ft. They were introduced by the Franciscans (as were various other subtropical fruits, pears

and grapes), but their scientific betterment and commercial importance date from about 1885. They grow very abundantly and of the finest quality; for many years poor methods of preparation prejudiced the market against the Californian product, but this has ceased to be the case. The modern orange industry practically began with the introduction into Southern California in 1873 of two seedless orange trees from Brazil; from their stock have been developed by budding millions of trees bearing a seedless fruit known as the “Washington navel,” which now holds first rank in American markets; other varieties, mainly seedlings, are of great but secondary importance. Shipments continue the year round. There has been more than one horticultural excitement in California, but especially in orange culture, which was for a time almost as epidemic a fever as gold seeking once was. By reason of the co-operative effort demanded for the large problems of irrigation, packing and marketing, the citrus industry has done much for the permanent development of the state, and its extraordinary growth made it, towards the close of the 19th century, the most striking and most potent single influence in the growth of agriculture. State legislation has advanced the fruit interest in all possible ways. Between 1872 and 1903 exports of canned fruits increased from 91 to 94,205 short tons; between 1880 and 1903 the increase of dried fruit exports was from 295 to 149,531 tons; of fresh deciduous fruits, from 2590 to 101,199; of raisins, from 400 to 39,963; of citrus fruits, from 458 to 299,623; of wines and brandies between 1891 and 1903, from 47,651 to 97,332 tons. Of the shipments in 1903 some 44% were from Southern California,—*i.e.* from the seven southernmost counties.

Grape culture has a great future in California. Vines were first introduced by the Franciscans in 1771 from Spain, and until after 1860 “Mission” grapes were practically the only stock in California. Afterwards many hundreds of European varieties were introduced with great success. “The state has such a variety of soil, slope, elevation, temperature and climatic conditions as to reproduce, somewhere within its borders, any wine now manufactured” (United States Census, 1900); but experience has not as yet divided the state into districts of specialized produce, nor determined just how far indigenous American vines may profitably be used, either as base or graftings, with European varieties. Grapes are grown very largely over the state. Raisins do well as far north as Yolo county, but do best in Madera, Fresno, Kings, Tulare and San Diego counties. The product is more than sufficient for the markets of the United States. Dry wine grapes do best in the counties around San Francisco Bay, on unirrigated lands; while sweet wine stocks do best in Yolo, San Joaquin and the counties of the raisin grape, and on irrigated lands. In 1900 California produced about three-fifths in value ($3,937,871) and in 1905 the same proportion ($6,688,620) of the wine output of the United States. The value of product more than sextupled from 1880 to 1900. In quantity the product was more than four times the combined product of all other states. The better California wines are largely sold under French labels. Brandies are an important product. They are made chiefly from grapes, and are used to fortify wines. It was officially estimated that in the spring of 1904 there were some 227,000 acres of vineyards in the state, of which exactly five-tenths were in wine grapes and four-tenths in raisin grapes.

Gold.—Between the pastoral period and the era of wheat was the golden epoch of Californian history. The existence of gold had long been suspected, and possibly known, in California before 1848, and there had been desultory washings in parts where there was very little to reward prospectors. The first perfectly authenticated discovery was made near Los Angeles in 1842. The discovery of real historical importance was made in January 1848 (the 24th is the correct date) at John A. Sutter’s mill, on the south fork of the American river near Coloma, by a workman, James W. Marshall (1810-1885). His monument now marks the spot. From 1848 to the 1st of January 1903, according to the state mining bureau, California produced $1,379,275,408 in gold. There were two periods of intense excitement. The first ended in 1854, at which time there was a decided reaction throughout the United States in regard to mining matters. The Californian discoveries had given rise to a general search for metalliferous deposits in the Atlantic states, and this bad been followed by wild speculations. At the time of their greatest productiveness, from 1850 to 1853, the highest yield of the washings was probably not less than $65,000,000 a year; according to the state mining bureau the average production from 1851-1854 was $73,570,087 ($81,294,270 in 1852, the banner year), and from 1850-1861 $55,882,861, never falling below $50,000,000. The estimates of other competent authorities differ considerably, and generally are somewhat less generous than these figures.

At first the diggings were chiefly along the rivers. These were “flumed,”—that is, the water was diverted by wooden flumes from the natural channel and the sand and gravel in the bed were washed. All the “gulches” or ravines leading down into the canyons were also worked over, with or without water. These were the richest “placers,” but in them the gold was very unequally distributed. Those who first got possession of the rich bars on the American, Yuba, Feather, Stanislaus and the other smaller streams in the heart of the gold region, made sometimes from $1000 to $5000 a day; but after one rich spot was worked out it might be days or weeks before another was found. In 1848 $500-700 a day was not unusual luck; but, on the other hand, the income of the great majority of miners was certainly far less than that of men who seriously devoted themselves to trade or even to common labour. Many extraordinary nuggets were found, varying from $1000 to $20,000 in value. The economic stimulus given by such times may be imagined. For several years gold-dust was a regular circulating medium in the cities as well as in the mining districts of the state. An ounce of dust in 1848 frequently went for $4 instead of $17; for a number of years traders in dust were sure of a margin of several dollars, as for example in private coinage, mints for which were common by 1851. From the record of actual exports and a comparison of the most authoritative estimates of total production, it may be said that from 1848 to 1856 the yield was almost certainly not less than $450,000,000, and that about 1870 the billion dollar mark had been passed. Just at this time came the highest point and the sudden fall of the second great mining fever of the state. This was a stock speculation based on the remarkable output ($300,000,000 in 20 years) of the silver “bonanzas” of the Comstock lode at Virginia City, Nevada, which were opened and financed by San Francisco capitalists. The craze pervaded all classes. Shares that at first represented so many dollars per foot in a tangible mine were multiplied and remultiplied until they came to represent paper thicknesses or almost nothing, yet still their prices mounted upward. In April 1872 came the revulsion; there was a shrinkage of $60,000,000 in ten days; then in 1873 a tremendous advance, and in 1875 a final and disastrous collapse; in ten years thereafter the stock of the Comstock lode shrank from $3,000,000 to $2,000,000. This Comstock fever belongs to Californian rather than to Nevadan history, and is one of the most extraordinary in mining annals.

First the “rocker,” then the “tom,” the “flume,” and the hydraulic stream were the tools of the miner. Into the “rocker” and the “tom” the miner shovelled dirt, rocking it as he poured in water, catching the gold on riffles set across the bottom of his box; thus imitating in a wooden box the work of nature in the rivers. The “flume” enabled him to dry the bed of a stream while he worked over its gravels. The hydraulic stream came into use as early as

1852 (or 1853) when prospecting of the higher ground made it certain that the “deep” or “high” gravels—*i.e.* the detrital deposits of tertiary age—contained gold, though in too small quantities to be profitably worked in the ordinary way. The hydraulic process received an immense development through successive improvements of method and machinery. In this method tremendous blasts of powder, sometimes twenty-five or even fifty tons, were used to loosen the gravel, which was then acted on by the jet of water thrown from the “pipes.” To give an idea of the force of the agent thus employed it may be stated that when an eight-inch nozzle is used under a heavy head, more than 3000 ft. may be discharged in a minute with a velocity of 150 ft. per second. The water as it thus issues from the nozzle feels to the touch like metal, and the strongest man cannot sensibly affect it with a crowbar. A gravel bank acted on by such tremendous force crumbled rapidly, and the disintegrated material could be run readily through sluices to the “dumps.” Hydraulic mining is no longer practised on the scale of early days. The results were wonderful but disastrous, for the “dumps” were usually river-beds. From 1870-1879 the bed of Bear river was raised in places in its lower course 97 ft. by the detritus wash of the hydraulic mines, and that of Sleepy Hollow Creek 136 ft. The total filling up to that time on the streams in this vicinity had been from 100 to 250 ft., and many thousand acres of fine farming land were buried under gravel,—some 16,000 on the lower Yuba alone. For many years the mining interests were supreme, and agriculture, even after it had become of great importance, was invariably worsted when the two clashed; but in 1884 the long and bitter “anti-débris” or “anti-slickins” fight ended in favour of the farmers. In 1893 the United States government created a California Débris Commission, which has acted in unison with the state authorities. Permits for hydraulic mining are granted by the commission only when all gravel is satisfactorily impounded and no harm is done to the streams; and the improvement of these, which was impossible so long as limits were not set to hydraulic mining, can now be effectively advanced. Quartz mining began as early as 1851. In 1908 about five-eighths of the gold output was from such mines. Quartz veins are very often as good at a depth of 3000 ft. as at the surface. A remarkable feature of recent years (especially since 1900) is gold “dredging.” Thousands of acres even of orchard, vineyard and farming land have been thus treated in recent years. Gold was being produced in 1906 in more than thirty counties. The annual output since 1875 has been about $15,000,000 to $17,000,000; in 1905, according to the Mines Report, it was $18,898,545. Colorado now excels California as a gold producer.

Mineral Products.—California produces more than forty mineral substances that are of commercial significance. Gold, petroleum, copper, borax and its products, clays, quicksilver and silver lead, in order of importance, representing some four-fifths of the total. From 1894 to 1902 the aggregate production increased from 20.2 to 35.1 million dollars; in 1908 it was $65,137,636. Metallic products long represented three-fourths of the total, but the feature of recent years has been the rising importance of hydrocarbons and gases, and of structural materials, and indeed of non-metallic products generally. The production of crude petroleum has grown very rapidly since about 1895. Oil is found from north to south over some 600 m., but especially in Southern California. The high cost of coal, which has always been a hindrance to the development of manufactures, makes the petroleum deposits of peculiar value. Their total output increased from 4,250,000 to 44,854,737 barrels between 1900 and 1908, and the value of the product in 1908 was $23,433,502. The Kern river field is the most important in the state and one of the greatest in the world. Those of Coalinga, Santa Maria and Lompoc, and Los Angeles are next in importance. Both in 1900 and in 1905 California ranked fifth among the states of the United States in the petroleum refining industry. Copper has risen in importance in very recent years; it is mined mainly in Shasta county; the value of the state’s total product in 1908 was $5,232,986. Gold mining still centres in the mountainous counties north of Tuolumne. This is the region of quartz mining. In borax (of which California’s output in 1904 was 45,647 tons) and structural materials San Bernardino has a long lead. More than nine-tenths of the borax product of the country comes from about Death Valley. San Bernardino marbles have a very high repute. California was the fourth state of the Union in 1908 in the production of granite. It furnishes about two-fifths of the quicksilver of the world. This has been mined since 1824; the output was greatest from 1875-1883, when it averaged about 43,000,000 pounds. The New Almaden mine (opened in 1824) in Santa Clara county produced from 1850 to 1896 some 73,000,000 pounds. The centre of production is north and south of San Francisco Bay. Californian coal is almost wholly inferior brown lignite, together with a small quantity of bituminous coals of poor quality; the state does not produce a tenth part of the coal it consumes. Of growing importance are the gems found in California: a few diamonds in Butte county; rock crystal in Calaveras county; and tourmalines, kunzite, the rare pink beryl and bright blue topazes in San Diego county. Chrysoprase, mined near Porterville and near Visalia (Tulare county), is used partly for gems, but more largely (like the vesuvianite found near Exeter, in the same county) for mosaic work; and there are ledges of fine rose quartz in the Coahuila mountains of Riverside county and near Lemon Cove, Tulare county.

A vivid realization of the industrial revolution in the state is to be gained from the reflection that in 1875 California was pre-eminent only for gold and sheep; that the aggregate mineral output thirty years later was more than a third greater than then, and that nevertheless the value of farm produce at the opening of the 20th century exceeded by more than $100,000,000 the value of mineral produce, and exceeded by $50,000,000 the most generous estimate of the largest annual gold output in the annals of the state.

Manufactures.—Previous to 1860 almost every manufactured article used in the state was imported from the east or from Europe. Dairy products, for example, for whose production good facilities always existed, were long greatly neglected, and not for two decades at least after 1848 was the state independent in this respect. The high cost of coal, the speculative attractions of mining, and the high wages of labour, handicapped the development of manufactures in early years. The first continued to be a drag on such industries, until after 1895 the increasing use of crude petroleum obviated the difficulty. Several remarkable electric power and lighting plants utilize the water power of the mountains.[4] Geographic isolation has somewhat fostered state industries. The value of gross manufactured products increased 41.9% from 1890 to 1900. In the latter year California ranked 12th among the states in the gross value of all manufactures ($302,874,761); the per-capita value of manufactured and agricultural products being $293,—$89 of the latter, $204 of the former. Of the wage-earners 61% were engaged in manufacturing. Fourteen industries represented from 41% to 45% of the employees, wages, capital and product of the aggregate manufacturers of the state. The leading ones in order of importance and the value of product in millions of dollars were: the manufacture of railway, foundry, and machine shop products (19.6 million dollars), lumber and timber industries (18.57), sugar and molasses refining (15.91), beef slaughtering (15.72), canning and preserving (13.08), flour and grist milling (13.10), the manufacture of malt, vinous and distilled liquors (9.26), leather industries (7.40), printing and publishing (6.86). In the second, third and fifth of these industries the state ranked respectively fifth, fourth and first in the Union.[5] The canning and preserving of fruits and vegetables is in the main an industry of the northern and central counties. In 1890 the state board of forestry

estimated that the redwood forests were in danger of exhaustion by 1930. The redwood is a general utility lumber second only to the common white pine, and the drain on the woods has been continuous since 1850. The wood has a fine, straight and even grain; and though light and soft, is firm and extremely durable, lying, it is authoritatively asserted, for centuries in the forest without appreciable decay. It takes a beautiful polish. The colour varies from cedar colour to mahogany. A small southern belt in San Mateo, Santa Clara and Santa Cruz counties is not being commercially exploited. The annual lumber cut from 1898-1903 averaged more than 663,348,000 ft.; of the 852,638,000 ft. cut in 1903, 465,460,000 were of redwood, and 264,890,000 of yellow pine; fir and sugar pines contributing another 104,600,000, and spruce and cedar 17,670,000 ft. In 1900 California ranked 16th among the states in value of product ($13,764,647, out of a total of $566,852,984). The total cut was under ½ of 1% of the estimated stand. In Humboldt county, in the redwood belt near Eureka, are probably the most modern and remarkable lumber mills of the world. In 1900 it was estimated that lumbermen controlled somewhat less than a fifth of the timber of the state, and the same part of the redwood. After 1890 important shipyards were established near San Francisco. The most important naval station of the United States on the Pacific coast is at Mare Island at the northern end of San Francisco Bay, and the private Union Iron Works, on the peninsula near San Francisco, is one of the largest shipyards of the country. In 1905 more than one-half of the factory product was the output of four cities: San Francisco ($137,788,233), Los Angeles ($34,814,475), Sacramento ($10,319,416) and Fresno ($9,849,001); next ranked Oakland, Stockton, and San José.

The transportation facilities in California increased rapidly after 1870. The building of the Central Pacific and Union Pacific lines are among the romances of American railway history. They joined tracks near Ogden, Utah, in May 1869. The New Orleans line of the Southern Pacific was opened in January 1883; the Atchison, Topeka & Santa Fé completed its line to San Diego in 1885, and to San Francisco Bay in 1900. The San Pedro, Los Angeles & Salt Lake, with trans-continental connexions at the eastern terminus, was chartered in 1901 and fully opened in March 1903. Railway mileage increased 137.3% from 1870 to 1880, and 154.6% from 1880 to 1900. At the close of 1908 the total mileage was 7039.36 m., practically all of which is either owned or controlled by the two great trans-continental systems of the Southern Pacific and the Atchison, Topeka & Santa Fé. From 1869 to 1875 registered mail exchanges were opened with China, Japan, Hawaii and Australia. There are now frequent mail connexions from San Francisco with Hawaii, Australasia, and eastern Asia, as well as with American ports north and south. The commerce of San Francisco amounts to some $80,000,000 or $90,000,000 yearly, about equally divided between imports and exports, until after 1905—in 1907 the imports were valued at $54,207,011, and the exports at $30,378,355 (less than any year since 1896). San Diego has a very good harbour, and the harbours of San Pedro (Los Angeles) and Eureka are fairly good and of growing importance. Grains, lumber, fish, fruits and fruit products, petroleum, vegetables and sugar are the leading items in the commerce of San Francisco. Other ports are of very secondary importance. Navigation on the Sacramento and San Joaquin rivers was very important in early days, but is to-day of relatively slight importance in comparison with railway traffic.

Population.—The population of California increased in successive decades from 1850 to 1910 respectively by 310.3, 47.3, 54.3, 40.3, 22.4 and 60.1%. (The percentage of increase in 1900-1910 was exceeded in Washington, Oklahoma, Idaho, Nevada, North Dakota and Oregon.) In 1910 the total population was 2,377,549, or 15.2 per sq. m. In 1900 there were 116 incorporated towns and cities; and of the total population 43.3% was urban,—*i.e.* resident in cities (11 in number) of 8000 or more inhabitants. These 11 cities were: San Francisco (pop. 342,782), Los Angeles (102,479), Oakland (66,960), Alameda (16,464), Berkeley (13,214),—the last three being suburbs of San Francisco, and the last the seat of the state university,—Sacramento, the state capital (29,282), San José (21,500), San Diego (17,700), Stockton (17,506), Fresno (12,470), and Pasadena (9117). Eight other cities had populations of more than 5000—Riverside City (7973), Vallejo (7965), Eureka (7327), Santa Rosa (6673), Santa Barbara (6587), San Bernardino (6156), Santa Cruz (5659), and Pomona (5526).

Of the entire population in 1900 persons of foreign birth or parentage (one or both parents being foreign) constituted 54.2 and those of native birth were 75.3%. Of the latter six-tenths were born in California. The foreign element included 45,753 Chinese (a falling off of 25,313 since 1890), and 10,151 Japanese (an increase of 9004 in the same decade). Twenty-two foreign countries contributed over 1000 residents each, the leading ones being the United Kingdom (91,638), Germany (72,449), Canada (29,618; 27,408 being English Canadians), Italy (22,777), Sweden (14,549), France (12,256), Portugal (12,068), Switzerland (10,974), Japan, Denmark, and Mexico, in the order named. Persons of negro descent numbered 11,045. Almost all the Indians of the state are taxed as citizens. In 1906 of 611,464 members of religious denominations 354,408 were Roman Catholics, 64,528 Methodist Episcopalians, 37,682 Presbyterians, 26,390 Congregationalists, 24,801 Baptists, 21,317 Protestant Episcopalians, 11,371 Lutherans, and 9,110 members of Eastern Orthodox churches. A peculiar feature in the population statistics of California is the predominance of males, which in 1900 was 156,009; the Asiatic element accounts for a third of this number. Since 1885 the eight counties south of the Tehachapi Range, which are known collectively and specifically as Southern California have greatly advanced in population. In 1880 their population was 7.3, in 1890 17.2, and in 1900 20.1% of the total population of the state. The initial impulse to this increase was the beginning of the “fruit epoch” in these counties, combined with a railway “rate-war” following the completion to the coast in 1885 of the Santa Fe, and an extraordinary land boom prevailing from 1886 to 1888. The conjuncture of circumstances, and the immigration it induced, were unusual. The growth of the South, as of the rest of the state, has been continuous and steady.

The Indians were prominent in early Californian history, but their progress toward their present insignificance began far back in the Spanish period. It proceeded much more rapidly after the restraining influence of the missions was removed, leaving them free to revert to savagery; and the downward progress of the race was fearfully accelerated during the mining period, when they were abused, depraved, and in large numbers killed. There have been no Indian wars in California’s annals, but many butcheries. The natives have declined exceedingly in number since 1830, in 1900 numbering 15,377. They have always been mild-tempered, low, and unintelligent, and are to-day a poor and miserable race. They are all called “Digger Indians” indiscriminately, although divided by a multiplicity of tongues.

Government and Institutions.—In the matter of constitution-making California has been conservative, having had only two between 1849 and 1910. The first was framed by a convention at Monterey in 1849, and ratified by the people and proclaimed by the United States military governor in the same year. The present constitution, framed by a convention in 1878-1879, came into full effect in 1880, and was subsequently amended. It was the work of the labour party, passed at a time of high discontent, and goes at great length into the details of government, as was demanded by the state of public opinion. The qualifications required for the suffrage are in

no way different from those common throughout the Union, except that by a constitutional amendment of 1894 it is necessary for a voter to be able to read the state constitution and write his name. As compared with the earlier constitution it showed many radical advances toward popular control, the power of the legislature being everywhere curtailed. The power of legislation was taken from it by specific inhibition in thirty-one subjects before within its power; its control of the public domain, its powers in taxation, and its use of the state credit were carefully safe-guarded. “Lobbying” was made a felony; provisions were inserted against lotteries and stock-exchange gambling, to tax and control common carriers and great corporations, and to regulate telegraph, telephone, storage and wharfage charges. The powers of the executive department were also somewhat curtailed. For the judiciary, provisions were made for expediting trials and decisions. Notable was the innovation that agreement by three-fourths of a jury should be sufficient in civil cases and that a jury might be waived in minor criminal cases, a provision which of course was based on experience under the Mexican law. All these changes in the organic law reflect bitter experience after 1850; and, read with the history of those years as a commentary, few American constitutions are more instructive. The constitution of 1879 corresponds very closely to the ordinary state constitution of to-day. The incorporation of banks issuing circulating notes is forbidden. Marriage is not only declared a civil contract, but the laws expressly recognize that the mere consent of the parties is adequate to constitute a binding marriage. The union of whites with persons of African descent is forbidden. Felons twice convicted may not be pardoned except on the recommendation of a majority of the judges of the supreme court. Judges and state executive officers are elected for terms longer than is usual in the different states (supreme judges 12 years, executive officers 4 years). These few provisions are mentioned, not as of particular importance in themselves, but as exceptions of some moment to the usual type of state Constitutions (see United States). The Australian ballot was introduced in 1891. In local government there are no deviations from the usual types that demand notice. In the matter of liquor-laws there is local option, and a considerable proportion of the towns and smaller cities, particularly in the south, adopt prohibition. In most of the rest high licence is more or less strictly enforced.

The total assessed valuation of property grew from $666,399,985 in 1880 to $1,217,648,683 in 1900 and $1,879,728,763 in 1907. In 1904, when the U.S. Census Report showed California to be the twenty-first state of the Union in population but the sixth in wealth, the total estimated true value of all property was $4,115,491,106, of which $2,664,472,025 was the value of real property and improvements thereon. The per capita wealth of the state was then reported as $2582.32, being exceeded only by the three sparsely settled states of Montana, Wyoming and Nevada. In 1898 California had the largest savings-bank deposit per depositor ($637.75) of any state in the Union; the *per caput* deposit was $110 in 1902, and about one person in seven was a depositor. The state bonded debt in 1907 amounted to three and a half million dollars, of which all but $767,529.03 was represented by bonds purchased by the state and held for the school and university funds; for the common school fund on the 1st of July 1907 there were held bonds for $4,890,950, and $800,000 in cash available for investment; for the university fund there were held $751,000 in state bonds, and a large amount in other securities. The total bonded county indebtedness was $4,879,600 in 1906 (not including that of San Francisco, a consolidated city and county, which was $4,568,600). A homestead, entered upon record and limited to a value of $5000 if held by the head of a family and to a value of $1000 if held by one not the head of a family, is exempt from liability for debts, except for a mortgage, a lien before it was claimed as a homestead or a lien afterward for improvements. A homestead held by a married man cannot be mortgaged without consent of his wife.

Under an act approved on the 25th of March 1903 a state board of charities and corrections,—consisting of six members, not more than three being of the same political party, appointed by the governor, with the advice and consent of the senate, and holding office for twelve years, two retiring at the end of each quadrennium,—investigates, examines, and makes “reports upon the charitable, correctional and penal institutions of the state,” excepting the Veterans’ Home at Yountville, Napa county, and the Woman’s Relief Corps Home at Evergreen, Santa Clara county. There are state prisons with convicts working under the public account system, at San Quentin, Marin county, and Folsom, Sacramento county. The Preston (Sonoma county) School of Industry, for older boys, and the Whittier (Los Angeles county) State School, for girls and for boys under sixteen, are the state reformatories, each having good industrial and manual training departments. There are state hospitals for the insane at Agnew, Santa Clara county; at Stockton, San Joaquin county; at Napa, Napa county; at Patton, San Bernardino county; and, with a colony of tubercular patients, at Ukiah, Mendocino county. In 1906 the ratio of insane confined to institutions, to the total population, was 1 to every 270. Also under state control are the home for care and training of feeble-minded children, at Eldridge, Sonoma county; the institution for the deaf and the blind at Berkeley, and the home of mechanical trades for the adult blind at Oakland. A Juvenile Court Law was enacted in 1903 and modified in 1905.

The educational system of California is one of the best in the country. The state board of education is composed of the governor of the state, who is its president; the superintendent of public instruction, who is its secretary; the presidents of the five normal schools and of the University of California, and the professor of pedagogy in the university. Sessions are long in primary schools, and attendance was made compulsory in 1874 (and must not be less than two-thirds of all school days). The state controlled the actual preparation and sale of text-books for the common schools from 1885 to 1903, when the Perry amendment to the constitution (ratified by popular vote in 1884) was declared to mean that such text-books must be manufactured within the state, but that the texts need not be prepared in California. The experiment of state-prepared text-books was expensive, and its effect was bad on the public school system, as such text-books were almost without exception poorly written and poorly printed. After 1903 copyrights were leased by the state. Secondary schools are closely affiliated with, and closely inspected by, the state university. All schools are generously supported, salaries are unusually good, and pension funds in all cities are authorized by state laws. The value of school property in 1900 was $19,135,722, and the expenditure for the public schools $6,195,000; in 1906 the value of school property was $29,013,150, and the expenditure for public schools $10,815,857. The average school attendance for all minors of school age (5-20 years) was 59.9%; of those native-born 61.5, of those foreign-born 34.6; of coloured children, including Asiatics and Indians, 35.8, and of white, 60.8%. In 1900, 6.2% of the males of voting age, and 2.4% of the native-born males of voting age, were illiterate (could not write). Some 3% of the total population could not speak English; Chinese and Japanese constituting almost half of the number, foreign-born whites somewhat less, and Indians and native-born whites of foreign parentage together less than a tenth of the total. Of the higher educational institutions of the state the most important are the state university at Berkeley and Leland Stanford Jr. University at Palo Alto. The former is supported with very great liberality by the state; and the latter, the endowment of which is private (the state, however, exempting it from taxation), is one of the richest educational institutions of

America. In 1906 there were also five state normal schools (at Chico, Los Angeles, San Diego, San Francisco, and San José), and a considerable number of denominational colleges. There is also a state polytechnic school at San Luis Obispo (1903).

History.—The name "California" was taken from Ordoñez de Montalvo's romance of chivalry *Las Sergas de Esplandian* (Madrid, 1510), in which is told of black Amazons ruling an island of this name "to the right of the Indies, very near the quarter of the terrestrial paradise." The name was given to the unknown north-west before 1540. It does not show that the namers were prophets or wise judges, for the Spaniards really knew California not at all for more than two centuries, and then only as a genial but rather barren land; but it shows that the *conquistadores* mixed poetry with business and illustrates the glamour thrown about the "Northern Mystery." Necessarily the name had for a long time no definite geographical meaning. The lower Colorado river was discovered in 1540, but the explorers did not penetrate California; in 1542-1543 Juan Rodriguez Cabrillo explored at least the southern coast; in 1579 Sir Francis Drake repaired his ships in some Californian port (almost certainly not San Francisco Bay), and named the land New Albion; two Philippine ships visited the coast in 1584 and 1595, and in 1602 and 1603 Sebastian Vizcaino discovered the sites of San Diego and Monterey. There was apparently no increase of knowledge thereafter for 150 years. Most of this time California was generally supposed to be an island or a group of islands. Jesuit missionaries entered Lower California as early as 1697, maintaining themselves there until Charles III.'s expulsion in 1767 of all Jesuits from his dominions; but not until Russian explorations in Alaska from 1745-1765 did the Spanish government show interest in Upper California. Because of these explorations, and also the long-felt need of a refitting point on the California coast for the galleons from Manila, San Diego was occupied in 1769 and Monterey in 1770 as a result of urgent orders from Charles III. San Francisco Bay was discovered in the former year. Meanwhile the Jesuit property in the Peninsula had been turned over to Franciscan monks, but in 1772 the Dominicans took over the missions, and the Franciscans not unwillingly withdrew to Upper California, where they were to thrive remarkably for some fifty years.

The rule of the missions.

This is the mission period—or from an economic standpoint, the pastoral period—of Californian history. In all, twenty-one missions were established between 1769 and 1823. The leader in this movement was a really remarkable man, Miguel José Serra (known as Junipero Serra, 1713-1784), a friar of very great ability, purest piety, and tireless zeal. He possessed great influence in Mexico and Madrid. "The theory of the mission system," says H.H. Bancroft, "was to make the savages work out their own salvation and that of the priests also." The last phrase scarcely does justice to the truly humane and devout intentions of the missionaries; but in truth the mission system was a complete failure save in the accumulation of material wealth. Economically the missions were the blood and life of the province. At them the neophytes worked up wool, tanned hides, prepared tallow, cultivated hemp and wheat, raised a few oranges, made soap, some iron and leather articles, mission furniture, and a very little wine and olive oil. Such as it was, this was about the only manufacturing or handicraft in California. Besides, the hides and tallow yielded by the great herds of cattle at the missions were the support of foreign trade and did much toward paying the expenses of the government. The Franciscans had no sympathy for profane knowledge, even among the Mexicans,—sometimes publicly burning quantities of books of a scientific or miscellaneous nature; and the reading of Fénelon's *Télémaque* brought excommunication on a layman. As for the intellectual development of the neophytes the mission system accomplished nothing; save the care of their souls they received no instruction, they were virtually slaves, and were trained into a fatal dependence, so that once coercion was removed they relapsed at once into barbarism. It cannot be said, however, that Anglo-Americans have done much better for them.

The political upheavals in Spain and Mexico following 1808 made little stir in this far-off province. Joseph was never recognized, and allegiance was sworn to Ferdinand (1809). When revolution broke out in Mexico (1811), California remained loyal, suffering much by the cessation of supplies from Mexico, the resulting deficits falling as an added burden upon the missions. The occupation of Monterey for a few hours by a Buenos Aires privateer (1818) was the only incident of actual war that California saw in all these years; and it, in truth, was a ridiculous episode, fit introduction to the bloodless play-wars, soon to be inaugurated in Californian politics. In 1820 the Spanish constitution was duly sworn to in California, and in 1822 allegiance was given to Mexico. Under the Mexican Federal constitution of 1824 Upper California, first alone (it was made a distinct province in 1804) and then with Lower California, received representation in the Mexican congress.

The following years before American occupation may be divided into two periods of quite distinct interest. From about 1840 to 1848 foreign relations are the centre of interest. From 1824 to 1840 there is a complicated and not uninteresting movement of local politics and a preparation for the future,—the missions fall, republicanism grows, the sentiment of local patriotism becomes a political force, there is a succession of sectional controversies and personal struggles among provincial chiefs, an increase of foreign commerce, of foreign immigration and of foreign influence.

The Franciscans were mostly Spaniards in blood and in sympathies. They viewed with displeasure and foreboding the fall of Iturbide's empire and the creation of the republic. They were not treasonable, but talked much, refusing allegiance to the new government; and as they controlled the resources of the colony and the good will of the Indians, they felt their strength against the local authority; besides, they were its constant benefactors. But secularization was in harmony with the growth of republican ideas. There was talk in California of the rights of man and neophytes, and of the sins of friars. The missions were never intended to be permanent. The missionaries were only the field workers sent out to convert and civilize the Indians, who were to be turned over then to the regular clergy, the monks pushing further onward into new fields. This was the well-established policy of Spain. In 1813 the Spanish Cortes ordered the secularization of all missions in America that were ten years old, but this decree was not published in California until 1821. After that secularization was the burning question in Californian politics. In 1826 a beginning toward it was made in partially emancipating the neophytes, but active and thorough secularization of the missions did not begin until 1834; by 1835 it was consummated at sixteen missions out of twenty-one, and by 1840 at all. At some of the missions the monks acted later as temporary curates for the civil authorities, until in 1845-1846 all the missions were sold by the government. Unfortunately the manner of carrying it out discredited a policy neither unjust nor bad in itself, increasing its importance in the political struggles of the time. The friars were in no way mistreated: Californians did not share Mexican resentments against Spaniards, and the national laws directed against these were in the main quietly ignored in the province. In 1831 the mission question led to a rising against the reactionary clerical rule of Governor Manuel Victoria. He was driven out of the province.

This was the first of the opéra bouffe wars. The causes underlying them were serious enough. In the first place, there was a growing dissatisfaction with Mexican rule, which accomplished nothing tangible for good in California,—although its plans were as excellent as could be asked had there only been peace and means to realize them; however, it made the mistake of sending convicts as soldiers. Californians were enthusiastic republicans, but found the benefits of republicanism slow in coming. The resentment of the Franciscans, the presence of these and other reactionaries and of Spaniards, the attitude of foreign residents, and the ambitions of leading Californian families united to foment and propagate discontent. The feeling against Mexicans—those "de la otra banda" as they were significantly termed—invaded political and even social life. In the second place, there was growing jealousy between northern towns and southern towns, northern families and southern families. These entered into disputes over the location of the capital and the custom-house, in the Franciscan question also (because the friars came some from a northern and some from a southern college), and in the question of the distribution of commands in the army and offices in the civil government. Then there was the mission question; this became acuter about 1833 when the friars began to destroy, or sell and realize on, the mission property. The next decade was one of plunder and ruin in mission history. Finally there was a real growth of republicanism, and some rulers—notably Victoria—were wholly out of sympathy with anything but personal, military rule. From all these causes sprang much unrest and considerable agitation.

In 1828-1829 there was a revolution of unpaid soldiers aided by natives, against alleged but not serious abuses, that really aimed at the establishment of an independent native government. In 1831 Governor Victoria was deposed; in 1836 Governor Mariano Chico was frightened out of the province; in 1836 Governor Nicolas Gutierrez and in 1844-1845 Governor Manuel Micheltorena were driven out of office. The leading natives headed this last rising. There was talk of independence, but sectional and personal jealousies could not be overcome. In all these wars there was not enough blood shed to discolour a sword. The rising of 1836 against Gutierrez seems to-day most interesting, for it was in part a protest against the growth of federalism in Mexico. California was even deferred to as (declared to be seems much too strong a statement) an Estado Libre y Soberano; and from 1836 to 1838, when the revolutionary governor, Juan B. Alvarado, was recognized by the Mexican government, which had again inclined to federalism and, besides, did not take the matter very seriously, the local government rested simply on local sentiment. The satisfaction of this ended all difficulties.

American immigration.

By this time foreign influence was showing itself of importance. Foreign commerce, which of course was contraband, being contrary to all Spanish laws, was active by the beginning of the 19th century. It was greatly stimulated during the Spanish-American revolutions (the Lima and Panama trade dating from about 1813), for, as the Californian authorities practically ignored the law, smuggling was unnecessary; this was, indeed, much greater after 1822 under the high duties (in 1836-1840 generally about 100%) of the Mexican tariffs. In the early 'forties some three-fourths of the imports, even at Monterey itself, are said to have paid no duties, being landed by agreement with the officials. Wholesale and retail trade flourished all along the coast in defiance of prohibitory laws. American trade was by far most important. The Boston traders—whose direct trade began in 1822, but the indirect ventures long before that—were men of decided influence in California. The trade supplied almost all the clothing, merchandise and manufactures used in the province; hides and furs were given in exchange. If foreign trade was not to be received, still less were foreign travellers, under the Spanish laws. However, the Russians came in 1805, and in 1812 founded on Bodega Bay a post they held till 1841, whence they traded and hunted (even in San Francisco Bay) for furs. From the day of the earliest foreign commerce sailors and traders of divers nationalities began to settle in the province. In 1826 American hunters first crossed to the coast; in 1830 the Hudson's Bay Company began operations in northern California. By this time the foreign element was considerable in number, and it doubled in the next six years, although the true overland immigration from the United States began only about 1840. As a class foreigners were respected, and they were influential beyond proportion to their numbers. They controlled commerce, and were more energetic, generally, than were the natives; many were naturalized, held generous grants of land, and had married into Californian families, not excluding the most select and influential. Most prominent of Americans in the interior was John A. Sutter (1803-1880), who held a grant of eleven square leagues around the present site of Sacramento, whereon he built a fort. His position as a Mexican official, and the location of his fortified post on the border, commanding the interior country and lying on the route of the overland immigrants, made him of great importance in the years preceding and immediately following American occupation; although he was a man of slight abilities and wasted his great opportunities. Other settlers in the coast towns were also of high standing and importance. In short, Americans were hospitably received and very well treated by the government and the people; despite some formalities and ostensible surveillance there was no oppression whatever. There was, however, some jealousy of the ease with which Americans secured land grants, and an entirely just dislike of "bad" Americans. The sources from which all the immigrants were recruited made inevitable an element of lawlessness and truculence. The Americans happened to predominate. Along with a full share of border individuality and restlessness they had the usual boisterous boastfulness and a racial contempt, which was arrogantly proclaimed, for Mexicans,—often too for Mexican legal formalities. The early comers were a conservative force in politics, but many of the later comers wanted to make California a second Texas. As early as 1805 (at the time of James Monroe's negotiations for Florida), there are traces of Spain's fear of American ambitions even in this far-away province. It was a fear she felt for all her American possessions. Spain's fears passed on to Mexico, the Russians being feared only less than Americans. An offer was made by President Jackson in 1835 to buy the northern part of California, including San Francisco Bay, but was refused. In 1836 and 1844 Americans were prominent in the incidents of revolution; divided in opinion in both years they were neutral in the actual "hostilities" of the latter, but some gave active support to the governor in 1836. From 1836 on, foreign interference was much talked about. Americans supposed that Great Britain wished to exchange Mexican bonds for California; France also was thought to be watching for an opening for gratifying supposed ambitions; and all parties saw that even without overt act by the United States the progress of American settlement seemed likely to gain them the province, whose connexion with Mexico had long been a notoriously loose one. A considerable literature written by travellers of all the countries named had before this discussed all interests. In 1840 for too active interest in politics some Americans and Englishmen were temporarily expelled.

American and European intriques.

In 1842 Commodore T.A.C. Jones (1789-1858) of the United States navy, believing that war had broken out between his country and Mexico and that a British force was about to seize California, raised the American flag over Monterey (October 21st), but finding that he had acted on misinformation he lowered the flag next day with due ceremony and warm apology. In California this incident served only to open up agreeable personal relations

and social courtesies, but it did not tend to clarify the diplomatic atmosphere. It showed the ease of seizing the country, the indifference of the natives, and the resolution of the United States government. Mexico sought to prevent American immigration, but the local authorities would not enforce such orders, however positive. Between 1843 and 1845, Great Britain, the United States, and France opened consulates. By 1845 there was certainly an agreement in opinion among all American residents (then not 700 in number) as regards the future of the country. The policy of France and Great Britain in these years is unknown. That of the United States is fully known. In 1845 the American consul at Monterey, Thomas O. Larkin (1802-1858), was instructed to work for the secession of California from Mexico, without overt aid from the United States, but with their good-will and sympathy. He very soon gained from leading officers assurances of such a movement before 1848. At the same time American naval officers were instructed to occupy the ports in case of war with Mexico, but first and last to work for the good-will of the natives. In 1845 Captain J.C. Frémont,—whose doings in California in the next two years were among the main assets in a life-long reputation and an unsuccessful presidential campaign,—while engaged in a government surveying expedition, aroused the apprehensions of the Californian authorities by suspicious and very possibly intentionally provocative movements, and there was a show of military force by both parties. Frémont had information beyond that of ordinary men that made him believe early hostilities between the United States and Mexico to be inevitable; he was also officially informed of Larkin's secret task and in no way authorized to hamper it. Resentment, however, incited him to personal revenge on the Californian government, and an ambition that clearly saw the gravity of the crisis prompted him to improve it unscrupulously for his own advancement, leaving his government to support or disavow him according as war should come or not. In violation therefore of international amities, and practically in disobedience of orders, he broke the peace, caused a band of Mexican cavalry mounts to be seized, and prompted some American settlers to occupy Sonoma (14th June 1846). This episode is known as the "Bear Flag War," inasmuch as there was short-lived talk of making California an independent state, and a flag with a bear as an emblem (California is still popularly known as the Bear Flag State) flew for a few days at Sonoma. It was a very small, very disingenuous, inevitably an anomalous, and in the vanity of proclamations and other concomitant incidents rather a ridiculous affair; and fortunately for the dignity of history —and for Frémont—it was quickly merged in a larger question, when Commodore John Drake Sloat (1780-1867) on the 7th of July raised the flag of the United States over Monterey, proclaiming California a part of the United States. The opening hostilities of the Mexican War had occurred on the Rio Grande. The excuses and explanations later given by Frémont—military preparations by the Californian authorities, the imminence of their attack, ripening British schemes for the seizure of the province, etc.—made up the stock account of historians until the whole truth came out in 1886 (in Royce's *California*). Californians had been very friendly to Americans, but Larkin's intimates thought they had been tricked, and the people resented the stealthy and unprovoked breaking of peace, and unfortunately the Americans did not known how to treat them except inconsiderately and somewhat contemptuously. The result was a feeble rising in the south. The country was fully pacified by January 1847. The aftermath of Frémont's filibustering acts, followed as they were by wholly needless hostilities and by some injustice then and later in the attitude of Americans toward the natives, was a growing misunderstanding and estrangement, regrettable in Californian history. Thus there was an end to the "lotos-land society" of California. Another society, less hospitable, less happy, less contented, but also less mild, better tempered for building states, and more "progressive," took the place of the old.

The "Bear Flag."

By the treaty of Guadalupe Hidalgo in 1848 Mexico ceded California to the United States. It was just at this time that gold was discovered, and the new territory took on great national importance. The discussion as to what should be done with it began in Congress in 1846, immediately involving the question of slavery. A furious conflict developed, so that nothing was accomplished in two successive sessions; even at the end of a third, in March 1849, the only progress made toward creating a government for the territory was that the national revenue laws had been extended over it and San Francisco had been made a port of entry. Meanwhile conditions grew intolerable for the inhabitants. Before the end of the war Mexican laws not incompatible with United States laws were by international law supposed to be in force; but nobody knew what they were, and the uncertainties of vague and variable alcalde jurisdictions were increased when Americans began to be alcaldes and grafted English common-law principles, like the jury, on Californian practice. Never was a population more in need of clear laws than the motley Californian people of 1848-1849, yet they had none when, with peace, military rule and Mexican law technically ended. There was a curious extra-legal fusion of laws, a half-breed legal system, and no definite basis for either law or government. Even the acts and theories of the officials were very inconsistent. Early in 1849 temporary local governments were set up in various towns, and in September a convention framed a free-state constitution and applied for admission to the Union. On the 7th of September 1850 a bill finally passed Congress admitting California as a free state. This was one of the bargains in the "Compromise Measures of 1850" that were intended to dispose of the question of slavery in the Territories. Meanwhile the gold discoveries culminated and surpassed "three centuries of wild talk about gold in California." For three months there was little excitement, then a wild rush. Settlements were completely deserted; homes, farms and stores abandoned. Ships deserted by their sailors crowded the bay at San Francisco—there were 500 of them in July 1850; soldiers deserted wholesale, churches were emptied, town councils ceased to sit, merchants, clerks, lawyers and judges and criminals, everybody, flocked to the foothills. Soon, from Hawaii, Oregon and Sonora, from the Eastern states, the South Seas, Australia, South America and China came an extraordinary flow of the hopeful and adventurous. In the winter of '48 the rush began from the states to Panama, and in the spring across the plains. It is estimated that 80,000 men reached the coast in 1849, about half of them coming overland; three-fourths were Americans. Rapid settlement, excessive prices, reckless waste of money, and wild commercial ventures that glutted San Francisco with all objects usable and unusable made the following years astounding from an economic point of view; but not less bizarre was the social development, nor less extraordinary the problems of state-building in a society "morally and socially tried as no other American community ever has been tried" (Royce). There was of course no home life in early California. In 1850 women numbered 8% of the population, but only 2% in the mining counties. The miners were an energetic, covetous, wandering, abnormally excitable body of men. Occasionally a kind of frenzy even would seem to seize on them, and lured by the hope of new deposits of unheard-of richness thousands would flock on unfounded rumours to new and perhaps distant localities, where many might perish from disease and starvation, the rest returning in poverty and rags. Such were the Kern River fever of 1855 and the greater "Fraser River rush" of 1858, the latter, which took perhaps 20,000 men out of the state, causing a terrible amount of suffering. Many interior towns lost half their population and some virtually all their population as a result of this emigration; and it precipitated a real estate crash in San Francisco that threatened temporary ruin. Mining times in California

California ceded to the United States.

The rush for gold.

brought out some of the most ignoble and some of the best traits of American character. Professor Josiah Royce has pictured the social-moral process by which society finally impressed its "claims on wayward and blind individuals" who "sought wealth and not a social order," and so long as possible shirked all social obligations. Through varied instruments—lynch law, popular courts, vigilance committees—order was, however, enforced, better as times went on, until there was a stable condition of things. In the economic life and social character of California to-day the legacies of 1848 are plain.

The slavery question was not settled for California in 1850. Until the Civil War the division between the Whig and Democratic parties, whose organization in California preceded statehood, was essentially based on slavery. The struggle fused with the personal contests of two men, rivals for the United States Senate, William McKendree Gwin (1805-85, U.S. senator, 1850-55 and 1857-61), the leader of the pro-slavery party, and David Colbreth Broderick (1819-1859), formerly a leader of Tammany in New York, and after 1857 a member from California of the United States Senate, the champion of free labour, who declared in 1860 for the policy of the Republican party. Broderick's undoing was resolved upon by the slavery party, and he was killed in a duel. The Gwin party hoped to divide California into two states and hand the southern over to slavery; on the eve of the Civil War it considered the scheme of a Pacific coast republic. The decade 1850-1860 was also marked by the activity of filibusters against Sonora and Central America. Two of these—a French adventurer, one Gaston Raoux, comte de Raousset-Boulbon (1817-1854), and William Walker, had very picturesque careers. The state was thoroughly loyal when war came. The later 'fifties are characterized by H.H. Bancroft as a period of "moral, political and financial night." National politics were put first, to the complete ignoring of excessive taxation, financial extravagance, ignorant legislation and corruption in California. The public was exploited for many years with impunity for the benefit of private interests. One legacy that ought to be briefly noted here is that of disputed land grants. Under the Mexican régime such grants were generous and common, and the complicated formalities theoretically essential to their validity were very often, if not usually, only in part attended to. Titles thus gained would never have been questioned under continued Mexican government, but Americans were unaccustomed to such riches in land and to such laxity. From the very first hundreds "squatted" on large claims, contesting the title. Instead of confirming all claims existing when the country passed to the United States, and so ensuring an immediate settlement of the matter, which was really the most important thing for the peace and purse of the community, the United States government undertook through a land commission and courts to sift the valid from the fraudulent. Claims of enormous aggregate value were thus considered and a large part of those dating from the last years of Mexican dominion (many probably artfully concocted and fraudulently antedated after the commission was at work) were finally rejected. This litigation filled the state and federal courts for many years. The high value of realty in San Francisco naturally offered extraordinary inducements to fraud, and the largest part of the city was for years involved in fraudulent claims, and its peace broken by "squatter"-troubles. Twenty or thirty years of the state's life were disturbed by these controversies. Land monopoly is an evil of large proportions in California to-day, but it is due to the laxness of the United States government in enabling speculators to accumulate holdings and not to the original extent of Mexican grants.

Disputed land grants.

In state gubernatorial elections after the Civil War the Democrats won in 1867, 1875, 1882, 1886, 1894; the Republicans in 1871, 1879, 1890, 1898, 1902, 1906, 1910. Features of political life and of legislation after 1876 were a strong labour agitation, the struggle for the exclusion of the Chinese, for the control of hydraulic mining, irrigation, and the advancement by state-aid of the fruit interests; the last three of which have already been referred to above. Labour conditions were peculiar in the decade following 1870. Mining, war times and the building of the Central Pacific had up to then inflated prices and prosperity. Then there came a slump; probably the truth was rather that money was becoming less unnaturally abundant than that there was any over-supply of labour. The turning off of some 15,000 Chinese (principally in 1869-1870) from the Central Pacific lines who flocked to San Francisco, augmented the discontent of incompetents, of disappointed late immigrants, and the reaction from flush times. Labour unions became strong and demonstrative. In 1877-1878 Denis Kearney (1847-1907), an Irish drayman and demagogue of considerable force and daring, headed the discontented. This is called the "sand-lots agitation" from the favourite meeting-place (in San Francisco) of the agitators.

The outcome of these years was the Constitution of 1879, already described, and the exclusion of Chinese by national law. In 1879 California voted against further immigration of Chinese by 154,638 to 883. Congress re-enacted exclusion legislation in 1902. All authorities agree that the Chinese in early years were often abused in the mining country and their rights most unjustly neglected by the law and its officers. Men among the most respected in California (Joaquin Miller, H.H. Bancroft and others) have said most in praise and defence of the Chinaman. From railroad making to cooking he has proved his abilities and trustworthiness. He is found to-day in the mines and fisheries, in various lines of manufacture, in small farming, and in all branches of domestic service. The question of the economic development of the state, and of trade to the Orient, the views of the mercenary labour-contractor and of the philanthropist, the factor of "upper-race" repugnance, the "economic-leech" argument, the "rat-rice-filth-and-opium" argument, have all entered into the problem. Certain it is that though the unprejudiced must admit that exclusion has not been at all an unmixed blessing, yet the consensus of opinion is that a large population, non-citizen and non-assimilable, sending—it is said—most of their earnings to China, living in the main meanly at best, and practically without wives, children or homes, is socially and economically a menace outweighing the undoubted convenience of cheaper (and frequently more trustworthy) menial labour than the other population affords. The exclusion had much to do with making the huge single crop ranches unprofitable and in leading to their replacement by small farms and varied crops. Many of the Chinese now in the state are wealthy. Race feeling against them has become much less marked.

One outcome of early mission history, the "Pious Fund of the Californias," claimed in 1902 the attention of the Hague Tribunal. (See Arbitration, International, Hague cases section.) In 1906-1907 there was throughout the state a remarkable anti-Japanese agitation, centring in San Francisco (*q.v.*) and affecting international relations and national politics.

Governors of California (State)[6]

I. Spanish

Gasper de Portolá	served 1767-1770
Filipe de Barri	" 1771-1774
Felipe de Neve	" 1774-1782

Pedro Pages	”	1782-1791
Jose Antonio Romeu	”	1791-1792
*José Joaquin de Arillaga	”	1792-1794
Diego de Borica	”	1794-1800
*José Joaquin de Arillaga	”	1800-1804
José Joaquin de Arillaga	”	1804-1814
*José Diario Arguello	”	1814-1815
Pablo Vicente de Sola	”	1815-1822
II. Mexican		
Pablo Vicente de Sola	served	1822
*Luis Antonio Arguello	”	1822-1825
José Maria Echeandía	”	1825-1831
Manuel Victoria	”	1831
José Maria Echeandía[7]	”	1831-1832
Pio Pico[8]	”	1832
José Figueroa	”	1832-1835
*José Castro	”	1835-1836
*Nicolas Gutierrez	”	1836
Mariano Chico	”	1836
Nicolas Gutierrez	”	1836
Juan Bautista Alvarado[9]	”	1836-1842
Carlos Antonio Carrillo[10]	”	1837-1838
Manuel Micheltorena	”	1842-1845
Pio Pico	”	1845-1846
III American		
(a) *Military*		
John D. Sloat	appointed	1846
Richard F. Stockton	”	1846-1847
Stephen W. Kearny	”	1847
R.B. Mason	”	1847-1849
Bennett Riley	”	1849

(b) *State*.

Peter H. Burnett	1849-1851	Democrat
*John H. McDougall	1851-1852	”
John Bigler	1852-1856	”
John M. Johnson	1856-1858	Know Nothing
John B. Weller	1858-1860	Lecompton Democrat
Milton S. Latham	1869 (6 days)	” ”
*John G. Downey	1860-1862	” ”
Leland Stanford	1862-1863	Republican
Frederick F. Low	1863-1867	”
Henry H. Haight	1867-1871	Democrat
Newton Booth	1871-1875	Republican
*Romualdo Pacheco	1875	”
William Irwin	1875-1880	Democrat
George G. Perkins	1880-1883	Republican
George C. Stoneman	1883-1887	Democrat
Washington Bartlett	1887	”
*Robert W. Waterman	1887-1891	Republican
Henry H. Markham	1891-1895	”
James H. Budd	1895-1899	Democrat
Henry T. Gage	1899-1903	Republican
George C. Pardee	1903-1907	”
James N. Gillett	1907-1911	”
Hiram W. Johnson	1911-	”

The mark * before the name of one of the Spanish governors indicates that he acted only *ad interim*, and, in the case of governors since 1849, that the officer named was elected as lieutenant-governor and succeeded to the office of governor.

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1 In December 1904 Salton Sea was dry; in February 1906 it was occupied by a lake 60 m. long.

2 During the interval from 1850 to 1872 the yearly rainfall at San Francisco ranged from 11.37 to 49.27 in.; from 1850 to 1904 the average was 22.74, and the probable annual variation 4 in.

3 The means for Los Angeles and Red Bluff, of Redding and Fresno, of San Diego and Sacramento, of San Francisco or Monterey and Independence, are respectively about the same; and all of them lie between 56° and 63° F. The places mentioned are scattered over 3½° of longitude and 6½° of latitude.

4 Small masses of water made to fall great distances and the use of turbines are important features of such plants. One on the North Yuba river at Colgate, where there is a 700 ft. fall, serves Oakland, San Jose and San Francisco, at high pressure yielding in San Francisco (220 m. away) 75% of its power. Other plants are one at Electra (154 m. from San Francisco), and one on the San Joaquin, which delivers to Fresno 62 m. distant.

5 The 1905 census of manufactures deals only with establishments under the factory system; its figures for 1905 and the figures for 1900 reduced to the same limits are as follows:—total value of products, 1905, $367,218,494; 1900, $257,385,521, an increase of 42.7%; leading industries, with value of product in millions of dollars—canning and

preserving, first in 1905 with 23.8 millions, third in 1900 with 13.4 millions; slaughtering and meat-packing, second in 1905 with 21.79 millions, first in 1900 with 15.71 millions; flour and grist mill products, third in 1905 with 20.2 millions, fourth in 1900 with 13.04 millions; lumber and timber, fourth in 1905 with 18.27 millions, second in 1900 with 13.71 millions; printing and publishing, fifth in 1905 with 17.4 millions, sixth in 1900 with 9.6 millions; foundry and machine shop products, sixdth in 1905 with 15.7 millions, fifth in 1900 with 12.04 millions; planing mill products, seventh in 1905 with 13.9 millions, twelfth in 1900 with 4.8 millions; bread and other bakery products, eighth in 1905 with 10.6 millions, eleventh in 1900 with 4.87 millions.

6 As months and even years often elapsed between the date when early governors were appointed and the beginning of their actual service, the date of commission is disregarded, and the date of service given. Sometimes this is to be regarded as beginning at Monterey, sometimes elsewhere in California, sometimes at Loreto in Lower California. All the Spanish and Mexican governors were appointed by the national government, except in the case of the semi-revolutionary rulers of 1831-1832 and 1836 (Alvarado), whose title rested on revolution, or on local choice under a national statute regarding gubernatorial vacancies.

7 Acting political chief, revolutionary title.

8 Briefly recognized in South.

9 Revolutionary title, 1836-1838.

10 Appointed 1837, never recognized in the North.

CALIFORNIA, LOWER (*Baja California*), a long narrow peninsula between the Gulf of California and the Pacific Ocean, forming a territory of the republic of Mexico. Pop. (1895), 42,245; (1900) 47,624. Lower California is a southward extension of the State of California, United States, and is touched by only one of the Mexican states, that of Sonora on the E. The peninsula is about 760 m. long and from 30 to 150 m. wide, and has an area of 58,328 sq. m. It is traversed throughout its entire length by an irregular range of barren mountains, which slopes toward the Pacific in a succession of low hills, but breaks down abruptly toward the Gulf. The coast has two or three good sheltered bays, that of La Paz on the Gulf side and of Magdalena on the Pacific side being best known. The coast is bordered by numerous islands, especially on the eastern side. The general appearance of the surface is arid and desolate, partly because of the volcanic remains, and partly because of the scanty rainfall, which is insufficient to support vegetation other than that of the desert except in the deeper mountain valleys. The northern part is hot and dry, like southern California, but the southern part receives more rain and has some fertile tracts, with a mild and pleasant climate. The principal natural product in this region is *orchil*, or Spanish moss, but by means of irrigation the soil produces a considerable variety of products, including sugar cane, cotton, cassava, cereals, tobacco and grapes. Horses, sheep and cattle are raised in the fertile valleys, but only to a limited extent. The territory is rich in minerals, among which are gold, silver, copper, lead, gypsum, coal and salt. The silver mines near La Paz were worked by the Jesuits as early as 1700. There are also extensive pearl fisheries in the Gulf, La Paz being the headquarters of the industry, and whale fisheries on the W. coast in the vicinity of Magdalena Bay. The development of mining and other industries in the territory has led to an extension of the California railway system southward into the peninsula, with the Mexican government’s permission, the first section of 37 m. from the northern frontier being completed and opened to traffic in 1907. The territory is divided into two districts, the northern having its capital at the insignificant little village of La Ensenada, on Todos Santos Bay, and the southern having its capital at La Paz, at the head of a deep bay opening into the Gulf. La Paz is a port of call for steamships running between Mazatlan and San Francisco, and had a population of 5056 in 1900. La Ensenada (pop. in 1906, about 1500), 65 m. by sea S. of San Diego, Cal., is the only port for the northern part of the territory, and supplies a district extending 250 m. along the coast and 60 m. inland, including the mining camps of the north; it manufactures and exports flour and leather.

By orders of Cortés the coast of Lower California was explored in 1539 by Francisco de Ulloa, but no settlement resulted. It was called California, the name (according to E.E. Hale) being derived from a popular Spanish romance of that time, entitled *Sergas de Esplandian*, in which an island named California was mentioned and situated “on the right hand of the Indies, very near the terrestrial paradise.” The name must have been given derisively, as the barren coasts of Lower California could not have suggested the proximity of a “terrestrial paradise.” The exploration of the coast did not extend above the peninsula until 1842. The name California was at first applied exclusively to the peninsula; later, on the supposition that a strait connected the Pacific with the head of the Gulf of California, the name Islas Californias was frequently used. This erroneous theory was held as late as 1721. The first settlement was made in 1597, but was abandoned. From 1633 to 1683 five unsuccessful attempts were made to establish a settlement at La Paz. Finally the Jesuits succeeded in founding a mission at Loreto on the Gulf coast, in about 26° N. lat., in 1697, and at La Paz in 1720. At the time of their expulsion (1767) they had sixteen missions which were either self-supporting or were maintained by funds invested for that special purpose. The settlement of Upper California began in 1769, after which the two provinces were distinguished as California Baja or Antigua, and California Alta, the seat of government remaining in the former for a short time. The two provinces were separated in 1804, were united under one governor residing in California Alta in 1825, and were then reunited in a single department through the political changes of 1836, which lasted no later than 1847. Lower California was only slightly disturbed by the struggle for independence among the Spanish-American colonies, but in 1822 Admiral Lord Cochrane, who was in the service of the Chilean revolutionists, appeared on the coast and plundered San José del Cabo, Todos Santos and Loreto. In the war between Mexico and the United States La Paz and other coast towns were occupied by small detachments from California. In 1853 a filibustering expedition against Sonora under William Walker took possession of La Paz and proclaimed a republic consisting of Sonora and the peninsula. Fearing an attack from the mainland, the filibusters first withdrew to La Ensenada, near the American frontier, and then in the following year broke up altogether during an attempt to invade Sonora by land. A revolution under the leadership of Marquez de Leon in 1879 met with some temporary success, but died for want of material support in 1880. The development of mining and other industries since that time, together with vigorous efforts to found colonies in the more favoured localities, have greatly improved the situation in the territory.

See the two volumes of H.H. Bancroft’s *North Mexican States and Texas*, lettered vols. 15 and 16 of his *Works*;

also Arthur Walbridge North, *The Mother of California* (San Francisco, 1908).

CALIFORNIA, UNIVERSITY OF, one of the largest and most important of state universities in America, situated at Berkeley, California, on the E. shore of San Francisco Bay. It took the place of the College of California (founded in 1855), received California's portion of the Federal land grant of 1862, was chartered as a state institution by the legislature in 1868, and opened its doors in 1869 at Oakland. In 1873 it was removed to its present site. In the revised state constitution of 1879 provision is made for it as the head of the state's educational system. The grounds at Berkeley cover 270 acres on the lower slopes (299-900 ft.) of the Berkeley Hills, which rise 1000 ft. or more above the university; the view over the bay to San Francisco and the Golden Gate is superb. In recent years new and better buildings have gradually been provided. In 1896 an international architectural competition was opened at the expense of Mrs Phoebe R. Hearst (made a regent of the university in 1898) for plans for a group of buildings harmonizing with the university's beautiful site, and ignoring all buildings already existing. The first prize was awarded in 1899 to Emile Bénard, of Paris. The first building begun under the new plans was that for the college of mines (the gift of Mrs Hearst), completed in 1907, providing worthily for the important school of mining, from 1885 directed by Prof. S.B. Christy (b. 1853); California Hall, built by state appropriation, had been completed in 1906. The Greek theatre (1903), an open-air auditorium seating 7500 spectators, on a hill-side in a grove of towering eucalypts, was the gift of William Randolph Hearst; this has been used regularly for concerts by the university's symphony orchestra, under the professor of music, John Frederick Wolle (b. 1863), who originated the Bach Festivals at Bethlehem, Pa.; free public concerts are given on Sunday afternoons; and there have been some remarkable dramatic performances here, notably Sudraka's *Mricchakattika* in English, and Aeschylus's *Eumenides* in Greek, in April 1907. There are no dormitories. Student self-government works through the "Undergraduate Students' Affairs Committee" of the Associated Students. The faculty of the university has its own social club, with a handsome building on the grounds. At Berkeley is carried on the work in the colleges of letters, social sciences, natural sciences, commerce, agriculture, mechanical, mining and civil engineering, and chemistry, and the first two years' course of the college of medicine—the Toland Medical College having been absorbed by the university in 1873; at Mount Hamilton, the work of the Lick astronomical department; and in San Francisco, that of dentistry (1888), pharmacy, law, art, and the concluding (post graduate or clinical) years of the medical course—the San Francisco Polyclinic having become a part of the university in 1892. Three of the San Francisco departments occupy a group of three handsome buildings in the western part of the city, overlooking Golden Gate Park. The Lick astronomical department (Lick Observatory) on Mount Hamilton, near San José, occupies a site covering 2777 acres. It was founded in 1875 by James Lick of San Francisco, and was endowed by him with $700,000, $610,000 of this being used for the original buildings and equipments, which were formally transferred to the university in 1888. The art department (San Francisco Institute of art) was until 1906 housed in the former home of Mark Hopkins, a San Francisco "railroad king"; it dated from 1893, under the name "Mark Hopkins Institute of Art." The building was destroyed in the San Francisco conflagration of 1906; but under its present name the department resumed work in 1907 on the old site. At the university farm, of nearly 750 acres, at Davisville, Yolo county, instruction is given in practical agriculture, horticulture, dairying, &c.; courses in irrigation are given at Berkeley; a laboratory of plant pathology, established in 1907 at Whittier, Riverside county, and an experiment station on 20 acres of land near Riverside, are for the study of plant and tree diseases and pests and of their remedies. A marine biological laboratory is maintained at La Jolla, near San Diego, and another, the Hertzstein Research Laboratory, at New Monterey; the Rudolph Spreckels Physiological Laboratory is in Berkeley. The university has excellent anthropological and archaeological collections, mostly made by university expeditions, endowed by Mrs Hearst, to Peru and to Egypt. In 1907 the university library contained 160,000 volumes, ranking, after the destruction of most of the San Francisco libraries in 1906, as the largest collection in the vicinity. The building of the Doe library (given by the will of Charles Franklin Doe), for the housing of the university library, was begun in 1907. The university has also the valuable Bancroft collection of 50,000 volumes and countless pamphlets and manuscripts, dealing principally with the history of the Pacific Coast from Alaska through Central America, and of the Rocky Mountain region, including Montana, Utah, Wyoming, Colorado, Arizona, New Mexico and Western Texas. This collection (that of the historian Hubert Howe Bancroft) was acquired in 1905 for $250,000 (of which Mr Bancroft contributed $100,000), and was entrusted (1907) to the newly organized Academy of Pacific Coast History. The library of Karl Weinhold (1823-1901) of Berlin, which is especially rich in Germanic linguistics and "culture history," was presented to the university in 1903 by John D. Spreckels. The university publishes *The University of California Chronicle*, an official record; and there are important departmental publications, especially those in American archaeology and ethnology, edited by Frederic Ward Putnam (b. 1839), including the reports of various expeditions, maintained by Mrs Hearst; in physiology, edited by Jacques Loeb (b. 1859); in botany, edited by William Albert Setchell (b. 1864); in zoology, edited by William Emerson Ritter (b. 1859); and in astronomy, the publications of the Lick Observatory, edited by William Wallace Campbell (b. 1862). In 1902, under the direction of Henry Morse Stephens (b. 1857), who then became professor of history, a department of university extension was organized; lecture courses, especially on history and literature, were delivered in 1906-1907 at fifteen extension "centres," at most of which classes of study were formed. Annexes to the university, but having no corporate connexion with it, are the Berkeley Bible Seminary (Disciples of Christ), the Pacific Theological Seminary (Congregational), the Pacific Coast Baptist Seminary and a Unitarian school.

The growth of the university has been extremely rapid. From 1890 to 1900 the number of students increased fourfold. In the latter year the university of California was second to Harvard only in the number of academic graduate and undergraduate students, and fifth among the educational institutions of the country in total enrolment. In July 1907 there were 519 officers in the faculties and 2987 students, of whom 226 were in the professional schools in San Francisco. In addition there were 707 students in the 1906 summer session, the total for 1906-1907 thus being 3684; of this number 1506 were women. The university conferred 482 degrees in 1907, 546 in 1906, 470 in 1905. The affairs of the university are administered by a board of twenty-three regents, seven state officials and heads of educational institutions, being members *ex officio*, and sixteen other members being appointed by the governor and senate of the state; its instruction is governed by the faculties of the different colleges, and an academic senate in which these are joined. The gross income from all sources for 1905-1906 was $1,564,190, of which about $800,000 was income from investments, state and government grants, fees, &c., and

the remainder was gifts and endowments. There is a permanent endowment of more than $3,000,000, partly from munificent private gifts, especially from Mrs Hearst and from Miss Cora Jean Flood. The financial support of the state has always been generous. No tuition fee is charged in the academic colleges to students resident in the state, and only $10.00 annually to students from without the state. The university maintains about 90 undergraduate scholarships, and 10 graduate scholarships and fellowships. All able-bodied male students are required to take the courses in military science, under instruction by an officer of the United States army detailed for the purpose. Physical culture and hygiene are prescribed for all men and women. A state law forbids the sale of liquor within one mile of the university grounds. To realize the ideal of the university as the head of the educational system of the state, a system of inspection of high schools has been developed, whereby schools reaching the prescribed standard are entitled to recommend their graduates for admission to the university without examination. It was anticipated at one time that the foundation of the Leland Stanford Junior University at Palo Alto would injure the state institution at Berkeley; but in practice this was not found to be the case; on the contrary, the competition resulted in giving new vigour and enterprise to the older university. Joseph Le Conte (professor from 1872 to 1901) and Daniel C. Oilman (president in 1872-1875) deserve mention among those formerly connected with the university. In 1899 Benjamin Ide Wheeler (b. 1854) became president. He had been a graduate (1875) of Brown University, and was professor first of comparative philology and then of Greek at Cornell University; his chief publications are *Der griechische Nominalaccent* (1885); *Analogy, and the Scope of its Application in Language* (1887); *Principles of Language Growth* (1891); *The Organization of Higher Education in the United States* (1897); *Dionysos and Immortality* (1899); and *Life of Alexander the Great* (1900).

CALIPASH and **CALIPEE** (possibly connected with *carapace,* the upper shell of a turtle), the gelatinous substances in the upper and lower shells, respectively, of the turtle, the calipash being of a dull greenish and the calipee of a light yellow colour.

CALIPH, Calif, or Khalif (Arab, *khălīfa*; the lengthening of the a is strictly incorrect), literally “successor,” “representative,” a title borne originally by Abu Bekr, who, on the death of Mahomet, became the civil and religious head of the Mahommedan state. In the same sense the term is used in the Koran of both Adam and David as the vicegerents of God. Abu Bekr and his three (or four) immediate successors are known as the “perfect” caliphs; after them the title was borne by the thirteen Omayyad caliphs of Damascus, and subsequently by the thirty-seven Abbasid caliphs of Bagdad whose dynasty fell before the Turks in 1258. By some rigid Moslems these rulers were regarded as only amirs, not caliphs. There were titular caliphs of Abbasid descent in Egypt from that date till 1517 when the last caliph was captured by Selim I. On the fall of the Omayyad dynasty at Damascus, the title was assumed by the Spanish branch of the family who ruled in Spain at Cordova (755-1031), and the Fatimite rulers of Egypt, who pretended to descent from Ali, and Fatima, Mahomet’s daughter, also assumed the name (see Fatimites).

According to the Shi‘ite Moslems, who call the office the “imamate” or leadership, no caliph is legitimate unless he is a lineal descendant of the Prophet. The Sunnites insist that the office belongs to the tribe of Koreish (Quraish) to which Mahomet himself belonged, but this condition would vitiate the claim of the Turkish sultans, who have held the office since its transference by the last caliph to Selim I. According to a tradition falsely ascribed to Mahomet, there can be but one caliph at a time; should a second be set up, he must be killed, for he “is a rebel.” (See Mahommedan Institutions.)

CALIPHATE.[1] The history of the Mahommedan rulers in the East who bore the title of caliph (*q.v.*) falls naturally into three main divisions:—(*a*) The first four caliphs, the immediate successors of Mahomet; (*b*) The Omayyad caliphs; (*c*) The Abbasid caliphs. To these three groups the present article is confined; for the Western caliphs, see Spain: *History* (and minor articles such as Almohades, Almoravides); for the Egyptian caliphs see Egypt: *History* (§ Mahommedan) and Fatimites. The history of Arabia proper will be found under Arabia: *History*.

A.—The First Four Caliphs

After the death of Mahomet the question arose who was to be his “representative.” The choice lay with the community of Medina; so much was understood; but whom were they to choose? The natives of Medina believed themselves to be now once more masters in their own house, and wished to promote one of themselves. But the Emigrants (see Mahomet) asserted their opposing claims, and with success, having brought into the town a considerable number of outside Moslems, so as to terrorize the men of Medina, who besides were still divided into two parties. The Emigrants’ leading spirit was Omar; he did not, however, cause homage to be paid to himself, but to Abu Bekr, the friend and father-in-law of the Prophet.

The affair would not have gone on so smoothly, had not the opportune defection of the Arabians put a stop to the inward schism which threatened. Islam suddenly found itself once more limited to the community of Medina; only Mecca and Tāif (Tāyef) remained true. The Bedouins were willing enough to pray, indeed, but less willing to pay taxes; their defection, as might have been expected, was a political movement.[2] None the less was it a revolt from Islam, for here the political society and the religious are identical. A peculiar compliment to Mahomet was

involved in the fact that the leaders of the rebellion in the various districts did not pose as princes and kings, but as prophets; in this appeared to lie the secret of Islam's success.

1. *Reign of Abu Bekr*.—Abu Bekr proved himself quite equal to the perilous situation. In the first place, he allowed the expedition against the Greeks, already arranged by Mahomet, quietly to set out, limiting himself for the time to the defence of Medina. On the return of the army he proceeded to attack the rebels. The holy spirit of Islam kept the men of Medina together, and inspired in them an all-absorbing zeal for the faith; the Arabs as a whole had no other bond of union and no better source of inspiration than individual interest. As was to be expected, they were worsted; eleven small flying columns of the Moslems, sent out in various directions, sufficed to quell the revolt. Those who submitted were forthwith received back into favour; those who persevered in rebellion were punished with death. The majority accordingly converted, the obstinate were extirpated. In Yamama (Yemama) only was there a severe struggle; the Banū Hanīfa under their prophet Mosailima fought bravely, but here also Islam triumphed.

The internal consolidation of Islam in Arabia was, strange to say, brought about by its diffusion abroad. The holy war against the border countries which Mahomet had already inaugurated, was the best means for making the new religion popular among the Arabs, for opportunity was at the same time afforded for gaining rich booty. The movement was organized by Islam, but the masses were induced to join it by quite other than religious motives. Nor was this by any means the first occasion on which the Arabian cauldron had overflowed; once and again in former times emigrant swarms of Bedouins had settled on the borders of the wilderness. This had last happened in consequence of the events which destroyed the prosperity of the old Sabaean kingdom. At that time the small Arabian kingdoms of Ghassān and Hira had arisen in the western and eastern borderlands of cultivation; these now presented to Moslem conquest its nearest and natural goal. But inasmuch as Hira was subject to the Persians, and Eastern Palestine to the Greeks, the annexation of the Arabians involved the extension of the war beyond the limits of Arabia to a struggle with the two great powers (see further Arabia: *History*).

After the subjugation of middle and north-eastern Arabia, Khālid b. al-Walīd proceeded by order of the caliph to the conquest of the districts on the lower Euphrates. Thence he was summoned to Syria, where hostilities had also broken out. Damascus fell late in the summer of 635, and on the 20th of August 636 was fought the great decisive battle on the Hieromax (Yarmuk), which caused the emperor Heraclius (*q.v.*) finally to abandon Syria.[3] Left to themselves, the Christians henceforward defended themselves only in isolated cases in the fortified cities; for the most part they witnessed the disappearance of the Byzantine power without regret. Meanwhile the war was also carried on against the Persians in Irak, unsuccessfully at first, until the tide turned at the battle of Kadisiya (Kadessia, Qādisīya) (end of 637). In consequence of the defeat which they here sustained, the Persians were forced to abandon the western portion of their empire and limit themselves to Iran proper. The Moslems made themselves masters of Ctesiphon (Madāin), the residence of the Sassanids on the Tigris, and conquered in the immediately following years the country of the two rivers. In 639 the armies of Syria and Irak were face to face in Mesopotamia. In a short time they had taken from the Aryans all the principal old Semitic lands—Palestine, Syria, Mesopotamia, Assyria and Babylonia. To these was soon added Egypt, which was overrun with little difficulty by 'Amr ibn-el-Ass (*q.v.*) in 640. (See Egypt: *History*, § Mahommedan.) This completed the circle of the lands bordering on the wilderness of Arabia; within these limits annexation was practicable and natural, a repetition indeed of what had often previously occurred. The kingdoms of Ghassan and Hira, advanced posts hitherto, now became the headquarters of the Arabs; the new empire had its centres on the one hand at Damascus, on the other hand at Kufa and Baṣra, the two newly-founded cities in the region of old Babylonia. The capital of Islam continued indeed for a while to be Medina, but soon the Hejaz (Hijaz) and the whole of Arabia proper lay quite on the outskirt of affairs.

The ease with which the native populations of the conquered districts, exclusively or prevailingly Christian, adapted themselves to the new rule is very striking. Their nationality had been broken long ago, but intrinsically it was more closely allied to the Arabian than to the Greek or Persian. Their religious sympathy with the West was seriously impaired by dogmatic controversies; from Islam they might at any rate hope for toleration, even though their views were not in accordance with the theology of the emperor of the day. The lapse of the masses from Christianity to Islam, however, which took place during the first century after the conquest, is to be accounted for only by the fact that in reality they had no inward relation to the gospel at all. They changed their creed merely to acquire the rights and privileges of Moslem citizens. In no case were they compelled to do so; indeed the Omayyad caliphs saw with displeasure the diminishing proceeds of the poll-tax derived from their Christian subjects (see Mahommedan Institutions).

It would have been a great advantage for the solidity of the Arabian empire if it had confined itself within the limits of those old Semitic lands, with perhaps the addition of Egypt. But the Persians were not so ready as the Greeks to give up the contest; they did not rest until the Moslems had subjugated the whole of the Sassanid empire. The most important event in the protracted war which led to the conquest of Iran, was the battle of Nehāwend in 641;[4] the most obstinate resistance was offered by Persis proper, and especially by the capital, Istakhr (Persepolis). In the end, all the numerous and partly autonomous provinces of the Sassanid empire fell, one after the other, into the hands of the Moslems, and the young king, Yazdegerd III. (*q.v.*), was compelled to retire to the farthest corner of his realm, where he came to a miserable end.[5] But it was long before the Iranians learned to accept the situation. Unlike the Christians of western Asia, they had a vigorous feeling of national pride, based upon glorious memories and especially upon a church having a connexion of the closest kind with the state. Internal disturbances of a religious and political character and external disasters had long ago shattered the empire of the Sassanids indeed, but the Iranians had not yet lost their patriotism. They were fighting, in fact, against the despised and hated Arabs, in defence of their holiest possessions, their nationality and their faith. Their subjection was only external, nor did Islam ever succeed in assimilating them as the Syrian Christians were assimilated. Even when in process of time they did accept the religion of the prophet, they leavened it thoroughly with their own peculiar leaven, and, especially, deprived it of the practical political and national character which it had assumed after the flight to Medina. To the Arabian state they were always a thorn in the flesh; it was they who helped most to break up its internal order, and it was from them also that it at last received its outward death-blow. The fall of the Omayyads was their work, and with the Omayyads fell the Arabian empire.

2. *Reign of Omar*.—Abu Bekr died after a short reign on the 22nd of August 634, and as a matter of course was succeeded by Omar. To Omar's ten years' Caliphate belong for the most part the great conquests. He himself did

not take the field, but remained in Medina with the exception of his visit to Syria in 638; he never, however, suffered the reins to slip from his grasp, so powerful was the influence of his personality and the Moslem community of feeling. His political insight is shown by the fact that he endeavoured to limit the indefinite extension of Moslem conquest, to maintain and strengthen the national Arabian character of the commonwealth of Islam,[6] and especially to promote law and order in its internal affairs. The saying with which he began his reign will never grow antiquated: "by Allah, he that is weakest among you shall be in my sight the strongest, until I have vindicated for him his rights; but him that is strongest will I treat as the weakest, until he complies with the laws." After the administration of justice he directed his organizing activity, as the circumstances demanded, chiefly towards financial questions—the incidence of taxation in the conquered territories,[7] and the application of the vast resources which poured into the treasury at Medina. It must not be brought against him as a personal reproach, that in dealing with these he acted on the principle that the Moslems were the chartered plunderers of all the rest of the world. But he had to atone by his death for the fault of his system. In the mosque at Medina he was stabbed by a Kufan workman and died in November 644.

3. *Reign of Othman.*—Before his death Omar had nominated six of the leading Mohajir (Emigrants) who should choose the caliph from among themselves—Othman, Ali, Zobair, Ṭalḥa, Sa'd b. Abi Waqqāṣ, and Abdarraḥmān b. Auf. The last-named declined to be a candidate, and decided the election in favour of Othman. Under this weak sovereign the government of Islam fell entirely into the hands of the Koreish nobility. We have already seen that Mahomet himself prepared the way for this transference; Abu Bekr and Omar likewise helped it; the Emigrants were unanimous among themselves in thinking that the precedence and leadership belonged to them as of right. Thanks to the energy of Omar, they were successful in appropriating to themselves the succession to the Prophet. They indeed rested their claims on the undeniable priority of their services to the faith, but they also appealed to their blood relationship with the Prophet as a corroboration of their right to the inheritance; and the ties of blood connected them with the Koreish in general. In point of fact they felt a closer connexion with these than, for example, with the natives of Medina; nature had not been expelled by faith.[8] The supremacy of the Emigrants naturally furnished the means of transition to the supremacy of the Meccan aristocracy. Othman did all in his power to press forward this development of affairs. He belonged to the foremost family of Mecca, the Omayyads, and that he should favour his relations and the Koreish as a whole, in every possible way, seemed to him a matter of course. Every position of influence and emolument was assigned to them; they themselves boastingly called the important province of Irak the garden of Koreish. In truth, the entire empire had become that garden. Nor was it unreasonable that from the secularization of Islam the chief advantage should be reaped by those who best knew the world. Such were beyond all doubt the patricians of Mecca, and after them those of Tāif, people like Khālid b. al-Walīd, Amr-ibn-el-Ass, 'Abdallāh b. abī Sarḥ, Moghīra b. Sho'ba, and, above all, old Abu Sofiān with his son Moawiya.

Against the rising tide of worldliness an opposition, however, now began to appear. It was led by what may be called the spiritual noblesse of Islam, which, as distinguished from the hereditary nobility of Mecca, might also be designated as the nobility of merit, consisting of the "Defenders" (*Ansar*), and especially of the Emigrants who had lent themselves to the elevation of the Koreish, but by no means with the intention of allowing themselves thereby to be effaced. The opposition was headed by Ali, Zobair, Ṭalḥa, both as leading men among the Emigrants and as disappointed candidates for the Caliphate. Their motives were purely selfish; not God's cause but their own, not religion but power and preferment, were what they sought.[9] Their party was a mixed one. To it belonged the men of real piety, who saw with displeasure the promotion to the first places in the commonwealth of the great lords who had actually done nothing for Islam, and had joined themselves to it only at the last moment. But the majority were merely a band of men without views, whose aim was a change not of system, but of persons in their own interest. Everywhere in the provinces there was agitation against the caliph and his governors, except in Syria, where Othman's cousin, Moawiya, son of Abu Sofiān (see below), carried on a wise and strong administration. The movement was most energetic in Irak and in Egypt. Its ultimate aim was the deposition of Othman in favour of Ali, whose own services as well as his close relationship to the Prophet seemed to give him the best claim to the Caliphate. Even then there were enthusiasts who held him to be a sort of Messiah.

The malcontents sought to gain their end by force. In bands they came from the provinces to Medina to wring concessions from Othman, who, though his armies were spreading terror from the Indus and Oxus to the Atlantic, had no troops at hand in Medina. He propitiated the mutineers by concessions, but as soon as they had gone, he let matters resume their old course. Thus things went on from bad to worse. In the following year (656) the leaders of the rebels came once more from Egypt and Irak to Medina with a more numerous following; and the caliph again tried the plan of making promises which he did not intend to keep. But the rebels caught him in a flagrant breach of his word,[10] and now demanded his abdication, besieging him in his own house, where he was defended by a few faithful subjects. As he would not yield, they at last took the building by storm and put him to death, an old man of eighty. His death in the act of maintaining his rights was of the greatest service to his house and of corresponding disadvantage to the enemy.

4. *Reign of Ali.*—Controversy as to the inheritance at once arose among the leaders of the opposition. The mass of the mutineers summoned Ali to the Caliphate, and compelled even Ṭalḥa and Zobair to do him homage. But soon these two, along with Ayesha, the mother of the faithful, who had an old grudge against Ali, succeeded in making their escape to Irak, where at Baṣra they raised the standard of rebellion. Ali in point of fact had no real right to the succession, and moreover was apparently actuated not by piety but by ambition and the desire of power, so that men of penetration, even although they condemned Othman's method of government, yet refused to recognize his successor. The new caliph, however, found means of disposing of their opposition, and at the battle of the Camel, fought at Baṣra in November 656, Ṭalḥa and Zobair were slain, and Ayesha was taken prisoner.

But even so Ali had not secured peace. With the murder of Othman the dynastic principle gained the twofold advantage of a legitimate cry—that of vengeance for the blood of the grey-haired caliph and a distinguished champion, the governor Moawiya, whose position in Syria was impregnable. The kernel of his subjects consisted of genuine Arabs, not only recent immigrants along with Islam, but also old settlers who, through contact with the Roman empire and the Christian church, had become to some extent civilized. Through the Ghassanids these latter had become habituated to monarchical government and loyal obedience, and for a long time much better order had prevailed amongst them than elsewhere in Arabia. Syria was the proper soil for the rise of an Arabian kingdom, and Moawiya was just the man to make use of the situation. He exhibited Othman's blood-stained garment in the mosque at Damascus, and incited his Syrians to vengeance.

Ali's position in Kufa was much less advantageous. The population of Irak was already mixed up with Persian elements; it fluctuated greatly, and was largely composed of fresh immigrants. Islam had its headquarters here; Kufa and Baṣra were the home of the pious and of the adventurer, the centres of religious and political movement. This movement it was that had raised Ali to the Caliphate, but yet it did not really take any personal interest in him. Religion proved for him a less trustworthy and more dangerous support than did the conservative and secular feeling of Syria for the Omayyads. Moawiya could either act or refrain from acting as he chose, secure in either case of the obedience of his subjects. Ali, on the other hand, was unable to convert enthusiasm for the principle inscribed on his banner into enthusiasm for his person. It was necessary that he should accommodate himself to the wishes of his supporters, which, however, were inconsistent. They compelled him suddenly to break off the battle of Siffin, which he was apparently on the point of gaining over Moawiya, because the Syrians fastened copies of the Koran to their lances to denote that not the sword, but the word of God should decide the contest (see further below, B.1; also Ali). But in yielding to the will of the majority he excited the displeasure of the minority, the genuine zealots, who in Moawiya were opposing the enemy of Islam, and regarded Ali's entering into negotiations with him as a denial of the faith. When the negotiations failed and war was resumed, the Kharijites refused to follow Ali's army, and he had to turn his armies in the first instance against them. He succeeded in disposing of them without difficulty at the battle of Nahrawān, but in his success he lost the soul of his following. For they were the true champions of the theocratic principle; through their elimination it became clear that the struggle had in no sense anything to do with the cause of God. Ali's defeat was a foregone conclusion, once religious enthusiasm had failed him; the secular resources at the disposal of his adversaries were far superior. Fortunately for him he was murdered (end of January 661), thereby posthumously attaining an importance in the eyes of a large part of the Mahommedan world (Shī'a) which he had never possessed during his life.

B.—The Omayyad Dynasty

Summary of Preceding Movements.—The conquest of Mecca had been of the greatest importance to the Prophet, not only because Islam thus obtained possession of this important city with its famous sanctuary, but above all because his late adversaries were at last compelled to acknowledge him as the Envoy of God. Among these there were many men of great ability and influence, and he was so eager to conciliate them or, as the Arabic expression has it, "to mellow their hearts" by concessions and gifts, that his loyal helpers (*Ansar*) at Medina became dissatisfied and could only with difficulty be brought to acquiesce in it. Mahomet was a practical man; he realized that the growing state needed skilful administrators, and that such were found in much greater number among the antagonists of yesterday than among the honest citizens of Medina. The most important positions, such as the governorships of Mecca and Yemen, were entrusted to men of the Omayyad house, or that of the Makhzūm and other Koreishite families. Abu Bekr followed the Prophet's example. In the great revolt of the Arabic tribes after the death of Mahomet, and in the invasion of Irak and Syria by the Moslems, the principal generals belonged to them. Omar did not deviate from that line of conduct. It was he who appointed Yazīd, the son of Abu Sofiān, and after his death, his brother Moawiya as governor of Syria, and assigned the province of Egypt to Amr-ibn-el-Ass ('Amr b. Āṣ). It is even surprising to find among the leading men so few of the house of Hāshim, the nearest family of the Prophet. The puzzled Moslem doctors explain this fact on the ground that the Hashimites were regarded as too noble to hold ordinary administrative offices, and that they could not be spared at Medina, where their counsel was required in all important affairs. There is, however, a tradition in which Ali himself calls the Omayyads born rulers. As long as Omar lived opposition was silent. But Othman had not the strong personality of his predecessor, and, although he practically adhered to the policy of Omar, he was accused of favouring the members of his own family—the caliph belonged himself to the house of Omayya—at the expense of the Hashimites and the Ansar. The jealousy of the latter two was prompted by the fact that the governorship and military commands had become not only much more important, but also much more lucrative, while power and money again procured many adherents. The truly devout Moslems on the other hand were scandalized by the growing luxury which relaxed the austere morals of the first Moslems, and this also was imputed to Othman.

We thus see how the power of the house of Omayya developed itself, and how there arose against it an opposition, which led in the first place to the murder of Othman and the Caliphate of Ali, and furthermore, during the whole period of the Omayyad caliphs, repeatedly to dangerous outbreaks, culminating in the great catastrophe which placed the Abbasids on the throne. The elements of this opposition were of very various kinds:—(1) The old-fashioned Moslems, sons of the *Ansar* and *Mohājir*, who had been Mahomet's first companions and supporters, and could not bear the thought that the sons of the old enemies of the Prophet in Mecca, whom they nicknamed *ṭolaqā* (freedmen), should be in control of the imamate, which carried with it the management of affairs both civil and religious. This party was in the foreground, chiefly in the first period. (2) The partisans of Ali, the Shi'a (Shi'ites), who in proportion as their influence with the Arabs declined, contrived to strengthen it by obtaining the support of the non-Arabic Moslems, aided thereto, especially in the latter period, by the Abbasids, who at the decisive moment succeeded in seizing the supreme power for themselves. (3) The Kharijites, who, in spite of the heavy losses they sustained at the hands of Ali, maintained their power by gaining new adherents from among those austere Moslems, who held both Omayyads and Alids as usurpers, and have often been called, not unjustly, the Puritans of Islam. (4) The non-Arabic Moslems, who on their conversion to Islam, had put themselves under the patronage of Arabic families, and were therefore called maula's (clients). These were not only the most numerous, but also, in virtue of the persistency of their hostility, the most dangerous. The largest and strongest group of these were the Persians, who, before the conquest of Irak by the Moslems, were the ruling class of that country, so that Persian was the dominant language. With them all malcontents, in particular the Shi'ites, found support; by them the dynasty of the Omayyads and the supremacy of the Arabs was finally overthrown. To these elements of discord we must add:—(1) That the Arabs, notwithstanding the bond of Islam that united them, maintained their old tribal institutions, and therewith their old feuds and factions; (2) that the old antagonism between Ma'adites[11] (original northern tribes) and Yemenites (original southern tribes), accentuated by the jealousy between the Meccans, who belonged to the former, and the Medinians, who belonged to the latter division, gave rise to perpetual conflicts; (3) that more than one dangerous pretender—some of them of the reigning family itself—contended with the caliph for the sovereignty, and must be crushed *coûte que coûte*. It is only by the detailed enumeration of these opposing forces that we can form an idea of the heavy task that lay before the Prince of the Believers, and of the amount of tact and ability which his position demanded.

The description of the reign of the Omayyads is extremely difficult. Never perhaps has the system of

undermining authority by continual slandering been applied on such a scale as by the Alids and the Abbasids. The Omayyads were accused by their numerous missionaries of every imaginable vice; in their hands Islam was not safe; it would be a godly work to extirpate them from the earth. When the Abbasids had occupied the throne, they pursued this policy to its logical conclusion. But not content with having exterminated the hated rulers themselves, they carried their hostility to a further point. The official history of the Omayyads, as it has been handed down to us, is coloured by Abbasid feeling to such an extent that we can scarcely distinguish the true from the false. An example of this occurs at the outset in the assertion that Moawiya deliberately refrained from marching to the help of Othman, and indeed that it was with secret joy that he heard of the fatal result of the plot. The facts seem to contradict this view. When, ten weeks before the murder, some hundreds of men came to Medina from Egypt and Irak, pretending that they were on their pilgrimage to Mecca, but wanted to bring before the caliph their complaints against his vicegerents, nobody could have the slightest suspicion that the life of the caliph was in danger; indeed it was only during the few days that Othman was besieged in his house that the danger became obvious. If the caliph then, as the chroniclers tell, sent a message to Moawiya for help, his messenger could not have accomplished half the journey to Damascus when the catastrophe took place. There is no real reason to doubt that the painful news fell on Moawiya unexpectedly, and that he, as mightiest representative of the Omayyad house, regarded as his own the duty of avenging the crime. He could not but view Ali in the light of an accomplice, because if, as he protested, he did not abet the murderers, yet he took them under his protection. An acknowledgment of Ali as caliph by Moawiya before he had cleared himself from suspicion was therefore quite impossible.

1. *The Reign of Moawiya.*—Moawiya, son of the well-known Meccan chief Abu Sofiān, embraced Islam together with his father and his brother Yazid, when the Prophet conquered Mecca, and was, like them, treated with the greatest distinction. He was even chosen to be one of the secretaries of Mahomet. When Abu Bekr sent his troops for the conquest of Syria, Yazid, the eldest son of Abu Sofiān, held one of the chief commands, with Moawiya as his lieutenant. In the year 639 Omar named him governor of Damascus and Palestine; Othman added to this province the north of Syria and Mesopotamia. To him was committed the conduct of the war against the Byzantine emperor, which he continued with energy, at first only on land, but later, when the caliph had at last given in to his urgent representations, at sea also. In the year 34 (A.D. 655) was fought off the coast of Lycia the great naval battle, which because of the great number of masts has been called “the mast fight,” in which the Greek[12] fleet, commanded by the emperor Constans II. in person, was utterly defeated. Moawiya himself was not present, as he was conducting an attack (the result of which we do not know) on Caesarea in Cappadocia. The Arabic historians are so entirely preoccupied with the internal events that they have no eye for the war at the frontier. The contention which Moawiya had with Ali checked his progress in the north.

Moawiya was a born ruler, and Syria was, as we have seen, the best administered province of the whole empire. He was so loved and honoured by his Syrians that, when he invited them to avenge the blood of Othman, they replied unanimously, “It is your part to command, ours to obey.” Ali was a valiant man, but had no great talent as a ruler. His army numbered a great many enthusiastic partisans, but among them not a few wise-acres; there were also others of doubtful loyalty. The battle at Siffin (657), near the Euphrates, which lasted two months and consisted principally in, sometimes bloody, skirmishes, with alternate success, ended by the well-known appeal to the decision of the Koran on the part of Moawiya. This appeal has been called by a European scholar “one of the unworthiest comedies of the whole world’s history,” accepting the report of very partial Arabic writers that it happened when the Syrians were on the point of losing the battle. He forgot that Ali himself, before the Battle of the Camel, appealed likewise to the decision of the Koran, and began the fight only when this had been rejected. There is in reality no room for suspecting Moawiya of not having been in earnest when making this appeal; he might well regret that internecine strife should drain the forces which were so much wanted for the spread of Islam. That the Book of God could give a solution, even of this arduous case, was doubtless the firm belief of both parties. But even if the appeal to the Koran had been a stratagem, as Ali himself thought, it would have been perfectly legitimate, according to the general views of that time, which had been also those of the Prophet. It is not unlikely that the chief leader of the Yemenites in Ali’s army, Ash‘ath b. Qais, knew beforehand that this appeal would be made. Certainty is not to be obtained in the whole matter.

On each side an umpire was appointed, Abu Mūsāa al-Ash‘arī, the candidate of Ash‘ath, on that of Ali, Amr-ibn-el-Ass (*q.v.*) on that of Moawiya. The arbitrators met in the year 37 (A.D. 658) at Adhroh, in the south-east of Syria, where are the ruins of the Roman Castra described by Brünnow and Domaszewsky (*Die Provincio Arabia,* i. 433-463). Instead of this place, the historians generally put Dūmat-al-Jandal, the biblical Duma, now called Jauf, but this rests on feeble authority. The various accounts about what happened in this interview are without exception untrustworthy. J. Wellhausen, in his excellent book *Das arabische Reich und sein Sturz,* has made it very probable that the decision of the umpires was that the choice of Ali as caliph should be cancelled, and that the task of nominating a successor to Othman should be referred to the council of notable men (*shūrā*), as representing the whole community. Ali refusing to submit to this decision, Moawiya became the champion of the law, and thereby gained at once considerable support for the conquest of Egypt, to which above all he directed his efforts. As soon as Amr returned from Adhroh, Moawiya sent him with an army of four or five thousand men against Egypt. About the same time the constitutional party rose against Ali’s vicegerent Mahommed, son of Abu Bekr, who had been the leader of the murderous attack on Othman. Mahommed was beaten, taken in his flight, and, according to some reports, sewn in the skin of an ass and burned.

Moawiya, realizing that Ali would take all possible means to crush him, took his measures accordingly. He concluded with the Greeks a treaty, by which he pledged himself to pay a large sum of money annually on condition that the emperor should give him hostages as a pledge for the maintenance of peace. Ali, however, had first to deal with the insurrection of the Kharijites, who condemned the arbitration which followed the battle of Siffin as a deed of infidelity, and demanded that Ali should break the compact (see above, A.4). Freed from this difficulty, Ali prepared to direct his march against Moawiya, but his soldiers declined to move. One of his men, Khirrīt b. Rāshid, renounced him altogether, because he had not submitted to the decision of the umpires, and persuaded many others to refuse the payment of the poor-rate. Ali was obliged to subdue him, a task which he effected not without difficulty. Not a few of his former partisans went over to Moawiya, as already had happened before the days of Siffin, amongst others Ali’s own brother ‘Aqīl. Lastly, there were in Kufa, and still more in Basra, many Othmaniya or legitimists, on whose co-operation he could not rely. Moawiya from his side made incessant raids into Ali’s dominion, and by his agents caused a very serious revolt in Basra. The statement that a treaty was concluded between Moawiya and Ali to maintain the *status quo*, in the beginning of the year 40 (A.D. 660), is not very probable, for it is pretty certain that just then Ali had raised an army of 40,000 men against the

Syrians, and also that in the second or third month of that year Moawiya was proclaimed caliph at Jerusalem. At the same time Bosr b. Abi Artāt made his expedition against Medina and Mecca, whose inhabitants were compelled to acknowledge the caliphate of Moawiya. On the murder of Ali in 661, his son Hasan was chosen caliph, but he recoiled before the prospect of a war with Moawiya, having neither the ambition nor the energy of Ali. Moawiya stood then with a large army in Maskin, a rich district lying to the north of the later West Bagdad, watered by the Dojail, or Little Tigris, a channel from the Euphrates to the Tigris. The army of Trak was near Madāin, the ancient Ctesiphon. The reports about what occurred are confused and contradictory; but it seems probable that Abdallah b. Abbas, the vicegerent of Ali at Basra and ancestor of the future Abbasid dynasty, was in command. No battle was fought. Hasan and Ibn Abbas opened, each for himself, negotiations with Moawiya. The latter made it a condition of surrender that he should have the free disposal of the funds in the treasury of Basra. Some say that he had already before the death of Ali rendered himself master of it. Notwithstanding the protest of the Basrians, he transported this booty safely to Mecca. When his descendants had ascended the throne and he had become a demi-saint, the historians did their best to excuse his conduct. Hasan demanded, in exchange for the power which he resigned, the contents of the treasury at Kufa, which amounted to five millions of dirhems, together with the revenues of the Persian province of Darābjird (Darab). When these negotiations became known, a mutiny broke out in Hasan's camp. Hasan himself was wounded and retired to Medina, where he died eight or nine years afterwards. The legend that he was poisoned by order of Moawiya is without the least foundation. It seems that he never received the revenues of Darābjird, the Basrians to whom they belonged refusing to cede them.

Moawiya now made his entry into Kufa in the summer of A.H. 41 (A.D. 661) and received the oath of allegiance as Prince of the Believers. This year is called the year of union (*jamā'a*). Moghīra b. Sho'ba was appointed governor of Kufa. Homrān b. Abān had previously assumed the government of Basra. This is represented commonly as a revolt, but as Homran was a client of Othman, and remained in favour with the Omayyads, it is almost certain that he took the management of affairs only to maintain order.

One strong antagonist to Moawiya remained, in the person of Ziyād. This remarkable man was said to be a bastard of Abu Sofiān, the father of Moawiya, and was, by his mother, the brother of Abu Bakra, a man of great wealth and position at Basra. He thus belonged to the tribe of Thaqīf at Tāif, which produced many very prominent men. At the age of fourteen years Ziyād was charged with the financial administration of the Basrian army. He had won the affection of Omar, by his knowledge of the Koran and the Sunna of the Prophet, and by the fact that he had employed the first money he earned to purchase the freedom of his mother Somayya. He was a faithful servant of Ali and put down for him the revolt excited by Moawiya's partisans in Basra. Thence he marched into Fārs and Kirman, where he maintained peace and kept the inhabitants in their allegiance to Ali. After Ali's death he fortified himself in his castle near Istakhr and refused to submit. Moawiya, therefore, sent Bosr b. Abi Artāt to Basra, with orders to capture Ziyād's three sons, and to force Ziyād into submission by threatening to kill them. Ziyād was obdurate; and it was due to his brother Abu Bakra, who persuaded Moawiya to cancel the order, that the threat was not executed. On his return to Damascus, Moawiya charged Moghīra b. Sho'ba to bring his countryman to reason. Abdallah b. 'Āmir was made governor of Basra.

As soon as Moawiya had his hands free, he directed all his forces against the Greeks. Immediately after the submission of Irak, he had denounced the existing treaty, and as early as 662 had sent his troops against the Alans and the Greeks. Since then, no year passed without a campaign. Twice he made a serious effort to conquer Constantinople, in 669 when he besieged it for three months, and in 674. On the second occasion his fleet occupied Cyzicus, which it held till shortly after his death in 680, when a treaty was signed. In Africa also the extension of Mahommedan power was pursued energetically. In 670 took place the famous march of 'Okba ('Oqba) b. Nāfi' and the foundation of Kairawan, where the great mosque still bears his name. Our information about these events, though very full, is untrustworthy, while of the events in Asia Minor the accounts are scarce and short. The Arabic historians are still absorbed by the events in Irak and Khorasan.

The talented prefect of Kufa, Moghīra b. Sho'ba, eventually broke down the resistance of Ziyād, who came to Damascus to render an account of his administration, which the caliph ratified. Moawiya seems also to have acknowledged him as the son of Abu Sofiān, and thus as his brother; in 664 this recognition was openly declared.[13] In the next year Ziyād was appointed governor of Basra and the eastern provinces belonging to it. As the austere champion of the precepts of Islam, he soon restored order in the whole district. Outwardly, this was the case in Kufa also. A rising of Kharijites in the year 663 had ended in the death of their chief. But the Shi'ites were dissatisfied and even dared to give public utterance to their hostility. Moghīra contented himself with a warning. He was already aged and had no mind to enter on a conflict. He died about the year 670, and his province also was entrusted to Ziyād, who appointed 'Amr b. Horaith as his vicegerent. At a Friday service in the great mosque 'Amr was insulted and pelted with pebbles. Ziyād then came himself, arrested the leader of the Shi'ites, and sent fourteen rebels to Damascus, among them several men of consideration. Seven of them who refused to pledge themselves to obedience were put to death; the Shi'ites considered them as martyrs and accused Moawiya of committing a great crime. But in Kufa peace was restored, and this not by military force, but by the headmen of the tribes. We must not forget that Kufa and Basra were military colonies, and that each tribe had its own quarter of the city. A wholesome diversion was provided by the serious resumption of the policy of eastern expansion, which had been interrupted by the civil war. For this purpose Irak had to furnish the largest contingent. The first army sent by Ziyād into Khorasan recaptured Merv, Herat and Balkh, conquered Tokhāristān and advanced as far as the Oxus. In 673 'Obaidallah, the son of Ziyād, crossed the river, occupied Bokhara, and returned laden with booty taken from the wandering Turkish tribes of Transoxiana. He brought 2000 Turkish archers with him to Basra, the first Turkish slaves to enter the Moslem empire. Sa'īd, son of the caliph Othman, whom Moawiya made governor of Khorasan, in 674 marched against Samarkand. Other generals penetrated as far as the Indus and conquered Kabul, Sijistan, Makrān and Kandahar.

Ziyād governed Irak with the greatest vigour, but as long as discontent did not issue in action, he let men alone. At his death (672-673), order was so generally restored that "nobody had any more to fear for life or estate, and even the unprotected woman was safe in her house without having her door bolted."

Moawiya was a typical Arab *sayyid* (gentleman). He governed, not by force, but by his superior intelligence, his self-control, his mildness and magnanimity. The following anecdote may illustrate this. One of Moawiya's estates bordered on that of Abdallah b. Zobair, who complained in a somewhat truculent letter that Moawiya's slaves had been guilty of trespassing. Moawiya, disregarding his son Yazid's advice that he should exact condign punishment for Zobair's disrespect, replied in flattering terms, regretting the trespass and resigning both slaves and estate to

Zobair. In reply Zobair protested his loyalty to Moawiya, who thereupon pointed a moral for the instruction of Yazid.

Moawiya has been accused of having poisoned more than one of his adversaries, among them Malik Ashtar, Abdarrahmān the son of the great captain Khālid b. Walīd, and Hasan b. Ali. As for the latter, European scholars have long been agreed that the imputation is groundless. As to Abdarrahmān the story is in the highest degree improbable. Madāinī says that Moawiya was prompted to it, because when he consulted the Syrians about the choice of his son Yazid as his successor, they had proposed Abdarrahmān. The absurdity of this is obvious, for Abdarrahmān died in the year 666.[14] Others say[15] that Moawiya was afraid lest Abdarrahmān should become too popular. Now, Abdarrahmān had not only been a faithful ally of Moawiya in the wars with Ali, but after the peace devoted all his energy to the Greek war. It is almost incredible that Moawiya out of petty jealousy would have deprived himself of one of his best men. The probability is that Abdarrahmān was ill when returning from the frontier, that Moawiya sent him his own medical man, the Christian doctor Ibn Othāl, and that the rumour arose that the doctor had poisoned him. It is remarkable withal that this rumour circulated, not in Homs (Emesa), where Abdarrahmān died, but in Medina. There a young relation of Abdarrahmān was so roused by the taunt that the death of his kinsman was unavenged, that he killed Ibn Othal near the mosque of Damascus. Moawiya imprisoned him and let him pay a high ransom, the law not permitting the talio against a Moslem for having killed a Christian. The story that this relative was Khālid, the son of Abdarrahmān, is absurd inasmuch as Moawiya made this Khālid commander against the Greeks in succession to his father. In the third case—that of Malik Ashtar—the evidence is equally inadequate. In fact, since Moawiya did not turn the weapon of assassination against such men as Abdallah b. Zobair and Hosain b. Ali, it is unlikely that he used it against less dangerous persons. These two men were the chief obstacles to Moawiya's plan for securing the Caliphate for his son Yazid. The leadership with the Arabic tribes was as a rule hereditary, the son succeeding his father, but only if he was personally fit for the position, and was acknowledged as such by the principal men of the tribe. The hereditary principle had not been recognized by Islam in the cases of Abu Bekr, Omar and Othman; it had had some influence upon the choice of Ali, the husband of Fatima and the cousin of the Prophet. But it had been adopted entirely for the election of Hasan. The example of Abu Bekr proved that the caliph had the right to appoint his successor. But this appointment must be sanctioned by the principal men, as representing the community. Moawiya seems to have done his best to gain that approbation, but the details given by the historians are altogether unconvincing. This only seems to be certain, that the succession of Yazid was generally acknowledged before the death of his father, except in Medina. (See Mahommedan Institutions.)

Moawiya died in the month of Rajab 60 (A.D. 680). His last words are said to have been: "Fear ye God, the Elevated and Mighty, for God, Praise be to Him, protects the man that fears Him; he who does not fear God, has no protection." Moawiya was, in fact, a religious man and a strict disciple of the precepts of Islam. We can scarcely, therefore, credit the charges made by the adversaries of his chosen successor Yazid, that he was a drinker of wine, fond of pleasure, careless about religion. All the evidence shows that, during the reign of the Omayyads, life in Damascus and the rest of Syria was austere and in striking contrast to the dissolute manners which prevailed in Medina.

2. *Rule of Yazid.*—When Moawiya died, the opposition had already been organized. On his accession Yazid sent a circular to all his prefects, officially announcing his father's death, and ordering them to administer the oath of allegiance to their subjects. In that sent to Walīd b. 'Otba, the governor of Medina, he enclosed a private note charging him in particular to administer the oath to Hosain, Abdallah b. Omar and Abdallah b. Zobair, if necessary, by force. Walid sent a messenger inviting them to a conference, thus giving them time to assemble their followers and to escape to Mecca, where the prefect Omar b. Sa'īd could do nothing against them. In the month Ramadan this Omar was made governor of Medina and sent an army against Ibn Zobair. This army was defeated, and from that time Ibn Zobair was supreme at Mecca.

On the news of Yazid's accession, the numerous partisans of the family of Ali in Kufa sent addresses to Hosain, inviting him to take refuge with them, and promising to have him proclaimed caliph in Irak. Hosain, having learned that the majority of the inhabitants were apparently ready to support him strenuously, prepared to take action. Meanwhile Yazid, having been informed of the riotous behaviour of the Shi'ites in Kufa, sent Obaidallah, son of the famous Ziyād and governor of Basra, to restore order. Using the same tactics as his father had used before, Obaidallah summoned the chiefs of the tribes and made them responsible for the conduct of their men. On the 8th of Dhu'l-Hijja Hosain set out from Mecca with all his family, expecting to be received with enthusiasm by the citizens of Kufa, but on his arrival at Kerbela west of the Euphrates, he was confronted by an army sent by Obaidallah under the command of Omar, son of the famous Sa'd b. Abi Waqqās, the founder of Kufa. Hosain gave battle, vainly relying on the promised aid from Kufa, and fell with almost all his followers on the 10th of Muharram 61 (10th of October 680).

No other issue of this rash expedition could have been expected. But, as it involved the grandson of the Prophet, the son of Ali, and so many members of his family, Hosain's devout partisans at Kufa, who by their overtures had been the principal cause of the disaster, regarded it as a tragedy, and the facts gradually acquired a wholly romantic colouring. Omar b. Sa'd and his officers, Obaidallah and even Yazid came to be regarded as murderers, and their names have ever since been held accursed by all Shi'ites. They observe the 10th of Muharram, the day of 'Ashūra, as a day of public mourning. Among the Persians, stages are erected on that day in public places, and plays are acted, representing the misfortunes of the family of Ali.[16] "Revenge for Hosain" became the watchword of all Shi'ites, and the Meshed Hosain (Tomb of the martyr Hosain) at Kerbela is to them the holiest place in the world (see Kerbela). Obaidallah sent the head of Hosain to Damascus, together with the women and children and Ali b. Hosain, who, being ill, had not taken part in the fight. Yazid was very sorry for the issue, and sent the prisoners under safe-conduct to Medina. Ali remained faithful to the caliph, taking no share in the revolt of the Medinians, and openly condemning the risings of the Shi'ites.

Ibn Zobair profited greatly by the distress caused by Hosain's death. Though he named himself publicly a refugee of the House of God, he had himself secretly addressed as caliph, and many of the citizens of Medina acknowledged him as such. Yazid, when informed of this, swore in his anger to have him imprisoned. But remembering the wisdom of his father, he sent messengers with a chain made of silver coins, and bearing honourable proposals. At the same time he received a number of the chief men of Medina, sent by the prefect, with great honour and loaded them with gifts and presents. But Ibn Zobair refused, and the Medinians, of whom the majority probably had never before seen a prince's court, however simple, were only confirmed in their rancour against Yazid, and told many horrible tales about his profligacy, that he hunted and held wild orgies with

Bedouin sheikhs, and had no religion. A characteristically Arabic ceremony took place in the mosque of Medina. “I cast off the oath of allegiance to Yazid, as I cast off my turban,” exclaimed the first, and all others followed, casting off one of their garments, till a heap of turbans and sandals lay on the floor. Ibn Ḥanẓala was made commander. The Omayyads, though they with their clients counted more than 1000 men, were not able to maintain themselves, and were allowed to depart only on condition of strict neutrality.

At last the patience of Yazid was exhausted. An army—the accounts about the number vary from 4000 to 20,000—was equipped in all haste and put under the command of Moslim b. ʻOqba, with orders first to exact submission from the Medinians, if necessary by force, and then to march against Ibn Zobair. Moslim, having met the expelled Omayyads at Wādi ʻl-Qorā, encamped near the city (August 683) and gave the inhabitants three days in which to return to obedience, wishing to spare the city of the Prophet and to prevent the shedding of blood. When, however, after the lapse of three days, a final earnest appeal had been answered insultingly, he began the battle. The Medinians fought valiantly, but could not hold out against the well-disciplined Syrians. Moreover, they were betrayed by the Medinian family of the Banū Ḥāritha, who introduced Syrian soldiers into the town. Medina lies between two volcanic hills, called *harra*. After one of these the battle has been named “The Day of Harra.” For three days the city was given up to plunder. It is said that a thousand bastards (the “children of the Harra”) were born in consequence of these days. The remaining citizens were compelled to take the oath of allegiance to Yazid in a humiliating form; the few who refused were killed. Ali b. Hosain, who had refused to have anything to do with the revolt, was treated with all honour. Mahommed b. al-Hanafiya, the son of Ali, and Abdallah b. Omar had likewise abstained, but they had left Medina for Mecca.

Moslim then proceeded towards Mecca. He was already ill, and died about midway between the two cities, after having given the command, according to the orders of the caliph, to Hosain b. Nomair. It is quite natural that the man who delivered up the city of the Prophet to plunder, and at whose hands so many prominent Moslems fell, should have been an object of detestation to the devout. Even some European scholars have drawn a false picture of his personality, as has been clearly shown by Wellhausen. About Medina also false statements have been made. The city recovered very soon from the disaster, and remained the seat not only of holy tradition and jurisdiction, but also of the Arabic aristocracy. In no city of the empire, during the reign of the Omayyads, lived more singers and musicians than in Medina.

Hosain b. Nomair arrived before Mecca in September 683 and found Ibn Zobair ready to defend it. A number of the citizens of Medina had come to the aid of the Holy City, as well as many Kharijites from Yamāma under Najda b. ʻÄmir. The siege had lasted 65—others say 40—days, when the news came of the death of Yazid, which took place presumably on the 14th of Rabia I, 64 (12th November 683). Eleven days before a fire, caused by imprudence, had consumed all the woodwork of the Ka’ba and burst the black stone in three places. The evidence is quite conclusive; yet the fire has been imputed to the Syrians, and a tale was invented about ballistas which hurled against the House of God enormous stones and vessels full of bitumen. In fact, the siege had been confined to enclosure and skirmishes. It is said that on the news of the death of Yazid a conference took place between Hosain and Ibn Zobair, and that the former offered to proclaim the latter as caliph provided he would accompany him to Syria and proclaim a general amnesty. Ibn Zobair refused haughtily, and Hosain, with a contemptuous criticism of his folly, ordered his army to break up for Syria.

Hitherto Ibn Zobair had confined himself to an appeal to the Moslems to renounce Yazid and to have a caliph elected by the council (*shūrā*) of the principal leading men. He now openly assumed the title of caliph and invited men to take the oath of allegiance. He was soon acknowledged throughout Arabia, in Egypt and in Irak. The Omayyads, who had returned to Medina, were again expelled.

Yazid is described in the *Continuatio Isidori Byz.* §27, as “iucundissimus et cunctis nationibus regni eius subditis vir gratissime habitus, qui nullam unquam, ut omnibus moris est, sibi regalis fastigii causa gloriam appetivit, sed communis[17] cum omnibus civiliter vixit.” This is confirmed by the fact that Moawiya II. is said to have been a mild ruler, like his father, and goes far to outweigh the prejudiced account given by his opponents and coloured still further by tradition. Against the accusation of being a drinker of wine he himself protested in verses which he recited when he sent the army against Ibn Zobair. Decisive is also the testimony of Ibn al-Hanafiya, who declared that all the accusations brought by the Medinians were false. It may be true that he was fond of hunting, but he was a peace-loving, generous prince. It is uncertain at what age he died. Accounts vary between 33 and 39. The latter finds confirmation in the statement that he was born in A.H. 25, though another account places his birth in 22. As his son Moawiya who succeeded him was certainly adult (the accounts vary between 17 and 23), the latter date seems to be preferable.

3. Moawiya II. had reigned a very short time—how long is again wholly uncertain—when he fell sick and died. Then commenced a period of the greatest confusion. The mother of Yazid, Maisūn, belonged to the most powerful tribe in Syria, the Kalb, and it seems that this and the cognate tribes of Qodāʻa (Yemenites) had enjoyed certain prerogatives, which had aroused the jealousy of the Qais and the cognate tribes of Modar. Immediately after the death of Yazid, Zofar b. Ḥārith, who had already fought with Ibn Zobair against Yazid, had induced northern Syria and Mesopotamia to declare for Ibn Zobair. In Homs (Emesa) the governor Noʻmān b. Bashīr had pledged himself to the same cause. The prefect of Damascus, Ḍaḥḥāk b. Qais, seemed to be wavering in his loyalty. Khālid, the brother of Moawiya II., was still a youth and appears to have had no strength of character. There was, however, a much more dangerous candidate, viz. Merwān b. Ḥakam, of another branch of the Omayyads, who had been Othman’s right-hand man. He had pledged himself after some hesitation to Yazid, but now his turn had come. The amir of the Kalb, Ibn Baḥdal, persuaded probably by Obaidallah b. Ziyād, conceived that only a man of distinction could win the contest, and proclaimed Merwan caliph, on condition that his successor should be Khālid b. Yazid, and after him ʻAmr b. Saʻīd al-Ashdaq, who belonged to the third branch of the Omayyads. Meanwhile Ḍaḥḥāk had declared himself openly for Ibn Zobair. A furious battle (A.D. 684) ensued at Merj Rāhiṭ, near Damascus, in which Ḍaḥḥāk and Zofar, though they had the majority of troops, were utterly defeated. This battle became the subject of a great many poems and had pernicious consequences, especially as regards the antagonism between the Qais-Moḍar and Kalb-Yemenite tribes.

4. *Reign of Merwan I.*—Merwan strengthened his position according to the old oriental fashion by marrying the widow of Yazid, and soon felt himself strong enough to substitute his own son Abdalmalik for Khālid b. Yazid as successor-designate. Khālid contented himself with protesting; he was neither a politician nor a soldier, but a student of alchemy and astronomy; translations of Greek books have been ascribed to him (Jāḥiz, *Bayān*, i. p. 126). In the year A.H. 435 there was still in Egypt a brazen globe attributed to Ptolemy which had belonged to

Khālid (Ibn Qiftī, p. 440, 1.15). He was also consulted about future events. There were, however, not a few who deplored the fact that the throne had passed from the descendants of Abu Sofiān. This feeling gave rise to the prophecy that there should appear later a Sofianī on the throne, who would reign with might and wisdom. ‘Amr Ashdaq made no opposition till the death of Merwan. After the victory at Merj Rāhiṭ, Merwan conquered Egypt, and installed as governor his second son Abdalazīz. An army sent to the rescue by Ibn Zobair under the command of his brother Muṣ‘ab was beaten in Palestine by ‘Amr Ashdaq. But a division sent by Merwan to the Hejaz was cut to pieces. Obaidallah b. Ziyād set out with the purpose of subduing Mesopotamia and marching thence against Irak. But he was detained a whole year in the former country, by a rising of the Shi‘ites in Kufa, who were still in mourning for Hosain and had formed an army which called itself “the army of the penitent.” They were routed at Ras ‘Ain, but Obaidallah had still to fight Zofar.

Meanwhile Mokhtār (son of that Abu ‘Obaid the Thaqifite who had commanded the Arabs against the Persians in the unfortunate battle of the Bridge), a man of great talents and still greater ambition, after having supported Ibn Zobair in the siege of Mecca, had gone to Kufa, where he joined the Shi‘ites, mostly Persians, and acquired great power. He claimed that he was commissioned by Ali’s son, Mahommed ibn al-Hanafiya, who after the death of Hosain was recognized by the Shi‘ites as their Mahdi. A vague message from Mahommed, that it was the duty of every good Moslem to take part with the family of the Prophet, was interpreted in favour of Mokhtār, and thenceforward all the Shi‘ites, among them the powerful Ibrāhīm, son of Ali’s right hand Malik Ashtar, followed him blindly as their chief. Afterwards Ibn al-Hanafiya seems to have acknowledged him distinctly as his vicegerent. Ibn Zobair’s representative in Kufa was compelled to flee, and all those who had participated in the battle of Kerbela were put to death. An army despatched against Obaidallah under Ibrāhīm routed the Syrians near Mosul (battle of Khāzir); Obaidallah and Hosain b. Nomair were slain. Mokhtār was now at the zenith of power, but Ibn Zobair, determined to get rid at all costs of so dangerous an enemy, named his brother Muṣ‘ab governor of Basra and ordered him to march against Kufa. Basra was at that time full of fugitives from Kufa, Arabian chiefs who resented the arrogance of Mokhtār’s adherents, and desired eagerly to regain their former position in Kufa. The troops of Basra had been, since the death of Yazid, at war with the Kharijites, who had supported Ibn Zobair during the siege of Mecca, but had deserted him later. Their caliph, Nāfi’ b. Azraq, after whom they were called also Azraqites, threatened even the city itself, when Mohallab b. Abi Ṣofra, a very able general, compelled them to retire. Mohallab then marched with Muṣ‘ab against Kufa. Mokhtār fell, and with him the ephemeral dominion of the Persian Shi‘ites. This had been their first attempt to dispute the authority of their Arabian conquerors, but it was not to be the last. Ibrāhīm b. Ashtar, Mokhtar’s governor of Mesopotamia, submitted and acknowledged the Caliphate of Ibn Zobair.

5. Reign of Abdalmalik.—Merwan died on the 27th of Ramadan 65 (7th May 685); according to tradition, he was suffocated by his wife, because he had insulted her son Khālid and herself. The accession of Abdalmalik was attended with no difficulty, but the first years of his reign were occupied by troubles in northern Syria, where, instigated by the Greeks, the Mardaites of the Amanus, called Jarājima by the Arabs, penetrated into the Lebanon. He was obliged to conclude an unfavourable treaty first with them, later with the emperor of Constantinople. Moreover, in the year 68 (A.D. 687-688) Syria was afflicted by a serious famine. Ibn Zobair, however, was occupied at Mecca with the rebuilding of the Ka’ba, and Muṣ‘ab was harassed not only by the Kharijites, but also by a noble freebooter, Obaidallah b. Ḥorr, who had created for himself a principality in the vicinity of Madāin (Ctesiphon).

The period of the pilgrimage caused a momentary truce to all these struggles, and in Dhu ‘l-hijja, A.H. 68 (January 688), was seen the curious spectacle of four different standards planted near Mecca, belonging respectively to four chiefs, each of whom was a pretender to the empire; the standard of Abdallah b. Zobair, caliph of Mecca; that of the caliph of Damascus, Abdalmalik; that of Ali’s son Mahommed b. al-Hanafiya, Mahdi of the Shi‘ites; and that of the Kharijites, who were at that time under the command of Najda b. ‘Āmir. Such, however, was the respect inspired by the holy places, that no disorders resulted.

When, in the year (69 A.H.) 689 Abdalmalik had at last encamped at Boṭān Ḥabīb in the vicinity of Kinnesrin (Qinnasrīn),[18] with the purpose of marching against Muṣ‘ab, his cousin ‘Amr Ashdaq, to whom by the treaty of Jābia, before the battle of Merj Rāhit, the succession to Merwan had been promised, took advantage of his absence to lay claim to the supreme power, and to have himself proclaimed caliph by his partisans. Abdalmalik was obliged to retrace his steps and to lay siege to his own capital. The garrison of Damascus took fright, and deserted their posts, so that ‘Amr Ashdaq was compelled to surrender. The caliph Abdalmalik summoned him to his palace and slew him with his own hand. Abdalmalik has every claim to our esteem as one of the ablest monarchs that ever reigned, but this murder remains a lasting blot on his career.

Abdalmalik could now give his whole attention to the projected expedition against Irak. Muṣ‘ab was encamped at Bājomairā in the neighbourhood of Takrīt. But Abdalmalik’s first task was to subdue Zofar and his Qaisites at Kerkesia (Qarqīsia), and the rest of the partisans of Mokhtār at Nisibis. Meanwhile, Muṣ‘ab had to curb a violent revolt in Basra, brought about by agents of Abdalmalik, and called after a place in the city the revolt of the Jofrites. About the middle of A.D. 691 Abdalmalik at last encamped at Dair al-Jathalīq (the monastery of the Catholicus) between Maskin, not far from the site of Bagdad, and Bājomairā. Muṣ‘ab’s best troops were fighting under Mohallab against the Kharijites; many Basrians were secretly favourable to the Omayyads, nor were the Kufian soldiers to be trusted. The people of Irak had never been accustomed to discipline, and no improvement had taken place during the troubles of the last years. Abdalmalik, therefore, wrote secretly to the chiefs of Muṣ‘ab’s army, and persuaded them to desert to him, with the exception of Ibrāhīm b. Ashtar, the brave son of a brave father, who, after the fall of Mokhtār, had become a faithful supporter of Ibn Zobair. His death, in the beginning of the battle, decided the fate of Muṣ‘ab, who was slain sword in hand by a Shi‘ite of Kufa.

This victory opened the gates of Kufa to Abdalmalik, and all Irak received him with acclamation. Thence, a few days later, he sent Hajjāj b. Yusuf at the head of 2000 Syrians against Ibn Zobair in Mecca, and despatched a messenger to Tāriq b.‘Amr, who was encamped at Wādi ‘l-Qorā with 5000 men, to make himself master of Medina and thence to rejoin Hajjāj. Before the arrival of this reinforcement, Hajjāj confined himself to skirmishes, in which his soldiers always had the advantage. Then, in Dhu ‘l Qa‘da 72 (March 25th, 692) Mecca was invested. The blockade lasted more than six months, during which the city was a prey to all the horrors of siege and famine. Hajjāj had set up a balista on the hill of Abu Qobais, whence he poured on the city a hail of stones, which was suspended only in the days of the pilgrimage. Ibn Zobair employed against him Abyssinians armed with Greek-fire-tubes, who, however, quitted him soon under the pressure of famine. This at length triumphed over his last adherents. Ten thousand fighting men, and even two of the sons of the pretender (it is said, on his own

advice), left the city and surrendered. Mecca being thus left without defenders, Ibn Zobair saw that ruin was inevitable. Hajjāj having promised him amnesty if he would surrender, he went to his mother Asmā, the daughter of Abu Bekr, who had reached the age of a hundred years, and asked her counsel. She answered that, if he was confident in the justice of his cause, he must die sword in hand. In embracing him for the last time, she felt the cuirass he wore and exclaimed that such a precaution was unworthy of a man resolved to die. He, therefore, took off the cuirass, and, when the Omayyad troops made their way into the city, attacked them furiously, notwithstanding his advanced age, and was slain. His head was cut off, and sent by Hajjāj to Damascus.

With Ibn Zobair perished the influence which the early companions of Mahomet had exercised over Islam. Medina and Mecca, though they continued to be the holy cities, had no longer their old political importance, which had already been shaken to its foundations by the murder of Othman and the subsequent troubles. Henceforward we shall find temporal interests, represented by Damascus, predominating over those of religion, and the centre of Islam, now permanently removed beyond the limits of Arabia, more susceptible to foreign influence, and assimilating more readily their civilizing elements. Damascus, Kufa and Basra will attract the flower of all the Moslem provinces, and thus that great intellectual, literary and scientific movement, which reached its apogee under the first Abbasid Caliphs at Bagdad, steadily becomes more marked.

After the burning of the Ka'ba during the siege of Mecca by Hosain b. Nomair, Ibn Zobair had rebuilt and enlarged the house of God. It is said that he thus carried out a design of the Prophet, which he had not ventured to undertake for fear of offending the newly converted Koreishites. Hajjāj pulled down the enlargements and restored the Ka'ba to its old state. Meanwhile, the caliph committed to him the government of the Hejaz. The Medinians, whose loyalty was suspected, were treated by him with severity; not a few *maulas* (clients) were obliged to wear a leaden badge on their neck (Tabarī, ii. p. 854 seq.).

Thus the protracted war against Ibn Zobair was brought to an end; hence this year (71) also is called the "year of union" (*jamā'a*). But the storms in Irak and Mesopotamia had not yet altogether subsided. The Qais could not leave unavenged the blood shed at Merj Rāhit. For about ten years the Syrian and Mesopotamian deserts were the scene of a series of raids, often marked by great cruelty, and which have been the subject of a great many poems. Abdalmalik had need of all his tact and energy to pacify ultimately the zealous sectaries, but the antagonism between Yemenites (Kalb and Azd) and Moḍarites (Qais and Tamīm) had been increased by these struggles, and even in the far east and the far west had fatal consequences.

When Abdalmalik, after a stay of forty days, returned from Irak to Syria, he left two Omayyad princes as his vicegerents in Kufa and Basra. Mohallab, who at the time of the battle of Bājomairā was in the field against the Azraqītes (Kharijites), and had put himself at the disposal of the caliph, had orders to carry on the war. But the two princes proved unequal to their task and did not support Mohallab sufficiently, so that the Kharijites gained more than one victory. Abdalmalik in alarm made Hajjāj governor of Irak with the most extensive powers. The troops of Kufa, who accompanied Mohallab in an expedition against the Kharijites, had abandoned their general and dispersed to their homes, and nothing could induce them to return to their duty. Then, in the year 75 (A.D. 694), at the moment when the people were assembled in the mosque for morning prayers, an unknown young man of insignificant appearance, with a veil over his face, ascended the pulpit. It seemed at first that he could not find his words. One of the audience, with a contemptuous remark, took a handful of pebbles to pelt him with. But he let them fall when Hajjāj lifted his veil and began to speak.

"Men of Kufa," he said, "I see before me heads ripe for the sickle, and the reaper—I am he. It seems to me, as if I saw already the blood between your turbans and your shoulders. I am not one of those who can be frightened by inflated bags of skin, nor need any one think to squeeze me like a fig. The Prince of the Believers has spread before him the arrows of his quiver, and has tried every one of them by biting its wood. It is my wood that he has found the hardest and strongest, and I am the arrow which he shoots against you."

At the end of this address he ordered his clerk to read the letter of the caliph. He began: "From the servant of God, Abdalmalik, Prince of the Believers, to the Moslems that are in Kufa, peace be with you." As nobody uttered a word in reply, Hajjāj said: "Stop, boy," and exclaimed: "The Prince of the Believers salutes you, and you do not answer his greeting! You have been but poorly taught. I will teach you afresh, unless you behave better. Read again the letter of the Prince of the Believers." Then, as soon as he had read: "peace upon ye," there remained not a single man in the mosque who did not respond, "and upon the Prince of the Believers be peace." Thereupon Hajjāj ordered that every man capable of bearing arms should immediately join Mohallab in Khūzistān (Susiana), and swore that all who should be found in the town after the third day should be beheaded. This threat had its effect, and Hajjāj proceeded to Baṣra, where his presence was followed by the same results. Mohallab, reinforced by the army of Irak, at last succeeded, after a struggle of eighteen months, in subjugating the Kharijites and their caliph Qatara b. Fojā'a, and was able at the beginning of the year 78 (A.D. 697) to return to Hajjāj at Baṣra. The latter loaded him with honours and made him governor of Khorasan, whence he directed several expeditions into Transoxiana. In the meantime Hajjāj himself had, in 695 and 696, with great difficulty suppressed Shabīb b. Yazīd at the head of the powerful tribe of Shaibān, who, himself a Kharijite, had assumed the title of Prince of the Believers, and had even succeeded in occupying Kufa. In the east the realm of Islam had been very much extended under the reign of Moawiya, when Ziyād was governor of Irak and Khorasan. Balkh and Tokhāristān, Bokhara, Samarkand and Khwarizm (modern Khiva), even Kabul and Kandahar had been subdued; but in the time of the civil war a great deal had been lost again. Now at last the task of recovering the lost districts could be resumed. When, in 697, Hajjāj gave the government of Khorasan to Mohallab, he committed that of Sijistān (Seistan) to Obaidallah b. Abi Bakra, a cousin of Ziyād. This prefect allowed himself to be enticed by Zanbīl, prince of Zabulistan, to penetrate into the country far from his base, and escaped narrowly, not without severe losses. The command over Sijistān was now given to Abdarrahman b. Ash'ath, a descendant of the old royal family of Kinda, and a numerous army was entrusted to him, so magnificently equipped that it was called "the peacock army." Not long after his arrival in Sijistān, Ibn Ash'ath, exasperated by the masterful tone of Hajjāj, the plebeian, towards himself, the high-born, decided to revolt. The soldiers of Irak, who did not love the governor, and disliked the prospect of a long and difficult war far from home, eagerly accepted the proposition of returning to Irak, and even proclaimed the dethronement of Abdalmalik, in favour of Ibn Ash'ath. The new pretender entered Fārs and Ahwāz (Susiana), and it was in this last province near Tostar (Shuster) that Hajjāj came up with him, after receiving from Syria the reinforcements which he had demanded in all haste from the caliph. Ibn Ash'ath drove him back to Baṣra, entered the city, and then turned his arms against Kufa, of which he took possession with aid from within. Hajjāj, afraid lest his communications with Syria should be cut off, pitched his camp at Dair Qorra, eighteen miles west from Kufa towards the desert, where Mahommed, the brother of the caliph, and Abdallah, his

son, brought him fresh troops. Ibn Ash'ath encamped not far from him at Dair al-Jamājim with a far more numerous army. In great alarm Abdalmalik endeavoured to stifle the revolt by offering to dismiss Hajjāj from his post. The insurgents rejected this offer, and hostilities recommenced. At the end of three months and a half, in July 702, a decisive action took place. Victory declared for Hajjāj. Ibn Ash'ath fled to Baṣra, where he managed to collect fresh troops; but having been again beaten in a furious battle that took place at Maskin near the Dojail, he took refuge at Ahwāz, from which he was soon driven by the troops of Hajjāj under 'Omāra b. Tamīm. The rebel then retired to Sijistān, and afterwards sought an asylum with the king of Kabul. His partisans fled before 'Omāra's army and penetrated into Khorasan, where they were isarmed by the governor Yazīd, son of the celebrated Mohallab, who had died in the year 701. The pretender was betrayed by the king of Kabul and killed himself. His head was sent to Hajjāj and then to Damascus. This happened in the year 703 or 704. Yazid b. Mohallab was soon after deprived of the government of Khorasan, Hajjāj accusing him of partiality towards the rebels of Yemenite extraction. He appointed in his stead first his brother Mofaḍḍal b. Mohallab, and nine months after Qotaiba b. Moslim, who was destined in a later period to extend the sway of Islam in the east as far as China.

The struggle of Ibn Ash'ath was primarily a contest for hegemony between Irak and Syria. The proud Arabic lords could not acquiesce in paying to a plebeian like Hajjāj, invested with absolute power by the caliph, the strict obedience he required. They considered it further as an injustice that the Syrian soldiers received higher pay than those of Irak. This is apparent from the fact that one of the conditions of peace proposed by Abdalmalik before the battle of Dair al-Jamājim had been that henceforth the Irakian troops should be paid equally with the Syrian. Moreover, Hajjāj, in order to maintain the regular revenue from taxation, had been obliged to introduce stringent regulations, and had compelled a great many villagers who had migrated to the cities to return to their villages. Several of these were *faqīhs*, students of Koranic science and law, and all these seconded Ibn Ash'ath with all their might. But, as Wellhausen has shown, it is not correct to consider the contest as a reaction of the *maula's* (Persian Moslems) against the Arabic supremacy.

Immediately after the victories of Dair al-Jamājim and Maskin, in 702, Hajjāj, built a new residence on the Tigris, between Baṣra and Kufa, which he called Wāsit ("Middle"). There his Syrian soldiers were not in contact with the turbulent citizens of the two capitals, and were at any moment ready to suppress any fresh outburst.

At the beginning of his reign Abdalmalik had replaced the humble mosque built by Omar on the site of the temple at Jerusalem by a magnificent dome, which was completed in the year 691. Eutychius and others pretend that he desired to substitute Jerusalem for Mecca, because Ibn Zobair had occupied the latter place, and thus the pilgrimage to the Ka'ba had become difficult for the Syrians. This is quite improbable. Abdalmalik was born and educated in Islam, and distinguished himself in his youth by piety and continence. He regarded himself as the champion of Islam and of the communion of the believers, and had among his intimates men of acknowledged devoutness such as Rajā b. Ḥaywa. The idea of interfering with the pilgrimage to the House of God at Mecca, which would have alienated from him all religious men, and thus from a political point of view would have been suicidal, cannot have entered his mind for a moment. But the glorification of Jerusalem, holy alike for Moslems, Christians and Jews, could not but exalt the glory of Islam and its rulers within and without.

As soon as the expedition to Irak against Muṣ'ab had terminated, the holy war against the Greeks was renewed. The operations in Asia Minor and Armenia were entrusted to Mahommed b. Merwan, the caliph's brother, who was appointed governor of Mesopotamia and Armenia, and in 692 beat the army of Justinian II. near Sebaste in Cilicia. From this time forth the Moslems made yearly raids, the chief advantage of which was that they kept the Syrian and Mesopotamian Arabs in continual military exercise. After the victorious march of Okba (Oqba) b. Nāfi' through north Africa and the foundation of Kairawan, his successor Qais b. Zohair had been obliged to retreat to Barca (Cyrenaica). In the year 696 Abdalmalik sent Hassān b. No'mān into Africa at the head of a numerous army. He retook Kairawan, swept the coast as far as Carthage, which he sacked, expelling the Greek garrisons from all the fortified places; he then turned his arms against the Berbers, who, commanded by the Kāhina (Diviner), as the Arabs called their queen, beat him so completely that he was compelled to retreat to Barca. Five years later he renewed the war, defeated and killed the Kāhina, and subdued the Berbers, who henceforward remained faithful to the Arabs. Hassān continued to be governor of Kairawan till after the death of Abdalmalik.

In the meantime Abdalmalik reconstituted the administration of the empire on Arabic principles. Up to the year 693 the Moslems had no special coinage of their own, and chiefly used Byzantine and Persian money, either imported or struck by themselves. Moawiya, indeed, had struck dinars and dirhems with a Moslem inscription, but his subjects would not accept them as there was no cross upon them. Abdalmalik instituted a purely Islamitic coinage. If we may believe Theophanes, who says that Justinian II. refused to receive these coins in payment of the tribute and therefore declared the treaty at an end, we must put the beginning of the coinage at least two years earlier. Hajjāj coined silver dirhems at Kufa in 694. A still greater innovation was that Arabic became the official language of the state. In the conquered countries till then, not only had the Greek and Persian administration been preserved, but Greek remained the official language in the western, Persian in the eastern provinces. All officials were now compelled to know Arabic and to conduct their administration in that language. To this change was due in great measure the predominance of Arabic throughout the empire. Lastly, a regular post service was instituted from Damascus to the provincial capitals, especially destined for governmental despatches. The postmasters were charged with the task of informing the caliph of all important news in their respective countries.

All the great rivals of Abdalmalik having now disappeared, he was no longer like his predecessors *primus inter pares*, but *dominus*. Under his rule the members of the Omayyad house enjoyed a greater amount of administrative control than had formerly been the case, but high office was given only to competent men. He succeeded in reconciling the sons of 'Amr Ashdaq, and also Khālid b. Yazid, to whom he gave his own daughter in marriage. He himself had married 'Ātika, a daughter of Yazid, a union which was in all respects a happy one. He took great care in the education of his sons, whom he destined as his successors. His brother Abdalazīz, governor of Egypt, whom Merwan had marked out as his successor, died in the year 703 or 704, and Abdalmalik chose as heirs to the empire first his son Walīd, and after him his second son Suleimān. He himself died on the 14th Shawwāl 86 (9th October 705) at the age of about sixty. His reign was one of the most stormy in the annals of Islam, but also one of the most glorious. Abdalmalik not only brought triumph to the cause of the Omayyads, but also extended and strengthened the Moslem power as a whole. He was well versed in old Arabic tradition and in the doctrine of Islam, and was passionately fond of poetry. His court was crowded with poets, whom he loaded with favours, even if they were Christians like Akhtal. In his reign flourished also the two celebrated rivals of

Akhtal, Jarīr and Farazdaq.

6. *Reign of Walid I.*—This is the most glorious epoch in the history of Islam. In Asia Minor and Armenia, Maslama, brother of the caliph, and his generals obtained numerous successes against the Greeks. Tyana was conquered after a long siege, and a great expedition against Constantinople was in preparation. In Armenia Maslama advanced even as far as the Caucasus. In Africa, Mūsā b. Noṣair, who succeeded Hassān b. No'mān as governor, in a short time carried his conquests as far as Fez, Tangier and Ceuta, and one of his captains even made a descent on Sicily and plundered Syracuse. When he returned from the west to Kairawan, he made his client Ṭāriq (or Tarik) governor of Tangier and of the whole western part of Africa. Under him the chiefs who had submitted to the Moslem arms retained their authority. One of them was the Greek exarch of Tangier, Julian, who, supported by the powerful Berber tribe of Ghomēra, had long resisted and even asked for aid from Spain, but had been compelled to surrender and was left governor of Ceuta. Meanwhile in Spain, after the death of the Gothic king Witiza in the year 90 (708-709), anarchy arose, which was terminated by the council of noblemen at Toledo electing Roderic, the powerful duke of Baetica, to be his successor in the fifth year of Walid. The eldest son of Witiza then applied to Julian, and asked the aid of the Arabs for the recovery of his father's throne. Ṭāriq forwarded the embassy to Kairawan, and Mūsā asked the caliph's permission to send an expedition into Spain. Authorized by Mūsā, Ṭāriq now sent, in Ramadan 91 (July 710), 500 Berbers under the command of Ṭārif to reconnoitre the country. This expedition, seconded by partisans of Witiza, was successful. In the beginning of A.D. 711 Roderic had been summoned to the north on account of an invasion of Navarra by the Franks, caused, it is said, by the conspirators. Ṭāriq, thus certain of meeting no serious opposition to his landing, passed into Spain himself with an army composed mainly of Berbers of the Ghomēra tribe under the guidance of Julian. The spot where he landed thence acquired the name of Jebel Ṭāriq, "Mountain of Ṭāriq," afterwards corrupted into Gibraltar. Having made himself master of Algeçiras and thereby secured his communication with Africa, Ṭāriq set out at once in the direction of Cordova. At the news of the invasion Roderic hastened back and led a numerous army against the combined forces of Ṭāriq and the partisans of Witiza. A fierce battle took place in the plain of Barbata on the little river of Guadaleta (north of Medina Sidonia), in which Roderic was completely routed. The spoils of the victors were immense, especially in horses, but the king himself had disappeared. Fearing lest he should have escaped to Toledo and should there fit out another army, the partisans of Witiza insisted that Ṭāriq should march immediately against the capital. Ṭāriq complied with their wishes, notwithstanding the express command of Mūsā b. Nosair that he should not venture too far into the country, and the protests of Julian. Having made himself master of Ecija and having despatched a detachment under Moghīth against Cordova, Ṭāriq took Mentesa (Villanueva de la Fuente) and marched upon Toledo, which he soon conquered. At the same time Moghīth took Cordova. But, notwithstanding these successes, Ṭāriq knew that his situation was most critical. King Roderic, who had escaped to Lusitania, and the noble Goths, who had fled from Toledo, would certainly not be slow in making efforts to regain what they had lost. He therefore sent a message in all haste to Mūsā, entreating him to come speedily. Mūsā, though angered by the disobedience of Ṭāriq, hastened to the rescue and embarked in April 712 with 18,000 men, among them many noble Arabs, and began, advised by Julian, a methodical campaign, with the purpose of establishing and securing a line of communication between the sea and Toledo. After having taken Seville, Carmona and Merida, he marched from the latter place by the Via Romana to Salamanca, after having ordered Ṭāriq to rejoin him in order to encounter king Roderic. Not far from Tamames the king was defeated and killed. King Alphonso the Great found his tombstone at Viseo with the inscription, "Hic requiescit Rodericus rex Gothorum." After this battle Mūsā reconquered Toledo, which, after the departure of Ṭāriq, had recovered its independence, and entered the capital in triumph. Already, before the expedition to Salamanca, he had perceived that the sons of Witiza had neither military nor political ability. He therefore proclaimed the caliph of Damascus as sole ruler of the whole peninsula. The Gothic princes must content themselves with honours and apanages, in which they readily acquiesced. In the same year 93 (A.D. 712) Mūsā struck Moslem coins with Latin inscriptions. Mūsā then continued the subjugation of Spain, till Walid recalled him to Damascus. He obeyed after having appointed his son Abdalazīz governor of Andalos (Andalusia), as the Arabs named the peninsula, and assigned Seville as his residence. Abdalazīz consolidated his power by marrying the widow of the late king Roderic. Mūsā left Spain about August 714, and reached Damascus shortly before the death of Walid. Notwithstanding the immense booty he brought, he did not receive his due reward. Accused of peculation, he was threatened with imprisonment unless he paid a fine of 100,000 pieces of gold. The old man—he was born in the year 640—was released by Yazid b. Mohallab, the then mighty favourite of the caliph Suleiman, but died in the same year 716 on his way to Mecca. His son Abdalazīz was an excellent ruler, who did much for the consolidation of the new conquests, but he reigned only one year and eleven months, when he was murdered. His death has been falsely imputed by some historians to the caliph Suleiman.[19]

In the East the Moslem armies gained the most astonishing successes. In the course of a few years Qotaiba b. Moslim conquered Paikend, Bokhara, Samarkand, Khwarizm (mod. Khiva), Ferghana and Shāsh (Tashkent), and even Kashgar on the frontiers of China. Meanwhile Mahommed b. Qāsim invaded Makran, took Daibol, passed the Indus, and marched, after having beaten the Indian king Daher, through Sind upon Multān, which he conquered and whence he carried off an immense booty.

Walid was the first caliph, born and trained as prince, who felt the majesty of the imamate and wished it to be felt by his subjects. He desired to augment the splendours of Islam and its sovereign, as Abdalmalik had already done by building the dome of Jerusalem. In the time of the conquest of Damascus, one half of the great church had been made a mosque, while the remaining half had been left to the Christians. Walid annexed this part, indemnifying the Christians elsewhere, and restored the whole building sumptuously and magnificently. In his time many fine palaces and beautiful villas were built in Syria, and Becker's conjecture seems not altogether improbable, that from this period dates the palace of Mashetta, the façade of which is now in the Kaiser Friedrich Museum at Berlin, as perhaps also the country houses discovered by Musil in the land of Moab. Walid also caused the mosque of Medina to be enlarged. For this purpose, the apartments of the Prophet and his wives were demolished, which at first caused much discontent in Medina, some crying out that thereby a verse of the Book of God (S. 49, v. 4) was cancelled. With this exception, the citizens of Medina had nothing to complain of. The vicegerent of Abdalmalik had treated them harshly. Walid immediately on his accession appointed as governor of Hejaz his cousin Omar b. Abdalazīz, who was received there with joy, his devoutness and gentle character being well known. But the reputation of Omar attracted to the two holy cities a great number of the inhabitants of Irak, who had been deeply involved in the rebellion of Ibn Ash'ath. Ḥajjāj, however, was not the man to allow the formation of a fresh nucleus of sedition, and persuaded the caliph to dismiss Omar in the year 712, and appoint Othman b. Ḥayyān at Medina and Khālid al-Qasrī at Mecca. These two prefects compelled the refugees to return

to Irak, where many of them were severely treated and even put to death by Ḥajjāj.

Few people have been so slandered as this great viceroy of the Orient. In reality he was a man of extraordinary ability, and accomplished the task committed to him with vigour and energy. To his unflagging constancy was due the suppression of the dangerous rebellion of Ibn Ash'ath. After the restoration of peace his capacity for organization was displayed in all directions. The draining and tilling of submerged or uncultivated land on a large scale, the promotion of agriculture in every way, in particular by the digging of channels, and the regulation of the system of taxation, were carried out on his initiative. He showed the utmost wisdom in the selection of his lieutenants. The fear of his name was so great that even in the desert there was security for life and property, and his brilliant military successes were unquestionably due in a great measure to the care which he bestowed on equipment and commissariat. The heavy expenses entailed thereby were largely met by the booty which he won. Ḥajjāj was a sincere Moslem; this, however, did not prevent him from attacking Ibn Zobair in the Holy City, nor again from punishing rebels, though they bore the name of holy men. He enjoyed the entire confidence of Abdalmalīk with Walid, but Suleiman, the appointed successor, regarded him with disfavour. Yazid b. Mohallab, whom he had recalled from Khorasan, and imprisoned, had escaped and put himself under the protection of Suleiman, who made himself surety for the fine to which Yazid had been condemned. Ḥajjāj foreboded evil, and prayed eagerly that he might die before Walid. His death took place about the end of Ramadan 95 (June or July 714).

7. *Reign of Suleiman* (*Solaiman*).—Suleiman had early missed the throne. Walid wished to have his son Abdalazīz chosen as his successor, and had offered Suleiman a large sum of money to induce him to surrender his rights. Walid went still further and sent letters to the governors of all the provinces, calling on them to take the oath of allegiance to his son. None, except Ḥajjāj and his two generals Qotaiba b. Moslim and Mahommed b. Qàsim, consented thus to set at naught the order of succession established by Abdalmalik; and Suleiman succeeded without difficulty on the death of his brother Jomāda II. 96 (February 715). We can easily conceive the hatred felt by Suleiman for Ḥajjāj and for all that belonged to him. Ḥajjāj himself was dead; but Suleiman poured out his wrath on his family and his officers. The governors of Medina and Mecca were dismissed; Mahommed b. Qasim, the conqueror of India, cousin of Ḥajjāj, was dismissed from his post and outlawed. Qotaiba b. Moslim, the powerful governor of Khorasan, tried to anticipate the caliph by a revolt, but a conspiracy was formed against him, which ended in his murder. Some historians say that he was falsely accused of rebellion.

Yazid b. Mohallab, the enemy of Ḥajjāj, was made governor of Irak. His arrival was hailed with joy, especially by the Azd, to whom his family belonged, and the other Yemenite tribes. Yazid discovered soon that the system of taxation as regulated by Hajjāj could not be altered without serious danger to the finances of the empire, and that he could not afford the expenses which his prodigal manner of life involved. He therefore asked the caliph to give him the governorship of Khorasan also, and took his residence in Merv, where he was free from control. On his return to Khorasan he set on foot a series of new expeditions against Jorjān and Tabaristān, with only partial success. He sent, however, to the caliph an exaggerated account of his victories and the booty he had made. He had cause to repent this later.

Walid had, in the last years of his reign, made preparations for a great expedition against Constantinople. Suleiman carried them on with energy, and as early as the autumn of A.D. 715 Maslama invaded Asia Minor at the head of a numerous army, whilst a well-equipped fleet under Omar b. Hobaira sailed out to second him. It is said that Suleiman was firmly persuaded that Constantinople would be conquered during his reign, in accordance with a Sibylline prophecy which said that the city would be subdued by a caliph bearing the name of a prophet, he himself being the first to fulfil this condition.[20] Moreover, the Byzantine empire was in these years disturbed by internal troubles. The first year of the expedition was not unsuccessful. The siege of Amorium in Phrygia was broken up, but Pergamum and Sardis were taken. On the 25th of August 716 the blockade of Constantinople began from the land side, and two weeks later from the sea side. A few months before, Leo the Isaurian had ascended the throne and prepared the city for the siege. This lasted about a year. The besieged were hard pressed, but the besiegers suffered by the severe winter, and were at last obliged to raise the siege. Maslama brought back the rest of his army in a pitiful state, while the fleet, on its return, was partly destroyed by a violent tempest. The Moslems regard this failure as one of the great evils that have befallen the human race, and one which retarded the progress of the world for ages,[21] the other calamity being the defeat in the battle of Tours by Charles Martel.

Maslama was still on his way back when Suleiman died at Dābiq in northern Syria, which was the base of the expeditions into Asia Minor. He seems not to have had the firmness of character nor the frugality of Walid; but he was very severe against the looseness of manners that reigned at Medina, and was highly religious. Rajā b. Haywa, renowned for his piety, whose influence began under Abdalmalik and increased under Walid, was his constant adviser and even determined him to designate as his successor his devout cousin Omar b. Abdalazīz. Suleiman was kind towards the Alids and was visited by several of them, amongst others by Abu Hāshim, the son of Mahommed b. al Ḥanafīya, who after his father's death had become the secret Imam (head) of the Shi'ites. On his way back to Hejaz this man visited the family of Abdallah b. 'Abbās, which resided at Ḥomaima, a place situated in the vicinity of 'Ammān, and died there, after having imparted to Mahommed b. Ali b. Abdallah b. Abbas the names of the chiefs of the Shi'a in Irak and Khorasan, and disclosed his way of corresponding with them. From that time the Abbasids began their machinations against the Omayyads in the name of the family of the Prophet, avoiding all that could cause suspicion to the Shi'ites, but holding the strings firmly in their own hands.

8. *Reign of Omar II.*—Omar b. Abdalazīz did his best to imitate his grandfather Omar in all things, and especially in maintaining the simple manner of life of the early Moslems. He was, however, born in the midst of wealth; thus frugality became asceticism, and in so far as he demanded the same rigour from his relatives, he grew unjust and caused uneasiness and discontent. By paying the highest regard to integrity in the choice of his officers, and not to ability, he did not advance the interests of his subjects, as he earnestly wished to do. In the matter of taxes, though actuated by the most noble designs, he did harm to the public revenues. The principle of Islam was, that no Moslem, whatever might be his nationality, should pay any tax other than the *zakāt* or poor-rate (see MAHOMMEDAN INSTITUTIONS). In practice, this privilege was confined to the Arabic Moslems. Omar wished to maintain the principle. The original inhabitants had been left on the conquered lands as agriculturists, on condition of paying a fixed sum yearly for each district. If one of these adopted Islam, Omar permitted him to leave his place, which had been strictly forbidden by Hajjāj in Irak and the eastern provinces, because by it many hands were withdrawn from the tilling of the ground, and those who remained were unable to pay the allotted

amount. Omar's system not only diminished the actual revenue, but largely increased in the cities the numbers of the *maula's* (clients), mainly Persians, who were weary of their dependency on their Arabic lords, and demanded equal rights for themselves. Their short dominion in Kufa under Mokhtār had been suppressed, but the discontent continued. In North Africa particularly, and in Khorasan the effect of Omar's proclamation was that a great multitude embraced Islam. When it became necessary to impose a tribute upon the new converts, great discontent arose, which largely increased the number of those who followed the Shi'ite preachers of revolt. Conversion to Islam was promoted by the severe regulations which Omar introduced for the non-believers, such as Christians and Jews. It was he who issued those humiliating rescripts, which are commonly but unjustly attributed to Omar I. But he forbade extortion and suppressed more than one illegal impost. He endeavoured above all to procure justice for all his subjects. Complaints against oppression found in him a ready listener, and many unlawfully acquired possessions were restored to the legal owners, for instance, to the descendants of Ali and Talḥa. Even to the Kharijites he contrived to give satisfaction, as far as possible. In all these matters he followed the guidance of divines and devotees, in whose congenial company he delighted. It is, therefore, not to be wondered at that these men saw in Omar the ideal of a prince, and that in Moslem history he has acquired the reputation of a saint.

After the failure of the siege of Constantinople, the advanced posts in Asia Minor were withdrawn, but the raids were continued regularly. It has been said that it was Omar's intention to give up his Spanish conquests, but the facts argue the contrary. The governor, named by Omar, Samḥ b. Abdallah, even crossed the Pyrenees and took possession of Narbonne; but he was beaten and killed at Toulouse in July 720. But Omar did all he could to prevent the degradation of the Holy War, which, instead of being the ultimate expedient for the propagation of Islam, if all other means had failed, had often degenerated into mere pillaging expeditions against peaceful nations.

9. *Reign of Yazid II.*—Omar's reign was as short as that of his predecessor. He died on the 24th of Rajab 101 (A.D. 9th February 720). Yazid II., son of Abdalmalik and, by his mother 'Ātika, grandson of Yazid I., ascended the throne without opposition. He had at once, however, to put down a dangerous rebellion. Yazid b. Mohallab had returned to Irak, after the conquest of Jorjān, when Suleiman was still alive. Shortly after, Adī b. Artāt, whom Omar II. had appointed governor, arrived, arrested Yazid, and sent him to Omar, who called him to account for the money he had mentioned in his letter to Suleiman, and imprisoned him when he pretended not to be able to pay the amount. Yazid II. had personal grounds for ill-will to Yazid b. Mohallab. One of the wives of the new caliph, the same who gave birth to that son of Yazid II. who afterwards reigned as Walid II., was niece to the celebrated Ḥajjāj, whose family had been ill-treated by the son of Mohallab, when he was governor of Irak under Suleiman. Aware that Yazid b. Abdalmalik, on ascending the throne, would spare neither him nor his family, Yazid b. Mohallab had succeeded in escaping to Basra, the home of his family, where his own tribe the Azd was predominant. Meanwhile 'Adī b. Artāt had all the brothers of Yazid and other members of the family of Mohallab arrested, and tried to prevent Yazid from entering the city. But 'Adi was too scrupulous to employ the public money for raising the pay of his soldiers, whilst Yazid promised mountains of gold. Yazid stormed the castle and took 'Adī prisoner, the public treasury fell into his hands, and he employed the money to pay his troops largely and to raise fresh ones. A pardon obtained for him from the caliph came too late; he had already gone too far. He now proclaimed a Holy War against the Syrians, whom he declared to be worse enemies of Islam than even the Turks and the Dailam. Notwithstanding the warnings of the aged Hasan al-Basrī, the friend of Omar II., the religious people, took the part of Yazid, and were followed by the *maulas*. Though the number of his adherents thus increased enormously, their military value was small. Ahwāz (Khūzistān), Fārs and Kirman were easily subdued, but in Khorasan the Azd could not prevail over the Tamīm, who were loyal to the caliph. As the rebellion threatened to spread far and wide, Yazid II. was obliged to appeal to his brother, the celebrated Maslama. With the approach of the Syrians, Yazid b. Mohallab tried to forestall them at Kufa. He took his way over Wāsit, which he mastered—the Syrian garrison seems to have been withdrawn in the days of Omar II.—but, before he could get hold of Kufa, the Syrian troops arrived. The meeting took place at 'Aqr in the vicinity of Babel, and Yazid was completely defeated and fell in the battle. His brothers and sons fled to Basra; thence they went by sea to Kirman and then to Kandabīl in India; but they were pursued relentlessly and slain with only two exceptions by the officers of Maslama. The possessions of the Mohallabites were confiscated.

Maslama was rewarded with the governorship of Irak and Khorasan, but was soon replaced by Omar b. Hobaira, who under Omar II. had been governor of Mesopotamia. He belonged to the tribe of Qais, and was very severe against the Azd and other Yemenite tribes, who had more or less favoured the part of Yazid b. Mohallab. In these years the antagonism between Qais (Moḍar) and Yemenites became more and more acute, especially in Khorasan. The real cause of the dismissal of Maslama was, that he did not send the revenue-quota to Damascus. Omar b. Hobaira, to supply the deficiency, ordered the prefect of Khorasan, Sa'īd-al-Ḥarashī, to take tribute from the Sogdians in Transoxiana, who had embraced Islam on the promise of Omar II. The Sogdians raised a revolt in Ferghana, but were subdued by Sa'īd and obliged to pay. A still more questionable measure of Ibn Hobaira was his ordering the successor of Sa'īd Harashī to extort large sums of money from several of the most respectable Khorasanians. The discontent roused thereby became one of the principal causes of the fall of the Omayyads.

In Africa serious troubles arose from the same cause. Yazid b. Abi Moslim, who had been at the head of the financial department in Irak under Ḥajjāj, and had been made governor of Africa by Yazid II., issued orders that the villagers who, having adopted Islam, were freed from tribute according to the promise of Omar II., and had left their villages for the towns, should return to their domiciles and pay the same tribute as before their conversion. The Berbers rose in revolt, slaughtered the unfortunate governor, and put in his place the former governor Mahommed b. Yazid. The caliph at first ratified this choice, but soon after dismissed Mahommed from his post, and replaced him by Bishr b. Ṣafwān, who under Hisham made an expedition against Sicily.

Yazid II. was by natural disposition the opposite of his predecessor. He did not feel that anxiety for the spiritual welfare of his subjects which had animated Omar II. Poetry and music, not beloved by Suleiman and condemned by Omar, were held by him in great honour. Two court-singers, Sallāma and Ḥabāba, exercised great influence, tempered only by the austerity of manners that prevailed in Syria. He was so deeply affected by the death of Ḥabāba, that Maslama entreated him not to exhibit his sorrow to the eyes of the public. He died a few days later, on the 26th of January 724, according to the chroniclers from grief for her loss. As his successor he had appointed in the first place his brother Hisham, and after him his own son Walid.

10. *Reign of Hisham.*—Hisham was a wise and able prince and an enemy of luxury, not an idealist like Omar II., nor a worldling like Yazid II., but more like his father Abdalmalik, devoting all his energy to the pacification of the

interior, and to extending and consolidating the empire of Islam. But the discontent, which had been sown under his predecessors, had now developed to such an extent that he could not suppress it in detail. His first care was to put an end to the tyrannical rule of the Qaisites (Moḍarites) in Irak and Khorasan by dismissing Omar b. Hobaira and appointing in his place Khālid al-Qasrī. This very able man, who under Haǰǰāǰ had been prefect of Mecca, belonged properly neither to the Qaisites nor to the Yemenites, but as he took the place of Ibn Hobaira and dismissed his partisans from their posts, the former considered him as their adversary, the latter as their benefactor. After his death, in particular, the Yemenites celebrated him as their chief, and assigned as the reason for their revolt the injuries which he suffered. Khālid himself assuredly did not intend it. He was a loyal servant of the dynasty, and remained such even after receiving very harsh treatment from them. For fifteen years Khālid governed the eastern half of the empire, and continued to maintain peace with only few exceptions throughout. He did much for the reclaiming and improving of lands in Irak, in which the caliph himself and several princes took an active part. The great revenues obtained thereby naturally caused much jealousy. Khālid lived on a very rich scale and was extraordinarily liberal, and he was charged with having carried out all his improvements for his own interests, and upbraided for selling the corn of his estates only when the prices were high. To these charges were added the accusation that he was too tolerant to Christians, Jews and Zoroastrians. As his mother professed the Christian religion, he was accused of infidelity. At last a conspiracy, into which the principal engineer of Khālid, Hassān the Nabataean, had been drawn, succeeded in inciting Hisham against Khālid. They told him that Khālid had used disrespectful terms in speaking of the caliph, and that he had appropriated revenues belonging to the state. The latter imputation especially influenced Hisham, who was very parsimonious. When the dismissal of Khālid had been resolved upon, Yūsuf b. Omar, his appointed successor, was sent secretly to Kufa, where he seized on Khālid unawares. For eighteen months Khālid remained in prison. But when he declined even under torture to confess that he had been guilty of extensive peculation, he was finally released. He settled at Damascus and made a noble return for his injuries by taking an active part in the war against the Greeks. In the summer of A.D. 740, while he was in Asia Minor, a great fire broke out in Damascus, the guilt of which was attributed to Khālid. Though it soon appeared that the imputation was false, Khālid, on his return, was furious, and uttered very offensive words against the caliph. Hisham, however, would not again punish his old servant; on the contrary, he seems to have regarded his indignation as a proof of innocence.

The successor of Khālid in Irak had not long been in office when Zaid b. Ali, grandson of Hosain b. Ali, who had come to Kufa for a lawsuit, was persuaded by the chiefs of the Shi'a to organize a revolt. He succeeded in so far that 15,000 Kufians swore to fight with him for the maintenance of the commandments of the Book of God and the *Sunna* (orthodox tradition) of his Prophet, the discomfiture of the tyrants, the redress of injury, and last, not least, the vindication of the family of the Prophet as the rightful caliphs. The revolt broke out on the 6th of January 740. Unfortunately for Zaid he had to do with the same Kufians whose fickleness had already been fatal to his family. He was deserted by his troops and slain. His body was crucified in Kufa, his head sent to Damascus and thence to Medina. His son Yahyā, still a youth, fled to Balkh in Khorasan, but was discovered at last and hunted down, till he fell sword in hand under Walid II. Abu Moslim, the founder of the Abbasid dynasty, proclaimed himself his avenger, and on that occasion adopted the black garments, which remained the distinctive colour of the dynasty.

In Khorasan also there were very serious disturbances. The Sogdians, though subdued by Sa'īd al Ḥarashī, were not appeased, but implored the assistance of the Turks, who had long been contending earnestly against the Arabs for the dominion of Transoxiana. They found besides a most valuable ally in Ḥārith b. Soraij, a distinguished captain of the Arabic tribe of Tamīm, who, with many pious Moslems, was scandalized by the government's perfidy in regard to the new converts. Ḥārith put himself at the head of all the malcontents, and raised the black flag, in compliance with a Sibylline prophecy, holding that the man with the black flag (the Prophet's flag) would put an end to the tyranny, and be the precursor of the Mahdi.[22] The government troops suffered more than one defeat, but in the last month of the year 118 (A.D. 736) the governor Asad al-Qasrī, the brother of Khālid, after having defeated Ḥārith, gained a brilliant victory over the Turks, which finally caused them to retreat. Asad died almost simultaneously with the dismissal of Khālid. Hisham then separated Khorasan from Irak and chose as governor of the former Naṣr b. Sayyār, a valiant soldier who had grown grey in war, and who, besides all his other capacities, was an excellent poet. Naṣr instituted a system of taxation, which, if it had been introduced earlier, would perhaps have saved the Arabic domination. It was that which later on was generally adopted, viz. that all possessors of conquered lands (*i.e.* nearly the whole empire except Arabia), whether Moslems or not, should pay a fixed tax, the latter in addition to pay a poll-tax, from which they were relieved on conversion to Islam. During the reign of Hisham, Naṣr made a successful expedition against Ḥārith and the Turks. The propaganda of the Shi'a by the Abbasids was continued in these years with great zeal.

In India several provinces which had been converted to Islam under the Caliphate of Omar II. declared themselves independent, because the promise of equal rights for all Moslems was not kept under the reign of his successors. This led to the evacuation of the eastern part of India (called Hind by the Arabs, Sind being the name of the western part), and to the founding of the strong cities of Maḥfūẓa and Manṣūra for the purpose of controlling the land.

In the north and north-west of the empire there were no internal disorders, but the Moslems had hard work to maintain themselves against the Alans and the Khazars. In the year 112 (A.D. 730) they suffered a severe defeat, in which the general Jarrāh perished. But the illustrious Maslama b. Abdalmalik, and Merwan b. Mahommed (afterwards caliph), governor of Armenia and Azerbaijan (Adherbaijan), succeeded in repelling the Khazars, imposing peace on the petty princes of the eastern Caucasus, and consolidating the Arab power in that quarter. The war against the Byzantines was continued with energy during the whole of Hisham's reign. Moawiya, the son of Hisham, whose descendants reigned later in Spain, was in command till 118 (A.D. 736), when he met his death accidentally in Asia Minor by a fall from his horse. After his death, Suleiman, another son of the caliph, had the supreme command. Both were eager and valiant warriors. But the hero of all the battles was Abdallah b. Hosain, surnamed al-Battāl (the brave). He has been the subject of many romantic tales. Tabarī tells how he took the emperor Constantine prisoner in the year 114 (A.D. 732; but Constantine V. Copronymus only began to reign in 740 or 741 A.D.); another Arabic author places this event in the year 122, adding that al-Battāl, having defeated the Greeks, was attacked and slain in returning with his captives. The Greek historians say nothing about Constantine having been made prisoner. It is probable that the Arabs took another Greek soldier for the prince.[23] The victories of the Moslems had no lasting results. During the troubles that began in the reign of Walid II., the Greeks reconquered Marash (Germanicia), Malatia (Malatiyeh) and Erzerum (Theodosiopolis).

In Spain the attention of the Moslems was principally turned to avenge the defeat of Samḥ beyond the Pyrenees. As early as the second year of the reign of Hisham, ‘Anbasa, the governor of Spain, crossed the Pyrenees, and pushed on military operations vigorously. Carcassonne and Nîmes were taken, Autun sacked. The death of ‘Anbasa in A.D. 725 and internal troubles put a stop to further hostilities. The Berbers were the chief contingent of the Moslem troops, but were treated by their Arab masters as inferior people. They began to resent this, and one of their chiefs, Munisa (Munuza), made himself independent in the north and allied himself with Odo, king of Aquitaine, who gave him his daughter in marriage. In the year 113 Abdarrahman b. Abdallah subdued Munisa, crossed the mountains and penetrated into Gascony by the valley of Roncesvalles. The Moslems beat Odo, gained possession of Bordeaux, and overran the whole of southern Gaul nearly as far as the Loire. But in October 732 their march was checked between Tours and Poitiers by Charles Martel and after some days of skirmishing a fierce but indecisive battle was fought. Abdarrahman was among the slain and the Moslems retreated hastily in the night, leaving their camp to the Franks. They were, however, not yet discouraged. In 739 the new governor of Spain, Oqba (Aucupa) b. Hajjāj, a man of high qualities, re-entered Gaul and pushed forward his raids as far as Lyons, but the Franks again drove back the Arabs as far as Narbonne. Thenceforth the continual revolts of the Berbers in Africa, and the internal troubles which disturbed Spain until the reign of Abdarrahman I., effectually checked the ambition of the Moslems.

In Africa the hand of government pressed heavily. The Berbers, though they had pledged themselves to Islam and had furnished the latest contingents for the Holy War, were treated as tributary serfs, notwithstanding the promises given by Omar II. The Kharijites, of whom a great many had emigrated to Africa, found them eager listeners. Still, they could not believe that it was according to the will of the caliph that they were thus treated, until a certain number of their chiefs went as a deputation to Hisham, but failed to obtain an audience. Thereupon a fierce insurrection broke out, against which the governor of Africa was powerless. Hisham at once sent an army of more than 30,000 men, under the command of Kolthum al-Qoshairī, and Balj b. Bishr. Not far from the river Sabu in Algeria,[24] the meeting with the army of the insurgents took place (A.D. 740). Kolthūm was beaten and killed; Balj b. Bishr led the rest of the Syrian army to Ceuta, and thence, near the end of 741, to Spain, where they aided in the suppression of the dangerous revolt of the peninsular Berbers. Balj died in 742. A year later the governor, Abu’l-Khaṭṭār, assigned to his troops for settlement divers countries belonging to the public domain.[25] An effort of the African Berbers to make themselves masters of Kairawan failed, their army being utterly defeated by the governor Ḥanẓala.

Hisham died in February 743, after a reign of twenty years. He had not been wanting in energy and ability, and kept the reins of the government in his own hands. He was a correct Moslem and tolerant towards Christians and Jews. His financial administration was sound and he guarded against any misuse of the revenues of the state. But he was not popular. His residence was at Roṣāfa on the border of the desert, and he rarely admitted visitors into his presence; as a rule they were received by his chamberlain Abrash. Hisham tried to keep himself free from and above the rival parties, but as his vicegerents were inexorable in the exaction of tribute, the Qaisites against the Yemenites, the Yemenites against the Qaisites, both parties alternately had reason to complain, whilst the non-Arabic Moslems suffered under the pressure and were dissatisfied. He caused a large extent of land to be brought into cultivation, and many public works to be executed, and he was accused of overburdening his subjects for these purposes. Therefore, Yazid III. (as also the Abbasids) on taking office undertook to abstain from spending money on building and digging. The principle that a well-filled treasury is the basis of a prosperous government was pushed by him too far. Notwithstanding his activity and his devotion to the management of affairs, the Moslem power declined rather than advanced, and signs of the decay of the Omayyad dynasty began to show themselves. The history of his four successors, Walid II., Yazid III., Ibrahim and Merwan II., is but the history of the fall of the Omayyads.

11. *Reign of Walid II.*—Walid II. was a handsome man, possessed of extraordinary physical strength, and a distinguished poet. But Hisham, to whom he was successor-designate, foolishly kept him in the background, and even made earnest efforts to get his own son Maslama acknowledged as his successor. Walid therefore retired to the country, and passed his time there in hunting, cultivating poetry, music and the like, waiting with impatience for the death of Hisham and planning vengeance on all those whom he suspected of having opposed him. His first public action was to increase the pay of all soldiers by 10 dirhems, that of the Syrians by 20. The Omayyads who came to pay their respects to him received large donations. Many philanthropic institutions were founded. As to the family of his predecessor, he contented himself with confiscating their possessions, with the single exception of Suleiman b. Hisham, whom he had whipped and put in prison. But the Makhzūmites, who were related to Hisham by his mother, he deprived of all their power and had them tortured to death. The vicegerents of Hisham were replaced by Qaisites; Yusuf b. Omar, the governor of Irak, being a Qaisite, was not only confirmed in his office, but received with it the supreme command of Khorasan. He made use of it immediately by ordering Naṣr b. Sayyār to collect a rich present of horses, falcons, musical instruments, golden and silver vessels and to offer it to the caliph in person, but before the present was ready the news came that Walid had been murdered.

It is not certain that Walid also suspected Khālid al-Qasrī of having intrigued against him. But Yusuf b. Omar did not rest until he had his old enemy in his power. It is said that he guaranteed Walid a large sum of money, which he hoped to extort from Khālid. This unfortunate man died under torture, which he bore with fortitude, in Muharram 126 (November 743).

Walid designated his two sons as heirs to the Caliphate. These were still under age and were not the children of a freeborn, noble mother. Both circumstances, according to the then prevailing notions, made them unfit for the imamate. Moreover, it was an affront, in particular, for the sons of Walid I., who already had considered the nomination of Yazid II. as a slight to themselves. A conspiracy arose, headed by Yazid b. Walid I., and joined by the majority of the Merwanid princes and many Kalbites and other Yemenites who regarded the ill-treatment of Khālid al-Qasrī as an insult to themselves. Various stories were circulated about the looseness of Walid’s manner of life; Yazid accused him of irreligion, and, by representing himself as a devout and God-fearing man, won over the pious Moslems. The conspirators met with slight opposition. A great many troops had been detached by Hisham to Africa and other provinces, the caliph himself was in one of his country places; the prefect of Damascus also was absent. Without difficulty, Yazid made himself master of Damascus, and immediately sent his cousin Abdalazīz with 2000 men against Walid, who had not more than 200 fighting men about him. A few men hastened to the rescue, among others ‘Abbās b. Walid with his sons and followers. Abdalazīz interrupted his march, took him prisoner and compelled him to take the oath of allegiance to his brother Yazid. Walid’s small body of soldiers was soon overpowered. After a valiant combat, the caliph retired to one of his apartments and sat

with the Koran on his knee, in order to die just as Othman had died. He was killed on the 17th of April 744. His head was taken to Damascus and carried about the city at the end of a spear.

On the news of the murder of the caliph, the citizens of Ḥoms (Emesa) put at their head Abu Mahommed as-Sofiānī, a grandson of Yazid I., and marched against Damascus. They were beaten by Suleimān b. Hishām at a place called Solaimānīa, 12 m. from the capital. Abu Mahommed was taken prisoner and shut up with several of his brethren and cousins in the Khadrā, the old palace of Moawiya, together with the two sons of Walid II. One or two risings in Palestine were easily suppressed. But the reigning family had committed suicide. Their unity was broken. The holiness of their Caliphate, their legitimate authority, had been trifled with; the hatred of the days of Merj Rāhiṭ had been revived. The orthodox faith also, whose strong representative and defender had hitherto been the caliph, was shaken by the fact that Yazid III. belonged to the sect of the Qadaris who rejected the doctrine of predestination. The disorganization of the empire was at hand.

12. *Reign of Yazid III.*—Yazid III., on his accession, made a fine speech, in which he promised to do all that could be expected from a good and wise ruler, even offering to make place immediately for the man whom his subjects should find better qualified for the Caliphate than himself. He cancelled, however, the increase of the pay granted by Walid and thus earned the nickname of the *Nāqiṣ* (diminisher). As he owed his position to the aid of the Kalbites, he chose his officers from among them. The governorship of Irak was confided to a Kalbite, Manṣūr b. Jomhūr, a hot-headed and unscrupulous man. Yūsuf b. Omar was unable to offer resistance, and was ultimately taken and confined in the Khadrā. Manṣūr had hardly been three months in office when Yazid replaced him by Abdallah, son of Omar II. The distant provinces, with the exception of Sind and Sijistan, renounced the authority of the new caliph. In Africa Abdarrahman b. Habīb, a descendant of the famous ‘Oqba b. Nāfī’, was almost independent. In Spain every amir tried to free himself from a suzerainty which appeared to him only nominal. Naṣr b. Sayyār, the governor of Khorasan, had not yet decided whether he ought to take the oath of allegiance when Yazid died, after a reign of only five months and a half, on the 12th of Dhu’l-Ḥijja A.H. 126 (25th September A.D. 744).

13. Yazid III. left his brother Ibrāhīm as his successor. He was acknowledged as caliph only in a part of Syria, and reigned no longer than two months, when he was obliged to abdicate and to submit to the authority of Merwan II.

14. Merwan II., the son of Mahommed b. Merwan and cousin of Maslama, was a man of energy, and might have revived the strength of the Omayyad dynasty, but for the general disorder which pervaded the whole empire. In 732 Hisham had entrusted to him the government of Armenia and Azerbaijan, which he held with great success till the death of Walid II. He had great military capacity and introduced important reforms. On the murder of Walid he prepared to dispute the supreme power with the new caliph, and invaded Mesopotamia. Yazid III., in alarm, offered him as the price of peace the government of this province together with Armenia and Azerbaijan. Merwan resolved to accept those conditions, and sent a deputation to Damascus, which, however, had just reached Manbij (Hierapolis) when Yazid died. Leaving his son Abdalmalik with 40,000 men in Rakka, Merwan entered Syria with 80,000 men. Suleimān b. Hishām, at the head of 120,000 men, was defeated at ‘Ain al-Jarr, between Baalbek and Damascus. Merwan made many prisoners, whom he treated with the greatest mildness, granting them freedom on condition that they should take the oath of allegiance to the sons of Walid II. He then marched upon Damascus. But Suleimān b. Hishām, Yazid, the son of Khālid al-Qasri, and other chiefs, hastened to the Khadrā and killed the two princes, together with Yūsuf b. Omar. Suleiman then made himself master of the treasury and fled with the caliph Ibrāhīm to Tadmor (Palmyra). Only Abu Mahommed as-Sofiānī escaped the murderers. When Merwan entered Damascus this man testified that the sons of Walid II., who had just become adult, had named Merwan successor to the Caliphate, and was the first to greet him as Prince of the Believers. All the generals and officers followed his example and took the oath of allegiance (7th December A.D. 744). Merwan did all he could to pacify Syria, permitting the Arabs of the four provinces to choose their own prefects, and even acquiescing in the selection as prefect of Palestine of Thābit b. No‘aim, who had behaved very treacherously towards him before, but whom he had forgiven. He did not, however, wish to reside in Damascus, but transplanted the seat of government to his own town, Harran in Mesopotamia. Suleiman b. Hisham and Ibrahim tendered their submission and were pardoned.

But the pacification was only on the surface. Many Omayyad princes considered Merwan as an upstart, his mother being a slave-girl; the Damascenes were angry because he had chosen Harran for his residence; the Kalbites felt themselves slighted, as the Qaisites predominated. Thābit b. No‘aim revolted in Palestine, Emesa (Homs) and Tadmor were turbulent, Damascus was besieged by Yazid b. Khālid al Qasrī. Merwan, who wanted to march against Irak, was obliged to return to Syria, where he put an end to the troubles. This time Thābit b. No‘aim had to pay for his perfidy with his life. After this new pacification, Merwan caused the Syrians to acknowledge his two sons as heirs to the Caliphate, and married them to two daughters of Hishām. All the Omayyad princes were invited to the wedding, Merwan hoping still to conciliate them. He then equipped 10,000 Syrians, and ordered them to rejoin the army of 20,000 men from Kinnesrin (Qinnasrīn) and Mesopotamia, who, under Yazid b. Omar b. Hobaira, were already on the march towards Irak. When these Syrians came to Roṣāfa (Rusafa), Suleimān b. Hishām persuaded them to proclaim himself caliph, and made himself master of Kinnesrin. From all sides Syrians flocked to his aid till he had 70,000 men under his orders. Merwan immediately ordered Ibn Hobaira to stop his march and to wait for him at Dūrīn, and marched with the main force against Suleimān, whom he utterly defeated at Khosāf in the district of Kinnesrin. Suleiman fled to Homs and thence to Tadmor and on to Kufa, leaving his brother Sa‘id in Homs. The siege of this place by Merwan lasted nearly five months. After the victory the walls were demolished, and likewise those of Baalbek, Damascus, Jerusalem and other towns. Syria was utterly crushed, and therewith the bulwark of the dynasty was destroyed. Not until the summer of 128 (A.D. 746) could Merwan resume his campaign against Irak.

The governor of this province, Abdallah, the son of Omar II., was a man of small energy, whose principal care was his personal ease and comfort. An ambitious man, Abdallah b. Moawiya, a great-grandson of Ali’s brother Ja‘far, put himself at the head of a band of Shi‘ites and *maulas*, made himself master of Kufa and marched upon Hira, where, since Yūsuf b. Omar, the governor and the Syrian troops had resided. The rebels were defeated, and Kufa surrendered (October 744) under condition of amnesty for the insurgents and freedom for Abdallah b. Moawiya. This adventurer now went into Media (Jabal), where a great number of *maulas* and Shi‘ites, even members of the reigning dynasty and of the Abbasid family, such as the future caliph Mansur, rejoined him. With their help he became master of a vast empire, which, however, lasted scarcely three years.

Ibn Omar did not acknowledge Merwan as caliph. For the moment Merwan could do no more than send a new governor, Ibn Sa'īd al Ḥarashī. This officer was supported only by the Qaisite troops, the Kalbites, who were numerically superior, maintaining Ibn Omar in his residence at Hira. There were many skirmishes between them, but a common danger soon forced them to suspend their hostilities. The general disorder after the death of Hisham had given to the Khawarij an opportunity of asserting their claims such as they had never had before. They belonged for the greater part to the Rabī'a, who always stood more or less aloof from the other Arabs, and had a particular grudge against the Moḍar. Their leading tribe, the Shaibān, possessed the lands on the Tigris in the province of Mosul, and here, after the murder of Walid II., their chief proclaimed himself caliph. Reinforced by many Kharijites out of the northern provinces, he marched against Kufa. Ibn Omar and Ibn Sa'iḍ al Ḥarashī tried to defend their province, but were completely defeated. Ḥarashī fled to Merwan, Ibn Omar to Hira, which, after a siege of two months, he was obliged to surrender in Shawwāl 127 (August A.D. 745). Manṣuř b. Jomhūr was the first to pass over to the Khawarij; then Ibn Omar himself took the oath of allegiance. That a noble Koreishite, a prince of the reigning house, should pledge himself to follow Ḍaḥḥāk the Shaibānite as his Imam, was an event of which the Khawarij were very proud. Ibn Omar was rewarded with the government of eastern Irak, Khūzistān and Fārs.

Whilst Merwan besieged Homs, Ḍaḥḥāk returned to Mesopotamia and took Mosul, whence he threatened Nisibis, where Abdallah, the son of Merwan, maintained himself with difficulty. Suleimān b. Hishām also had gone over to the Khawarij, who now numbered 120,000 men. Mesopotamia itself was in danger, when Merwan at last was able to march against the enemy. In a furious battle at Kafartūtha (September A.D. 746) the Khawarij were defeated; Ḍaḥḥāk and his successor Khaibarī perished; the survivors were obliged to retire to Mosul, where they crossed the Tigris. Merwan followed them and encamped on the western bank. Immediately after the battle of Kafartūtha, Yazid b. Omar b. Hobaira directed his troops towards Irak. He beat the Kharijites repeatedly and entered Kufa in May or June 747. Ibn Omar was taken prisoner; Manṣūr b. Jomhūr fled to Ibn Moawiya. Ibn Hobaira was at last free to send Ibn Ḍobāra with an army to Mesopotamia. At his approach the Kharijites left their camp and fled to Abdallah b. Moawiya, who was now at the height of his power. But it was not destined to last. The two generals of Ibn Hobaira, Ibn Ḍobāra and Nobāta b. Ḥanẓala defeated his army; Ibn Moawiya fled to Khorasan, where he met his death; the chief of the Kharijites, Shaibān Yashkori went to eastern Arabia; Suleimān b. Hishām and Manṣūr b. Johmūr escaped to India. Thus, at last, the western and south-eastern parts of the empire lay at the feet of Merwan. But in the north-east, in Khorasan, meanwhile a storm had arisen, against which his resources and his wisdom were alike of no avail.

When the news of the murder of Walid II. reached Khorasan, Naṣr b. Sayyār did not at once acknowledge the Caliphate of Yazid III., but induced the Arab chiefs to accept himself as amir of Khorasan, until a caliph should be universally acknowledged. Not many months later (Shawwāl 126) he was confirmed in his post by Yusuf b. Omar, the governor of Irak. But Naṣr had a personal enemy, the chief of the Azd (Yemenites) Jodai' al-Kirmānī, a very ambitious man. A quarrel arose, and in a short time the Azd under Kirmānī, supported by the Rabī'a, who always were ready to join the opposition, were in insurrection, which Naṣr tried in vain to put down by concessions.

So stood matters when Ḥārith b. Soraij, seconded by Yazid III., reappeared on the scene, crossed the Oxus and came to Merv. Naṣr received him with the greatest honour, hoping to get his aid against Kirmānī, but Ḥārith, to whom 3000 men of his tribe, the Tamīm, had gone over, demanded Naṣr's abdication and tried to make himself master of Merv. Having failed in this, he allied himself with Kirmānī. Naṣr could hold Merv no longer, and retired to Nishapur. But the Tamīm of Ḥārith could not endure the supremacy of the Azd. In a moment the allies were divided into two camps; a battle ensued, in which Ḥārith was defeated and killed. Originally, Ḥārith seems to have had the highest aims, but in reality he did more than any one else to weaken the Arabic dominion. He brought the Turks into the field against them; he incited the native population of Transoxiana against their Arab lords, and stirred up discord between the Arabs themselves. Being a Tamīmite, he belonged to the Moḍar, on whom the government in Khorasan depended; but he aided the Yemenites to gain the upper hand of them. Thus he paved the way for Abu Moslim.

Since the days of Ali there had been two tendencies among the Shi'ites. The moderate party distinguished itself from the other Moslems only by their doctrine that the imamate belonged legally to a man of the house of the Prophet. The other party, that of the ultra-Shi'ites, named Hāshimīya after Abu Hāshim the son of Mahommed b. al-Ḥanafīya, preached the equality of all Moslems, Arabs or non-Arabs, and taught that the same divine spirit that had animated the Prophet, incorporated itself again in his heirs (see SHI'ITES). After the death of Hosain, they chose for their Imam Mahommed b. al-Ḥanafīya, and at his decease his son Abu Hāshim, from whom Mahommed b. Ali, the grandson of Abdallah b. Abbas, who resided at Ḥomaima in the south-east of Syria, obtained the secrets of the party and took the lead (A.H. 98, see above). This Mahommed, the father of the two first Abbasid caliphs, was a man of unusual ability and great ambition. He directed his energies primarily to Khorasan. The missionaries were charged with the task of undermining the authority of the Omayyads, by drawing attention to all the injustices that took place under their reign, and to all the luxury and wantonness of the court, as contrasted with the misery of many of their subjects. God would not suffer it any longer. As soon as the time was ripe that time could not be far off—He would send a saviour—and out of the house of the Prophet, the Mahdi, who would restore Islam to its original purity. All who desired to co-operate in this holy purpose must pledge themselves to unlimited obedience to the Imam, and place their lives and property at his disposal. As a proof of their sincerity they were required at once to pay a fixed sum for the Imam. The missionaries had great success, especially among the non-Arabic inhabitants of Khorasan and Transoxiana.

Mahommed b. Ali died A.H. 126 (A.D. 743-744), and his son Ibrahīm, the Imam, took his place. Ibrahīm had a confidant about whose antecedents one fact alone seems certain, that he was a *maula* (client) of Persian origin. This man, Abu Moslim by name, was a man of real ability and devoted to his master's cause. To him, in 745-746, the management of affairs in Khorasan was entrusted, with instructions to consult in all weighty matters the head of the mission, the Arab Suleimān b. Kathīr. At first the chiefs of the mission were by no means prepared to recognize Abu Moslim as the plenipotentiary of the heir of the Prophet. In the year 129 he judged that the time for open manifestation had arrived. His partisans were ordered to assemble from all sides on a fixed day at Sīqadenj in the province of Merv. Then, on the 1st Shawwāl (15th June 747), the first solemn meeting took place and the black flags were unfolded. On that occasion Suleimān b. Kathīr was still leader, but by the end of the year Abu Moslim, whom the majority believed to belong himself to the family of the Prophet, was the acknowledged head of a strong army. Meantime, Naṣr had moved from Nishapur to Merv, and here the two Arabic armies confronted each other. Then, at last, the true significance of Abu Moslim's work was recognized. Naṣr warned the

Arabs against their common enemy, “who preaches a religion that does not come from the Envoy of God, and whose chief aim is the extirpation of the Arabs.” In vain he had entreated Merwan and Ibn Hobaira to send him troops before it should be too late. When at last it was possible to them to fulfil his wish, it was in fact too late. For a moment it seemed as though the rival Arab factions, realizing their common peril, would turn their combined forces against the Shi‘ites. But Abu Moslim contrived to re-awaken their mutual distrust and jealousy, and, taking advantage of the opportunity, made himself master of Merv, in Rabia II. A.H. 130 (December 747). Naṣr escaped only by a headlong flight to Nishapur. This was the end of the Arabic dominion in the East. Many Arab chiefs were killed, partly by order of Abu Moslim, partly by their clients. The latter, however, was strictly forbidden by Abu Moslim. So severe indeed was the discipline he exercised, that one of the chief missionaries, who by a secret warning had rendered possible the escape of Naṣr from Merv, paid for it with his life.

As soon as Abu Moslim had consolidated his authority, he sent his chief general Qaḥṭaba against Nishapur. Naṣr’s son Tamīm was vanquished and killed, and Naṣr retreated to Kumis (Qūmis) on the boundary of Jorjān, whither also advanced from the other side Nobāta at the head of an army sent by Merwan. Qaḥṭaba detached his son Ḥasan against Naṣr and went himself to meet Nobāta, whom he beat on the 1st of Dhu’l-ḥijja 130 (6th August 748). Naṣr could not further resist. He reached Sāwā in the vicinity of Hamadan, where he died quite exhausted, at the age of eighty-five years. Rei and Hamadan were taken without serious difficulty. Near Nehawend, Ibn Ḍobāra, at the head of a large army, encountered Qaḥṭaba, but was defeated and killed. In the month of Dhu’l-qa‘da 131 (June 749) Nehawend (Nehavend) surrendered, and thereby the way to Irak lay open to Qaḥṭaba. Ibn Hobaira was overtaken and compelled to retire to Wāsit. Qaḥṭaba himself perished in the combat, but his son Ḥasan entered Kufa without any resistance on the 2nd of September 740.

Merwan had at last discovered who was the real chief of the movement in Khorasan, and had seized upon Ibrahīm the Imam and imprisoned him at Harran. There he died, probably from the plague, though Merwan was accused of having killed him. When the other Abbasids left Ḥomaima is not certain. But they arrived at Kufa in the latter half of September 749, where in the meantime the head of the propaganda, Abu Salama, called the wazir of the family of Mahomet, had previously undertaken the government. This Abu Salama seems to have had scruples against recognizing Abu’l-Abbas as the successor of his brother Ibrahīm, and to have expected that the Mahdi, whom he looked for from Medina, would not be slow in making his appearance, little thinking that an Abbasid would present himself as such. But Abu Jahm, on the instructions of Abu Moslim, declared to the chief officers of the Khorasanian army that the Mahdi was in their midst, and brought them to Abu’l-Abbas, to whom they swore allegiance. Abu Salama also was constrained to take the oath. On Friday, the 12th Rabia II. A.H. 132 (28th November 749) Abu’l-Abbas was solemnly proclaimed caliph in the principal mosque of Kufa. The trick had been carried out admirably. On the point of gathering the ripe fruit, the Alids were suddenly pushed aside, and the fruit was snatched away by the Abbasids. The latter gained the throne and they took good care never to be deprived of it.

After the conquest of Nehawend, Qaḥṭaba had detached one of his captains, Abu ‘Aun, to Shahrazūr, where he defeated the Syrian army which was stationed there. Thereupon Abu ‘Aun occupied the land of Mosul, where he obtained reinforcements from Kufa, headed by Abdallah b. Ali, an uncle of Abu’l-Abbas, who was to have the supreme command. Merwan advanced to meet him, and was completely defeated near the Greater Zab, an affluent of the Tigris, in a battle which lasted eleven days. Merwan retreated to Harran, thence to Damascus, and finally to Egypt, where he fell in a last struggle towards the end of 132 (August 750). His head was cut off and sent to Kufa.[26] Abu Aun, who had been the real leader of the campaign against Merwan, remained in Egypt as its governor. Ibn Hobaira, who had been besieged in Wasit for eleven months, then consented to a capitulation, which was sanctioned by Abu’l-Abbas. Immediately after the surrender, Ibn Hobaira and his principal officers were treacherously murdered. In Syria, the Omayyads were persecuted with the utmost rigour. Even their graves were violated, and the bodies crucified and destroyed. In order that no members of the family should escape, Abdallah b. Ali pretended to grant an amnesty to all Omayyads who should come in to him at Abu Fotros (Antipatris) and acknowledge the new caliph, and even promised them the restitution of all their property. Ninety men allowed themselves to be entrapped, and Abdallah invited them to a banquet. When they were all collected, a body of executioners rushed into the hall and slew them with clubs. He then ordered leathern covers to be thrown upon the dying men, and had the banquet served upon them. In Medina and Mecca Da’ud b. Ali, another uncle of Abu’l-Abbas, conducted the persecution; in Baṣra, Suleiman b. Ali. Abu’l-Abbas himself killed those he could lay his hands on in Hira and Kufa, amongst them Suleimān b. Hishām, who had been the bitterest enemy of Merwan. Only a few Omayyads escaped the massacre, several of whom were murdered later. A grandson of Hisham, Abdarrahmān, son of his most beloved son Moawiya, reached Africa and founded in Spain the Omayyad dynasty of Cordova.

With the dynasty of the Omayyads the hegemony passes finally from Syria to Irak. At the same time the supremacy of the Arabs came to an end. Thenceforth it is not the contingents of the Arabic tribes which compose the army, and on whom the government depends; the new dynasty relies on a standing army, consisting for the greater part of non-Arabic soldiers. The barrier that separated the Arabs from the conquered nations begins to crumble away. Only the Arabic religion, the Arabic language and the Arabic civilization maintain themselves, and spread more and more over the whole empire.

C.—The Abbasids

We now enter upon the history of the new dynasty, under which the power of Islam reached its highest point.

1. Abu’l-Abbas inaugurated his Caliphate by a harangue in which he announced the era of concord and happiness which was to begin now that the House of the Prophet had been restored to its right. He asserted that the Abbasids were the real heirs of the Prophet, as the descendants of his oldest uncle Abbas. Addressing the Kufians, he said, “Inhabitants of Kufa, ye are those whose affection towards us has ever been constant and true; ye have never changed your mind, nor swerved from it, notwithstanding all the pressure of the unjust upon you. At last our time has come, and God has brought you the new era. Ye are the happiest of men through us, and the dearest to us. I increase your pensions with 100 dirhems; make now your preparations, for I am the lavish shedder of blood[27] and the avenger of blood.”

Notwithstanding these fine words, Abu’l-Abbas did not trust the Kufians. He resided outside the town with the Khorasanian troops, and with them went first to Hira, then to Hāshimīya, which he caused to be built in the

neighbourhood of Anbar. For their real sympathies, he knew, were with the house of Ali, and Abu Salama their leader, who had reluctantly taken the oath of allegiance, did not conceal his disappointment. Abu Jahm, the vizier (*q.v.*; also Mahommedan Institutions), or "helper," of Abu Moslim, advised that Abu Ja'far, the caliph's brother, should be sent to Khorasan to consult Abu Moslim. The result was that Abu Salama was assassinated, and at the same time Suleimān b. Kathīr, who had been the head of the propaganda in Khorasan, and had also expected that the Mahdi would belong to the house of Ali. It is said that Abu Ja'far, whilst in Khorasan, was so impressed by the unlimited power of Abu Moslim, and saw so clearly that, though he called his brother and himself his masters, he considered them as his creatures, that he vowed his death at the first opportunity.

The ruin of the Omayyad empire and the rise of the new dynasty did not take place without mighty convulsions. In Bathanīya and the Ḥaurān, in the north of Syria, in Mesopotamia and Irak Khorasan insurrections had to be put down with fire and sword. The new caliph then distributed the provinces among the principal members of his family and his generals. To his brother Abu Ja'far he gave Mesopotamia, Azerbaijan and Armenia; to his uncle Abdallah b. Ali, Syria; to his uncle Da'ud, Hejaz, Yemen and Yamāma (Yemama); to his cousin 'Īsā b. Mūsā, the province of Kufa. Another uncle, Suleimān b. Ali, received the government of Baṣra with Bahrein and Oman; Ismā 'īl b. Ali that of Ahwāz; Abu Moslim, Khorasan and Transoxiana; Mahommed b. Ash'ath, Fārs; Abu 'Aun, Egypt. In Sind the Omayyad governor, Manṣūr b. Jomhūr, had succeeded in maintaining himself, but was defeated by an army sent against him under Mūsā b. Ka'b, and the black standard of the Abbasids was raised over the city of Manṣūra. Africa and Spain are omitted from this catalogue, because the Abbasids never gained any real footing in Spain, while Africa remained, at least in the first years, in only nominal subjection to the new dynasty. In 754 Abu Moslim came to Irak to visit Abu'l-Abbas and to ask his permission to make the pilgrimage to Mecca. He was received with great honour, but the caliph said that he was sorry not to be able to give him the leadership of the pilgrimage, which he had already purposely entrusted to his brother, Abu Ja'far.

Abu'l-Abbas died on the 13th of Dhu'l-ḥijja 136 (5th June 754). He seems to have been a man of limited capacity, and had very little share in the achievements accomplished in his name. He initiated practically nothing without the consent of Abu Jahm, who was thus the real ruler. In the few cases where he had to decide, he acted under the influence of his brother Abu Ja'far.

2. *Reign of Mansur.*—Abu'l-Abbas had designated as his successors first Abu Ja'far, surnamed al-Manṣūr (the victorious), and after him his cousin 'Īsā b. Mūsā. Abu Ja'far was, according to the historians, older than Abu'l-Abbas, but while the mother of the latter belonged to the powerful Yemenite tribe of al-Ḥārith b. Ka'b, the mother of Abu Ja'far was a Berber slave-girl. But he was a son of Mahommed b. Ali, and was therefore preferred by Abu Moslim to his uncles and cousins. Abu'l-Abbas, however, had promised the succession to his uncle Abdallah b. Ali, when he marched against Merwan. When the news of the death of Abu'l-Abbas reached Abdallah, who at the head of a numerous army was on the point of renewing the Byzantine war, he came to Harran, furious at his exclusion, and proclaimed himself caliph. Abu Moslim marched against him, and the two armies met at Nisibis, where, after a number of skirmishes, a decisive engagement took place (28th November 754). Abdallah was defeated and escaped to Baṣra, where he found a refuge with his brother Suleimān. A year later he asked for pardon, and took the oath of allegiance to Mansur. The caliph spared his life for a time, but he did not forget. In 764 Abdallah met his death by the collapse of his house, which had been deliberately undermined.

The first care of Mansur was now to get rid of the powerful Abu Moslim, who had thus by another brilliant service strengthened his great reputation. On pretence of conferring with him on important business of state, Mansur induced him, in spite of the warnings of his best general, Abu Naṣr, to come to Madāin (Ctesiphon), and in the most perfidious manner caused him to be murdered by his guards. Thus miserably perished the real founder of the Abbasid dynasty, the *Ṣāḥib addaula*, as he is commonly called, the *Amīn* (trustee) of the House of the Prophet. A witty man, being asked his opinion about Abu Ja'far (Mansur) and Abu Moslim, said, alluding to the Koran 21, verse 22, "if there were two Gods, the universe would be ruined." The Khorasanian chiefs were bribed into submission, and order was at last re-established by Mansur's general Khāzim b. Khozaima in Mesopotamia, and by Abu Dā'ūd, the governor of Khorasan in the east.

About the same time Africa[28] and Spain escaped from the dominion of the eastern Caliphate; the former for a season, the latter permanently. The cause of the revolt of Africa was as follows. Mansur had written to Abdarrahmān, announcing the death of Abu'l-Abbas, and requiring him to take the oath of allegiance. Abdarrahmān sent in his adhesion, together with a few presents of little value. The caliph replied by a threatening letter which angered Abdarrahmān. He called the people together at the hour of prayer, publicly cursed Mansur from the pulpit and declared him deposed. He next caused a circular letter, commanding all Maghribins to refuse obedience to the caliph, to be read from the pulpit throughout the whole extent of the Maghrib (western North Africa). A brother of Abdarrahmān, Ilyās, saw in this revolt an opportunity of obtaining the government of Africa for himself. Seconded by many of the inhabitants of Kairawan, who had remained faithful to the cause of the Abbasids, he attacked his brother, slew him, and proclaimed himself governor in his stead. This revolution in favour of the Abbasids was, however, not of long duration. Ḥabīb, the eldest son of Abdarrahmān, who had fled in the night of his father's murder, was captured, but the vessel which was to convey him to Spain having been detained by stress of weather, his partisans took arms and rescued him. Ilyās was marching against them, when the idea occurred to Ḥabīb of challenging him to single combat. Ilyās hesitated, but his own soldiers compelled him to accept the challenge. He measured arms with Ḥabīb, and was slain. The party of independence thus triumphed, but in the year 144 (761) Mahommed b. Ash'ath, the Abbasid general, entered Kairawan and regained possession of Africa in the name of the eastern caliph. From the year 800, it must be added, Africa only nominally belonged to the Abbasids; for, under the reign of Harun al-Rashid, Ibrahīm b. al-Aghlab, who was invested with the government of Africa, founded in that province a distinct dynasty, that of the Aghlabites.

At the same time as the revolt in Africa, the independent Caliphate of the western Omayyads was founded in Spain. The long dissensions which had preceded the fall of that dynasty in the East had already prepared the way for the independence of a province so distant from the centre of the empire. Every petty amir then tried to seize sovereign power for himself, and the people groaned under the consequent anarchy. Weary of these commotions, the Arabs of Spain at last came to an understanding among themselves for the election of a caliph, and their choice fell upon one of the last survivors of the Omayyads, Abdarrahmān b. Moawiya, grandson of the caliph Hishām. This prince was wandering in the deserts of Africa, pursued by his implacable enemies, but everywhere protected and concealed by the desert tribes, who pitied his misfortunes and respected his illustrious origin. A deputation from Spain sought him out in Africa and offered him the Caliphate, which he accepted with joy. On the

1st Rabia I. 138 (14th August 755) Abdarrahmān landed in the Iberian peninsula, where he was universally welcomed, and speedily founded at Cordova the Western Omayyad Caliphate (see SPAIN: *History*).

While Mansur was thus losing Africa and Spain, he was trying to redeem the losses the empire had sustained on the northern frontier by the Byzantines. In 750-751 the emperor Constantine V. (Copronymus) had unsuccessfully blockaded Malatia; but five years later he took it by force and razed its wall to the ground. Mansur now sent in 757 an army of 70,000 men under the command of his cousin Abdalwahhāb, the son of Ibrāhīm the Imam, whom he had made governor of Mesopotamia, the real chief being Hasan b. Qaḥṭaba. They rebuilt all that the emperor had destroyed, and made this key of Asia Minor stronger than ever before. The Moslems then made a raid by the pass of Ḥadath (Adata) and invaded the land of the Byzantines. Two aunts of the caliph took part in this expedition, having made a vow that if the dominion of the Omayyads were ended they would wage war in the path of God. Constantine advanced with a numerous army, but was afraid of attacking the invaders. The Moslems also rebuilt Mopsuestia. But from 758 till 763 Mansur was so occupied with his own affairs that he could not think of further raids.

In 758 (others say in 753 or 754) a body of 600 sectaries, called Rāwendīs (*q.v.*), went to Hāshimīya, the residence of the caliph, not far from Kufa. They believed that the caliph was their lord, to whom they owed their daily bread, and came to pay him divine honours. They began by marching in solemn procession round the palace, as if it had been the Ka'ba. Mansur being told of it said: "I would rather they went to hell in obedience to us, than to heaven in disobedience." But as they grew tumultuous, and he saw that this impious homage gave offence to his men, he caused the principal leaders to be seized and thrown into prison. The Rāwendīs immediately rose in revolt, broke the prison doors, rescued their chiefs, and returned to the palace. The unfortunate fanatics were hunted down and massacred to the last man, and thereby the ties that bound the Abbasids to the ultra-Shi'ites were severed. From that time forward the Abbasid caliphs became the maintainers of orthodox Islam, just as the Omayyads had been. The name of Hāshimīya, which the reigning family still retained, was henceforward derived not from Abu Hāshim, but from Hāshim, the grandfather of Abbas, the great-grandfather of the Prophet.

A much greater danger now threatened Mansur. In the last days of the Omayyads, the Shi'ites had chosen as caliph, Mahommed b. Abdallah b. Hasan, whom they called the Mahdi and the "pure soul," and Mansur had been among those who pledged themselves to him by oath. Not unnaturally, the Alids in Medina were indignant at being supplanted by the Abbasids, and Mansur's chief concern was to get Mahommed into his power. Immediately after his occupying the throne, he named Ziyād b. Obaidallah governor of Medina, with orders to lay hands on Mahommed and his brother Ibrāhīm, who, warned betimes, took refuge in flight. In 758 Mansur, informed that a revolt was in preparation, came himself to Medina and ordered Abdallah to tell him where his sons were. As he could not or would not tell, he together with all his brothers and some other relatives were seized and transported to Irak, where Abdallah and his brother Ali were beheaded and the others imprisoned. Notwithstanding all these precautions, a vast conspiracy was formed. On the same day Mahommed was to raise the standard of revolt in Medina, Ibrāhīm in Baṣra. But the Alids, though not devoid of personal courage, never excelled in politics or in tactics. In A.D. 762 Mahommed took Medina and had himself proclaimed caliph. The governor of Kufa, 'Isā b. Mūsā, received orders to march against him, entered Arabia, and captured Medina, which, fortified by Mahommed by the same means as the Prophet had employed against the besieging Meccans, could not hold out against the well-trained Khorasanians. Mahommed was defeated and slain. His head was cut off and sent to Mansur. When on the point of death, Mahommed gave the famous sword of the Prophet called Dhu'l-Fiqār to a merchant to whom he owed 400 dinars. It came later into the possession of Harun al-Rashid. In the meanwhile Ibrāhīm had not only gained possession of Baṣra, Ahwāz and Fārs, but had even occupied Wāsit. The empire of the Abbasids was in great jeopardy. For fifty days Mansur stayed in his room, neither changing his clothes nor allowing himself a moment's repose. The greater part of his troops were in Rei with his son al-Mahdi, who had conquered Tabaristan, in Africa, with Mahommed b. Ash'ath, and in Arabia with 'Īsā b. Mūsā. Had Ibrāhīm marched at once against Kufa he might have crushed Mansur, but he let slip the opportunity. A terrible conflict took place at Bā-Khamra, 48 m. from Kufa. Ḥomaid b. Qaḥṭaba, the commander of Mansur's army, was defeated, only a small division under 'Īsā b. Mūsā holding its ground. At that moment Salm, the son of the famous Qotaiba b. Moslim, came to the rescue by attacking the rear of Ibrāhīm. Ḥomaid rallied his troops, and Ibrāhīm was overpowered. At last he fell, pierced by an arrow, and, in spite of the desperate efforts of his followers, his body remained in the hands of the enemy. His head was cut off and brought to Mansur.

Mansur could now give his mind to the founding of the new capital. When the tumult of the Rāwendīs took place he saw clearly that his personal safety was not assured in Hāshimīya,[29] where a riot of the populace could be very dangerous, and his troops were continually exposed to the perverting influence of the fickle and disloyal citizens of Kufa. He had just made choice of the admirable site of the old market-town of Bagdad when the tidings came of the rising of Mahommed in Medina. In those days he saw that he had been very imprudent to denude himself of troops, and decided to keep henceforth always with him a body of 30,000 soldiers. So Bagdad, or properly "the round city" of Mansur, on the western bank of the Tigris, was built as the capital. Strictly it was a huge citadel, in the centre of which was the palace of the caliph and the great mosque. But around this nucleus there soon grew up the great metropolis which was to be the centre of the civilized world as long as the Caliphate lasted.[30] The building lasted three years and was completed in the year 149 (A.D. 766). That year is really the beginning of the new era. "The Omayyads," says the Spanish writer Ibn Ḥazm, "were an Arabic dynasty; they had no fortified residence, nor citadel; each of them dwelt in his villa, where he lived before becoming caliph; they did not desire that the Moslems should speak to them as slaves to their master, nor kiss the ground before them or their feet; they only gave their care to the appointment of able governors in the provinces of the empire. The Abbasids, on the contrary, were a Persian dynasty, under which the Arab tribal system, as regulated by Omar, fell to pieces; the Persians of Khorasan were the real rulers, and the government became despotic as in the days of Chrosroes." The reign of Abu'l-Abbas and the first part of that of Mansur had been almost a continuation of the former period. But now his equals in birth and rank, the Omayyads and the Alids, had been crushed; the principal actors in the great struggle, the leaders of the propaganda and Abu Moslim were out of the way; the caliph stood far above all his subjects; and his only possible antagonists were the members of his own family.

'Īsā b. Mūsā had been designated, as we have seen, by Abu'l-Abbas as successor to Mansur. The latter having vainly tried to compel 'Īsā to renounce his right of succession, in favour of Mansur's son Mahommed al-Mahdi, produced false witnesses who swore that he had done so. However unwillingly, 'Īsā was obliged at last to yield, but it was understood that, in case of Mahommed's death, the succession should return to 'Īsā. One of the false witnesses was, it is asserted, Khālid b. Barmak, the head of that celebrated family the Barmecides (*q.v.*), which

played so important a part in the reign of Harun al-Rashid. This Khālid, who was descended from an old sacerdotal family in Balkh, and had been one of the trusty supporters of Abu Moslim, Mansur appointed as minister of finance.

A son of Mahommed the Alid had escaped to India, where, with the connivance of the governor Omar b. Hafs Hazarmerd, he had found refuge with an Indian king. Mansur discovered his abode, and caused him to be killed. His infant son was sent to Medina and delivered to his family. Omar Hazarmerd lost his government and received a command in Africa, where he died in 770.

In A.H. 158 (A.D. 775) Mansur undertook a pilgrimage to Mecca, but succumbed to dysentery at the last station on the route. He was about sixty-five years of age, and had reigned for twenty-two years. He was buried at Mecca. He was a man of rare energy and strength of mind. His ambition was boundless and no means, however perfidious, were despised by him. But he was a great statesman and knew how to choose able officers for all places. He was thrifty and anxious to leave to his son a full treasury. He seems to have cherished the ideal that this son, called Mahommed b. Abdallah, after the Prophet, should fulfil the promises of peace and happiness that had been tendered to the believers, and therefore to have called him al-Mahdi. For that purpose it was necessary that he should have the means not only to meet all state expenses, but also to be bounteous. But from the report of the historian Haitham b. ‘Adī[31] about the last discourse which father and son had together, we gather that the former had misgivings in regard to the fulfilment of his wishes.

Khalid b. Barmak took the greatest care of the revenues, but contrived at the same time to consult his own interests. Mansur discovered this in the same year in which he died, and threatened him with death unless he should pay to the treasury three millions of dirhems within three days. Khalid already had so many friends that the sum was brought together with the exception of 30,000 dirhems. At that moment tidings came about a rising in the province of Mosul, and a friend of Khalid said to the caliph that Khalid was the only man capable of putting it down. Thereupon Mansur overlooked the deficiency and gave Khalid the government of Mosul. “And,” said a citizen of that town, “we had such an awe and reverence for Khalid, that he appeased the disorders, almost without punishing anybody.”

3. *Reign of Mahdi.*—As soon as Mansur was dead, Rabi’, his client and chamberlain, induced all the princes and generals who accompanied the caliph, to take the oath of allegiance to his son Mahommed al-Mahdi, who was then at Bagdad. Isa b. Musa hesitated, but was compelled to give in. In 776 Mahdi constrained him for a large bribe to renounce his right of succession in favour of his sons, Musa and Harun. Mansur wrote in his testament to his son that he had brought together so much money that, even if no revenue should come in for ten years, it would suffice for all the wants of the state. Mahdi, therefore, could afford to be munificent, and in order to make his accession doubly welcome to his subjects, he began by granting a general amnesty to political prisoners. Among these was a certain Ya’qub b. Da’ud, who, having insinuated himself into the confidence of the caliph, especially by discovering the hiding places of certain Alids, was afterwards (in 778) made prime minister. The provincial governors in whom his father had placed confidence, Mahdi superseded by creatures of his own.

In Khorasan many people were discontented. The promises made to them during the war against the Omayyads had not been fulfilled, and the new Mahdi did not answer at all to their ideal. A revolt in 160 under the leadership of a certain Yusuf b. Ibrahïm, surnamed al-Barm, was suppressed by Yazid b. Mazyad, who, after a desperate struggle, defeated Yusuf, took him prisoner and brought him in triumph to Bagdad, where he with several of his officers was killed and crucified. In the following year, Mahdi was menaced by a far more dangerous revolt, led by a sectary, known generally as Mokanna (*q.v.*), or “the veiled one,” because he always appeared in public wearing a mask. He took up his abode in the Transoxianian province of Kish and Nakhshab, where he gathered around him a great number of adherents. After some successes, the pretender was ultimately cornered at the castle of Sanam near Kish, and took poison together with all the members of his family. His head was cut off and sent to Mahdi in the year 163.

Mahdi had been scarcely a year on the throne when he resolved to accomplish the pilgrimage to Mecca. The chroniclers relate that on this occasion for the first time camels loaded with ice for the use of the caliph came to Mecca. Immediately on his arrival in the Holy City he applied himself, at the request of the inhabitants, to the renewal of the curtains which covered the exterior walls of the Ka‘ba. For a very long time no care had been taken to remove the old covering when a new one was put on; and the accumulated weight caused uneasiness respecting the stability of the walls. Mahdi caused the house to be entirely stripped and anointed with perfumes, and covered the walls again with a single cloth of great richness. The temple itself was enlarged and restored. On this occasion he distributed considerable largesses among the Meccans. From Mecca Mahdi went to Medina, where he caused the mosque to be enlarged, and where a similar distribution of gifts took place. During his stay in that city he formed for himself a guard of honour, composed of 500 descendants of the Ansār,[32] to whom he assigned a quarter in Bagdad, named after them the Qatī‘a (Fief) of the Ansār. Struck by the difficulties of every kind which had to be encountered by poor pilgrims to Mecca from Bagdad and its neighbourhood, he ordered Yaqtīn, his freedman, to renew the milestones, to repair the old reservoirs, and to dig wells and construct cisterns at every station of the road where they were missing. He also had new inns built and decayed ones repaired. Yaqtīn remained inspector of the road till 767.

During the reign of Mansur the annual raids against the Byzantines had taken place almost without intermission, but the only feat of importance had been the conquest of Laodicea, called “the burnt” (ἡ κατακεκαυμένη), by Ma‘yūf b. Yahyā in the year 770. At first the armies of Mahdi were not successful. The Greeks even conquered Marash (Germanicia) and annihilated the Moslem army sent from Dābiq. In 778, however, Hasan b. Qaḥṭaba made a victorious raid as far as Adhrūliya (Dorylaeum); it was on his proposition that Mahdi resolved on building the frontier town called Ḥadath (Adata), which became an outpost. In 779 the caliph decided on leading his army in person. He assembled his army in the plains of Baradān north of Bagdad and began his march in the early spring of 780, taking with him his second son Hārūn, and leaving his elder son Mūsā as his lieutenant in Bagdad. Traversing Mesopotamia and Syria, he entered Cilicia, and established himself on the banks of the Jihan (Pyramus). Thence he despatched an expeditionary force, nominally under the command of Hārūn, but in reality under that of his tutor, the Barmecide Yahyā b. Khālid. Hārūn captured the fortress Samālu after a siege of thirty-eight days, the inhabitants surrendering on condition that they should not be killed or separated from one another. The caliph kept faith with them, and settled them in Bagdad, where they built a monastery called after their native place. In consequence of this feat, Mahdi made Hārūn governor of the whole western part of the empire, including Azerbaijan and Armenia. Two years later war broke out afresh between the Moslems and the

Greeks. Leo IV., the East Roman emperor, had recently died, leaving the crown to Constantine VI. This prince being only ten years old, his mother Irene acted as regent and assumed the title Augusta. By her orders an army of 90,000 men, under the command of Michael Lachanodrakon, entered Asia Minor. The Moslems, on their side, invaded Cilicia under the orders of Abdalkabīr who, being afraid of encountering the enemy, retired with his troops. Irritated by this failure, the caliph in 781 sent Hārūn, accompanied by his chamberlain Rabī', with an army of nearly 100,000 men, with orders to carry the war to the very gates of Constantinople. The patrician Nicetas, count of Opsikion, who sought to oppose his march, was defeated by Hārūn's general, Yazid b. Mazyad, and put to flight. Hārūn then marched against Nicomedia, where he vanquished the domesticus, the chief commander of the Greek forces, and pitched his camp on the shores of the Bosporus. Irene took alarm, sued for peace, and obtained a truce for three years, but only on the humiliating terms of paying an annual tribute of 90,000 denarii, and supplying the Moslems with guides and markets on their way home. This brilliant success so increased Mahdi's affection for Hārūn that he appointed him successor-designate after Mūsā and named him *al-Rashīd* ("the follower of the right cause"). Three years later, he resolved even to give to him the precedence in the succession instead of Mūsā, yielding to the importunity of Khaizorān, the mother of the two princes, and to his own predilection. It was necessary first to obtain from Mūsā a renunciation of his rights; and for that purpose he was recalled from Jorjān, where he was engaged on an expedition against the rebels of Tabaristān. Mūsā, informed of his father's intentions, refused to obey this order, and Mahdi determined to march in person against him. But, after his arrival at Māsabadhān, a place in Jabal (Media, the later Persian Irak), he died suddenly, at the age of only forty-three. Some attribute his death to an accident met with in hunting; others believe him to have been poisoned. Some European scholars have suspected Mūsā of having been concerned in it, but of this we have no proof whatever.

The reign of Mahdi was a time of great prosperity. Much was done for the organization of the huge empire; agriculture and commerce flourished; the revenues were increasing, whilst the people fared well. The power of the state was acknowledged even in the far east: the emperor of China, the king of Tibet, and many Indian princes concluded treaties with the caliph. He was an ardent champion of the orthodox faith, repudiating all the extravagant doctrine preached by the Abbasid missionaries and formerly professed by his father. In particular he persecuted mercilessly the Manichaeans and all kinds of freethinkers.

4. *Reign of Hādī*.—On the death of Mahdi, Hārūn, following the advice of Yahyā. b. Khālid, sent the insignia of the Caliphate, with letters of condolence and congratulation, to Mūsā in Jorjān, and brought the army which had accompanied Mahdi peacefully back from Media to Bagdad. Mūsā returned in all haste to the capital, and assumed the title of *al-Hādī* ("he who directs"). The accession of a new caliph doubtless appeared to the partisans of the house of Ali a favourable opportunity for a rising. Hosain b. Ali b. Hasan III. raised an insurrection at Medina with the support of numerous adherents, and proclaimed himself caliph. Thence he went to Mecca, where on the promise of freedom many slaves flocked to him, and many pilgrims also acknowledged him. Suleimān b. Mansur, the caliph's representative in the pilgrimage of that year, was entrusted with the command against him. Hosain was attacked at Fakh, 3 m. from Mecca, and perished in the combat with many other Alids. His maternal uncle, Idrīs b. Abdallah, a brother of Mahommed and Ibrāhīm, the rivals of Mansur, succeeded in escaping, and fled to Egypt, whence by the help of the postmaster, himself a secret partisan of the Shi'ites, he passed into West Africa, where at a later period his son founded the Idrisite dynasty in Fez (see Morocco).

Hādī, who had never been able to forget that he had narrowly escaped being supplanted by his brother, formed a plan for excluding him from the Caliphate and transmitting the succession to his own son Ja'far. To this he obtained the assent of his ministers and the principal chiefs of his army, with the exception of Yahyā b. Khālid, Hārūn's former tutor, who showed such firmness and boldness that Hādī cast him into prison and resolved on his death. Some historians say that he had already given orders for his execution, when he himself was killed (September 14th, 786) by his mother Khaizorān, who had systematically and successfully intrigued against him with the object of gaining the real power for herself. Hādī, indignant at the fact that she was generally regarded as the real source of authority, had attempted to poison her, and Khaizorān, hoping to find a more submissive instrument of her will in her second and favourite son, caused Hādī to be smothered with cushions by two young slaves whom she had presented to him. She herself died three years later.

5. *Reign of Hārūn al-Rashīd*.—We have now reached the most celebrated name among the Arabian caliphs, celebrated not only in the East, but in the West as well, where the stories of the *Thousand and One Nights* have made us familiar with that world which the narrators represent in such brilliant colours. Hārūn ascended the throne without opposition. His first act was to choose as prime minister his former tutor, the faithful Yahyā b. Khālid, and to confide important posts to the two sons of Yahyā, Faḍl and Ja'far, of whom the former was his own foster-brother, the latter his intimate friend. The Barmecide family were endowed in the highest degree with those qualities of generosity and liberality which the Arabs prized so highly, and the chronicles never weary in their praises. Loaded with all the burdens of government, Yahyā brought the most distinguished abilities to the exercise of his office. He put the frontiers in a good state of defence; he filled the public treasury, and carried the splendour of the throne to the highest point. His sons, especially Faḍl, were worthy of their father.

Although the administration of Hārūn's states was committed to skilful hands, yet the first years of his long reign were not free from troubles. Towards the year 176 (A.D. 792-793) a man of the house of Ali, named Yahyā b. Abdallah, another brother of Mahommed and Ibrāhīm, who had taken refuge in the land of Dailam on the south-western shores of the Caspian Sea, succeeded in forming a powerful party, and publicly claimed the Caliphate. Hārūn immediately sent against him an army of 50,000 men, under the command of Faḍl, whom he made governor of all the Caspian provinces. Reluctant, however, to fight against a descendant of the Prophet, Faḍl first attempted to induce him to submit by promising him safety and a brilliant position at the court of Bagdad. Yahyāaccepted the proposal, but required that the caliph should send him letters of pardon countersigned by the highest legal authorities and the principal personages of the empire. Hārūn consented and Yahyā went to Bagdad, where he met with a splendid reception. At the end of some months, however, he was calumniously accused of conspiracy, and the caliph, seizing the opportunity of ridding himself of a possible rival, threw him into prison, where he died, according to the majority of the historians, of starvation. Others say that Ja'far b. Yahyā b. Khālid, to whose care he had been entrusted, suffered him to escape, and that this was the real cause of Hārūn's anger against the Barmecides (*q.v.*). Dreading fresh insurrections of the Alids, Hārūn secured the person of another descendant of Ali, Mūsā b. Ja'far, surnamed al-Kāzim, who enjoyed great consideration at Medina, and had already been arrested and released again by Mahdi. The unfortunate man was brought by the caliph himself to Bagdad, and there died, apparently by poison.

Meanwhile Hārūn did not forget the hereditary enemy of Islam. In the first year of his reign all the strong places of Kinnesrin and Mesopotamia were formed into a special province, which received the name of al-ʻAwāṣim ("the defending fortresses"), with Manbij (Hierapolis) as its capital. The building of the fortress of Hadath having been completed, Hārūn committed to Faraj the Turk the task of rebuilding and fortifying the city of Tarsus. Thanks to these and similar measures, the Moslem armies were able to advance boldly into Asia Minor. Almost every year successful raids were made, in the year 797 under the command of the caliph himself, so that Irene was compelled to sue for peace. An attack by the Khazars called the caliph's attention from his successes in Asia Minor. This people had made an irruption into Armenia, and their attack had been so sudden that the Moslems and Christians were unable to defend themselves, and 100,000 had been reduced to captivity. Two valiant generals, Khozaima b. Khāzīm and Yazīd b. Mazyad, marched against the Khazars and drove them out of Armenia.

In the midst of the cares of war, Hārūn was assiduous in his religious duties, and few years passed without his making the pilgrimage. Having determined to fix the order of succession in so formal a manner as to take away all pretext for future contentions, he executed a deed by which he appointed his eldest son Mahommed his immediate heir, and after him the second, Abdallah, and after Abdallah the third, Qāsim. Mahommed received the surname of *al-Amīn* ("the Sure"), Abdallah that of *al-Maʻmūn* ("he in whom men trust"), and Qāsim that of *al-Moʻtamin billāh* ("he who trusts in God"). Hārūn further stipulated that Mamun should have as his share during the lifetime of his brother the government of the eastern part of the empire. Each of the parties concerned swore to observe faithfully every part of this deed, which the caliph caused to be hung up in the Kaʻba, imagining that it would be thus guaranteed against all violation on the part of men, a precaution which was to be rendered vain by the perfidy of Amīm.

It was in the beginning of the following year, at the very moment when the Barmecides thought their position most secure, that Hārūn brought sudden ruin upon them. The causes of their disgrace have been differently stated by the annalists (see BARMECIDES). The principal cause appears to have been that they abused the sovereign power which they exercised. Not a few were jealous of their greatness and sought for opportunities of instilling distrust against them into the mind of Hārūn, and of making him feel that he was caliph only in name. The secret dissatisfaction thus aroused was increased, according to some apparently well-informed authorities, by the releasing of the Alid Yahyā b. Abdallah, already mentioned. Finally Hārūn resolved on their destruction, and Jaʻfar b. Yahyā, who had just taken leave of him after a day's hunting, was arrested, taken to the castle of Hārūn, and beheaded. The following day, his father Yahyā, his brother Fadl, and all the other Barmecides were arrested and imprisoned; all their property was confiscated. The only Barmecide who remained unmolested with his family was Mahommed the brother of Yahyā, who had been the chamberlain of the caliph till 795, when Fadl b. Rabi' got his place. This latter had henceforward the greatest influence at court.

In the same year a revolution at Constantinople overthrew the empress Irene. The new emperor Nicephorus, thinking himself strong enough to refuse the payment of tribute, wrote an insulting letter to Hārūn, who contented himself with replying: "Thou shall not hear, but see, my answer." He entered Asia Minor and took Heraclea, plundering and burning along his whole line of march, till Nicephorus, in alarm, sued for peace. Scarcely had the caliph returned into winter quarters when Nicephorus broke the treaty. When the news came to Rakka, where Hārūn was residing, not one of the ministers ventured to tell him, until at last a poet introduced it in a poem which pleased the monarch. Notwithstanding the rigour of the season, Hārūn retraced his steps, and Nicephorus was compelled to observe his engagements. In 805 the first great ransoming of Moslem prisoners took place on the banks of the little river Lamus in Cilicia. But Nicephorus, profiting by serious disturbances in Khorasan, broke the treaty again, and overran the country as far as Anazarba and Kanīsat as-saudā ("the black church") on the frontier, where he took many prisoners, who were, however, recovered by the garrison of Mopsuestia. Thus Hārūn was obliged to take the field again. He entered Asia Minor with an army of 135,000 regulars, beside volunteers and camp followers. Heraclea was taken, together with many other places, and Tyana was made a military station. At the same time his admiral, Homaid b. Maʻyūf, conquered Cyprus, which had broken the treaty, and took 16,000 of its people captive. Nicephorus was now so completely beaten that he was compelled to submit to very harsh conditions. In the year 808 the second ransoming between the Moslems and the Greeks took place near the river Lamus.

The disturbances in Khorasan were caused by the malversations of the governor of that province, Ali b. ʻĪsā b. Māhān. The caliph went in person to Merv, in order to judge of the reality of the complaints which had reached him. Ali b. ʻĪsā hastened to meet the caliph on his arrival at Rai (Rhagae), near the modern Teheran, with a great quantity of costly presents, which he distributed with such profusion among the princes and courtiers that no one was anxious to accuse him. Hārūn confirmed him in his post, and, after having received the chiefs of Tabaristān who came to tender their submission, returned through Bagdad to Rakka on the Euphrates, which city was his habitual residence. In the following year Rāfi' b. Laith, a grandson of Nasr b. Sayyār, raised the standard of revolt in Samarkand, and, at the head of a numerous army, defeated the son of Ali b. ʻĪsā. Thereupon Ali fled from Balkh, leaving the treasury, which was plundered by the populace after his departure. The caliph on learning that the revolt was due to Ali's tyranny, sent Harthama b. Aʻyan with stringent orders to seize Ali and confiscate his possessions. This order was carried out, and it is recorded that 1500 camels were required to transport the confiscated treasures. The caliph's hope that Rāfi' would submit on condition of receiving a free pardon was not fulfilled, and he resolved to set out himself to Khorasan, taking with him his second son Mamun. On the journey he was attacked by an internal malady, which carried him off, ten months after his departure from Bagdad, A.H. 193 (March 809), just on his arrival at the city of Tūs. Hārūn was only forty-five years of age. He was far from having the high qualifications of his grandfather Mansur; indeed he did not even possess the qualities of his father and his brother. When the latter asked him to renounce his right of succession, he was willing to consent, saying that a quiet life with his beloved wife, the princess Zobaida, was his highest wish, but he obeyed his mother and Yahyā b. Khālid. As long as the Barmecides were in office, he acted only on their direction. After their disgrace he was led into many impolitic actions by his violent and often cruel propensities. But the empire was, especially in the earlier part of his reign, in a very prosperous state, and was respected widely by foreign powers. Embassies passed between Charlemagne and Hārūn in the years 180 (A.D. 797) and 184 (A.D. 801), by which the former obtained facilities for the pilgrims to the Holy Land, the latter probably concessions for the trade on the Mediterranean ports. The ambassadors brought presents with them; on one of these occasions the first elephant reached the land of the Franks.

Under the reign of Hārūn, Ibrāhīm b. al-Aghlab, the governor of Africa, succeeded in making himself independent of the central government, on condition of paying a fixed annual tribute to his suzerain the caliph.

This was, if we do not take Spain into the account, the first instance of dismemberment, later to be followed by many others.

In the days of this caliph the first paper factories were founded in Bagdad.

6. *Reign of Amīn.*—On the death of Hārūn his minister, Fadl b. Rabī', with the view of gaining the new caliph's confidence, hastened to call together all the troops of the late caliph and to lead them back to Bagdad, in order to place them in the hands of the new sovereign, Amīn. He even, in direct violation of Hārūn's will, led back the corps which was intended to occupy Khorasan under the authority of Mamun. Aware, however, that in thus acting he was making Mamun his irreconcilable enemy, he persuaded Amīn to exclude Mamun from the succession. Mamun, on receiving his brother's invitation to go to Bagdad, was greatly perplexed; but his tutor and later vizier, Fadl b. Sahl, a Zoroastrian of great influence, who in 806 had adopted Islam, reanimated his courage, and pointed out to him that certain death awaited him at Bagdad. Mamun resolved to hold out, and found pretexts for remaining in Khorasan. Amīn, in anger, caused the will of his father, which, as we have seen, was preserved in the Ka'ba, to be destroyed, declared on his own authority that Mamun's rights of succession were forfeited, and caused the army to swear allegiance to his own son Mūsā, a child of five, on whom he bestowed the title of *an-Nātiq bil-Haqq* ("he who speaks according to truth"), A.H. 194 (A.D. 809-810). On hearing the news, Mamun, strong in the rightfulness of his claim, retaliated by suppressing the caliph's name in all public acts. Amīn immediately despatched to Khorasan an army of 40,000 under the command of Ali b. 'Īsā, who had regained his former influence, and told the caliph that, at his coming to Khorasan, all the leading men would come over to his side. Zobaida, the mother of the caliph, entreated Ali to treat Mamun kindly when he should have made him captive. It is said that Fadl b. Sahl had, through a secret agent, induced Fadl b. Rabī' to select Ali, knowing that the dislike felt towards him by the Khorasanians would double their strength in fighting against him. Mamun, on his side, sent in all haste an army of less than 4000 men of his faithful Khorasanians, and entrusted their command to Ṭāhir b. Hosain, who displayed remarkable abilities in the war that ensued. The two armies met under the walls of Rai (Shaaban 195, May 811). By a bold attack, in the manner of the Kharijites of yore, Ṭāhir penetrated into the centre of the hostile army and killed Ali. The frightened army fled, leaving the camp with all its treasures to Ṭāhir, who from that day was named "the man with the two right hands." A courier was despatched immediately to Merv, who performed the journey, a distance of about 750 miles, in three days. On the very day of his arrival, Harthama b. A'yan had left Merv with reinforcements. Mamun now no longer hesitated to take the title of caliph.

When the news of Ali's defeat came to Bagdad, Amīn sent Abdarrahmān b. Jabala to Hamadān with 20,000 men. Ṭāhir defeated him, forced Hamadān to surrender, and occupied all the strong places in Jabal (Media). The year after, Amīn placed in the field two new armies commanded respectively by Ahmad b. Mazyad and Abdallah b. Ḥomaid b. Qaḥṭaba. The skilful Ṭāhir succeeded in creating divisions among the troops of his adversaries, and obtained possession, without striking a blow, of the city of Holwān, an advantage which opened the way to the very gates of Bagdad. He was here reinforced by troops sent from Khorasan under the command of Harthama b. A'yan, who was appointed leader of the war against Amīn, with orders to send Ṭāhir to Ahwāz. Ṭāhir continued his victorious march, conquered Ahwāz, took Wāsit and Madāin, and pitched his camp near one of the gates of the capital, where he was rejoined by Harthama. One after the other the provinces fell away from Amīn, and he soon found himself in possession of Bagdad alone. The city, though blockaded on every side, made a desperate defence for nearly two years. Ultimately the eastern part of the city fell into the hands of Ṭāhir, and Amīn, deserted by his followers, was compelled to surrender. He resolved to treat with Harthama, as he was averse to Ṭāhir; but this step caused his ruin. Ṭāhir succeeded in intercepting him on his way to Harthama, and immediately ordered him to be put to death. His head was sent to Mamun (September 813). It was presented to him by his vizier, Faḍl b. Sahl, surnamed Dhu'l-Riyāsatain, or "the man with two governments," because his master had committed to him both the ministry of war and the general administration. Mamun hid his joy beneath a feigned display of sorrow.

Amīn was only twenty-eight years old. As a ruler he was wholly incompetent. He hardly comprehended the importance of the affairs with which he was called upon to deal. He acted invariably on the advice of those who for the time had his confidence, and occupied himself mainly with the affairs of his harem, with polo, fishing, wine and music. The five years of his reign were disastrous to the empire, and in particular to Bagdad which never entirely recovered its old splendour.

7. *Reign of Mamun.*—On the day following the death of Amīn Ṭāhir caused Mamun to be proclaimed at Bagdad, and promised in his name a general amnesty. The accession of this prince appeared likely to restore to the empire the order necessary for its prosperity. It was not so, however. The reign of Mamun—that reign in which art, science and letters, under the patronage of the caliph, threw so brilliant a lustre—had a very stormy beginning. Mamun was in no haste to remove to Bagdad, but continued to reside at Merv. In his gratitude to Faḍl b. Sahl, to whose service he owed his success, he not only chose him as prime minister of the empire, but also named his brother, Hasan b. Sahl, governor of Media, Fārs, Ahwāz, Arabia and Irak. The two generals to whom he owed still more were not treated as they deserved. Harthama was ordered to return to Khorasan; Ṭāhir was made governor of Mesopotamia and Syria, with the task of subduing Naṣr b. Shabath, who with numerous adherents refused submission to the caliph. The Alids seized on the elevation of Mamun as a pretext for fresh revolts. At Kufa a certain Ibn Ṭabāṭabā placed an army in the field under Abu'l-Sarāyā, who had been a captain in the army of Harthama. An army sent by Hasan b. Sahl was defeated, and Abu'l-Sarāyā, no longer content to play a second part, poisoned his chief, Ibn Ṭabāṭabā, and put in his place another of the family of Ali, Mahommed b. Mahommed, whom, on account of his extreme youth, he hoped to govern at his will. Abu'l-Sarāyā's success continued, and several cities of Irak—Basra, Wāsit and Madāin—fell into his hands. Mecca, Medina and Yemen also were mastered by the Alids, who committed all kinds of atrocities and sacrilege. Abu'l-Sarāyā, who even struck money in Kufa, began to menace the capital, when Hasan b. Sahl hastily sent a messenger to Harthama b. A'yan, who was already at Holwān on his way back to Merv, entreating him to come to his aid. Harthama, who was deeply offended by his dismissal, refused at first, but at last consented, and at once checked the tide of disaster. The troops of the Alids were everywhere driven back, and the whole of Irak fell again into the hands of the Abbasids. Kufa opened its gates; Basra was taken by assault. Abu'l-Sarāyā and Mahommed b. Mahommed fled to Mesopotamia, but were made prisoners. The former was decapitated, the latter was sent to Khorasan, the revolt in Arabia was quickly suppressed, and peace seemed within reach. This, however, was by no means the case. The disorder of civil war had caused a multitude of robbers and vagabonds to emerge from the purlieus of Bagdad. These ruffians proceeded to treat the capital as a conquered city, and it became necessary for all good citizens to organize themselves into a regular militia. Harthama, having vanquished Abu'l-Sarāyā, did not go to

Hasan b. Sahl, but proceeded towards Merv with the purpose of telling Mamun that the state of affairs was not as Fadl b. Sahl represented it to him, and urging him to come to Bagdad, where his presence was necessary. Fadl, informed of his intentions, filled the caliph's mind with distrust against the old general, so that when Harthama arrived Mamun had him cast into prison, where he died shortly afterwards. When the tidings of his disgrace came to Bagdad, the people expelled the lieutenant of Hasan b. Sahl, called by them the Mājūzī ("the Zoroastrian"), who had chosen Madāin for his residence, and put at their head Mansūr, a son of Mahdi, who refused to assume the title of caliph, but consented to be Mamun's vicegerent instead of Hasan b. Sahl.

Meanwhile, at Merv, Mamun was adopting a decision which fell like a thunderbolt on the Abbasids. In A.H. 201 (A.D. 817), under pretence of putting an end to the continual revolts of the partisans of Ali, and acting on the advice of his prime minister Fadl, he publicly designated as his successor in the Caliphate Ali ar-Ridā, a son of that Mūsā al-Kāzim who perished in the prison of Mahdi, a direct descendant of Hosain, the son of Ali, and proscribed black, the colour of the Abbasids, in favour of that of the house of Ali, green. This step was well calculated to delight the followers of Ali, but it could not fail to exasperate the Abbasids and their partisans. The people of Bagdad refused to take the oath to Ali b. Mūsā, declared Mamun deposed, and elected his uncle, Ibrāhīm, son of Mahdi, to the Caliphate.[33] It was only indirectly that the news reached the caliph, who then saw that Fadl had been treating him as a puppet. His anger was great, but he kept it carefully to himself. Fadl was one day found murdered, and Ali b. Mūsā died suddenly. The historians bring no open accusation against Mamun, but it seems clear that the opportune removal of these men was not due to chance. Mamun affected the profoundest grief, and, in order to disarm suspicion, appointed as his prime minister the brother of Fadl, Hasan b. Sahl, whose daughter Būrān he afterwards married. Soon after the news came to him that Hasan b. Sahl had become insane. Mamun appointed an officer to act as his lieutenant, and wrote that he was coming to Bagdad in a short time. From that moment the pseudo-caliph Ibrāhīm found himself deserted, and was obliged to seek safety in concealment. His precarious reign had, however, lasted nearly two years. Mamun had found out also that the general uneasiness was largely due to his treatment of Harthama and Tāhir, the latter having been put in a rebellious country without the men and the money to maintain his authority. The caliph therefore wrote to Tāhir to meet him at Nahrawān, where he was received with the greatest honour. Having taken all precautions, Mamun now made his solemn entry into Bagdad, but, to show that he came as a master, he still displayed for several days the green colours, though at last, at the request of Tāhir, he consented to resume the black. From this time, A.H. 204 (August 819), the real reign of Mamun began, freed as he now was from the tutelage of Faḍl.

When welcoming Tāhir, Mamun bade him ask for any reward he might desire. Tāhir, fearing lest the caliph, not being able to endure the sight of the murderer of his brother, should change his mind towards him, contrived to get himself appointed governor of Khorasan. Like most of the great Moslem generals, Tāhir, it is said, had conceived the project of creating an independent kingdom for himself. His death, A.H. 207 (A.D. 822), prevented its realization; but as his descendants succeeded him one after the other in the post of governor, he may be said in reality to have founded a dynasty in Khorasan. His son Abdallah b. Tāhir was a special favourite of Mamun, He brought Naṣr b. Shabath to subjection in Mesopotamia, and overcame by great ability a very dangerous rebellion in Egypt. When he returned thence, the caliph gave him the choice between the government of Khorasan and that of the northern provinces, where he would have to combat Babak the Khorramite. Abdallah chose the former (see below, § 8).

The pseudo-caliph, Ibrāhim, who, since Mamun's entry into Bagdad, had led a wandering life, was eventually arrested. But Mamun generously pardoned him, as well as Faḍl b. Rabi', the chief promoter of the terrible civil war which had so lately shaken the empire. After that time, Ibrahim lived peacefully at the court, cultivating the arts of singing and music.

Tranquillity being now everywhere re-established, Mamun gave himself up to science and literature. He caused works on mathematics, astronomy, medicine and philosophy to be translated from the Greek, and founded in Bagdad a kind of academy, called the "House of Science," with a library and an observatory. It was also by his orders that two learned mathematicians undertook the measurement of a degree of the earth's circumference. Mamun interested himself too in questions of religious dogma. He had embraced the Motazilite doctrine about free will and predestination, and was in particular shocked at the opinion which had spread among the Moslem doctors that the Koran was the uncreated word of God. In the year 212 (A.D. 827) he published an edict by which the Motazilite (Mu'tazilite) doctrine was declared to be the religion of the state, the orthodox faith condemned as heretical. At the same time he ordered all his subjects to honour Ali as the best creature of God after the Prophet, and forbade the praise of Moawiya. In A.H. 218 (A.D. 833) a new edict appeared by which all judges and doctors were summoned to renounce the error of the uncreated word of God. Several distinguished doctors, and, among others, the celebrated Ahmad b. Ḥanbal (*q.v.*), founder of one of the four orthodox Moslem schools, were obliged to appear before an inquisitorial tribunal; and as they persisted in their belief respecting the Koran, they were thrown into prison. Mamun, being at Tarsus, received from the governor of Bagdad the report of the tribunal, and ordered that the culprits should be sent off to him. Happily for these unfortunate doctors, they had scarcely reached Adana, when news of the caliph's death arrived and they were brought back to Bagdad. The two successors of Mamun maintained the edicts—Ahmad b. Ḥanbal, who obstinately refused to yield, was flogged in the year 834— but it seems that Motasim did not himself take much interest in the question, which perhaps he hardly understood, and that the prosecution of the inquisition by him was due in great part to the charge which was left him in Mamun's will. In the reign of Motawakkil the orthodox faith was restored, never to be assailed again.[34]

In spite of these manifold activities Mamun did not forget the hereditary enemy of Islam. In the years 830, 831 and 832 he made expeditions into Asia Minor with such success that Theophilus, the Greek emperor, sued for peace, which Mamun haughtily refused to grant. Accordingly, he decided on marching in the following year against Amorium, and thence to Constantinople itself. Having sent before him his son Abbas to make Tyana a strong fortress, he set out for Asia Minor to put himself at the head of the army, but died of a fever brought on by bathing in the chill river, Pedendon, 40 m. from Tarsus, in Rajab 218 (A.D. August 833), at the age of forty-eight.

Mamun was a man of rare qualities, and one of the best rulers of the whole dynasty after Mansur. By him the ascendancy of the Persian element over the Arabian was completed. Moreover, he began to attract young Turkish noblemen to his court, an example which was followed on a much larger scale by his successor and led to the supremacy of the Turks at a later period.

8. *Reign of Motasim.*—Abu Isḥāk al-Mo'taṣim had for a long time been preparing himself for the succession.

Every year he had bought Turkish slaves, and had with him in the last expedition of Mamun a bodyguard of 3000. Backed by this force he seems to have persuaded the ailing caliph to designate him as his successor. The chroniclers content themselves with recording that he himself wrote in the name of the caliph to the chief authorities in Bagdad and elsewhere that he was to be the successor. His accession, however, met at first with active opposition in the army, where a powerful party demanded that Abbas should take the place of his father. Abbas, however, publicly renounced all pretension to the Caliphate, and the whole army accepted Motasim, who immediately had the fortifications of Tyana demolished and hastened back to Bagdad, where he made his public entry on the 20th of September 833.

Motasim wanted officers for his bodyguard. Immediately after his coming to Bagdad, he bought all the Turkish slaves living there who had distinguished themselves. Among them were Ashnās, Itākh, Wasīf, Sīmā, all of whom later became men of great influence. The guard was composed of an undisciplined body of soldiers, who, moreover, held in open contempt the religious precepts of Islam. Tired of the excesses committed by these Turks, the people of Bagdad beat or killed as many of them as they could lay hands on, and Motasim, not daring to act with severity against either his guard or the citizens, took the course of quitting the city. Having bought in 834 territories at Sāmarrā, a small place situated a few leagues above Bagdad, he caused a new residence to be built there, whose name, which could be interpreted “Unhappy is he who sees it,” was changed by him into Sorra-man-ra‘ā, “Rejoiced is he who sees it.” Leaving the government of the capital in the hands of his son Hārūn al-Wāthiq, he established himself at Sāmarrā in 836. This resolution of Motasim was destined to prove fatal to his dynasty; for it placed the caliphs at the mercy of their praetorians. In fact, from the time of Wāthiq, the Caliphate became the plaything of the Turkish guard, and its decline was continuous.

In the time of the civil war the marshlands in Irak between Basra and Wāsit had been occupied by a large population of Indians, called *yat*, or, according to the Arabic pronunciation, *Zoṭṭ*, who infested the roads and levied a heavy tribute from the ships ascending and descending the Tigris. From the year 821 onwards Mamun had tried in vain to bring them to submission. When Motasim came back to Bagdad, after the death of his brother, he found the people in great distress, their supply of dates from Basra having been cut off by the Zoṭṭ, and resolved to put them down with all means. After seven months of vigorous resistance, they at last yielded on condition of safety of life and property. In January 835 the Zoṭṭ in their national costume and with their own music were conducted on a great number of boats through Bagdad. Thence they were transported to Ainzarba (Anazarba) on the frontier of the Greek empire. Twenty years later they entered Asia Minor, whence in a later period they came into Europe, under the name of Athinganoi (Ziganes) and Egyptians (gipsies).[35]

A far more difficult task lay before Motasim, the subjection of Bābak al-Khorramī in Azerbaijan. Though the name Khorramī is often employed by the Moslem writers to designate such extravagant Moslem sectaries as the Hāshimīya, the real Khorramī were not Moslems, but Persian Mazdaqites, or communists. The name Khorramī, or Khorramdīnī, “adherent of the pleasant religion,” seems to be a nickname. As they bore red colours, they were also called Mohammira, or Redmakers. Their object was to abolish Islam and to restore “the white religion.” We find the first mention of them in the year 808, when Harun al-Rashid sent an army against them. During the civil war their power was steadily increasing, and spread not only over Azerbaijan, but also over Media (Jabal) and Khorasan. The numerous efforts of Mamun to put them down had been all in vain, and they were now in alliance with the Byzantine emperor. Therefore, in the year 835, Motasim made Afshīn, a Turkish prince who had distinguished himself already in the days of Mamun, governor of Media, with orders to take the lead of the war against Bābak. After three years’ fighting, Bābak was taken prisoner. He was carried to Sāmarrā, led through the city on the back of an elephant, and then delivered to the executioners, who cut off his arms and legs. His head was sent to Khorasan, his body was crucified. For long afterwards the place where this happened bore the name of “Bābak’s Cross.”

In the hope of creating a diversion in Bābak’s favour, Theophilus in 837 fell upon and laid waste the frontier town of Zibatra. There and in several other places he took a great number of prisoners, whom he mutilated. The news arrived just after that of the capture of Bābak, and Motasim swore to take exemplary vengeance. He assembled a formidable army, penetrated into Asia Minor, and took the city of Amorium, where he gained rich plunder. During his return the caliph was informed of a conspiracy in the army in favour of ‘Abbās the son of Mamun, of which ‘Ojaif b. ‘Anbasa was the ringleader. The unfortunate prince was arrested and died soon after in prison. The conspirators were killed, many of them with great cruelty. (For the campaign see Bury in *J.H.S.*, 1909, xxix. pt. i.)

Motasim had just returned to Sāmarrā when a serious revolt broke out in Tabaristan, Māziyār, one of the hereditary chiefs of that country, refusing to acknowledge the authority of Abdallah Ibn Ṭāhir, the governor of Khorasan, of which Tabaristan was a province. The revolt was suppressed with great difficulty, and it came out that it was due to the secret instigation of Afshīn, who hoped thereby to cause the fall of the Ṭāhirids, and to take their place, with the ulterior object of founding an independent kingdom in the East. Afshīn, who stood at that moment in the highest favour of the caliph, was condemned and died in prison. Motasim died a year later, January 842.

9. *Reign of Wāthiq.*—His son Wāthiq, who succeeded, though not in the least to be compared with Mamun, had yet in common with him a thirst for knowledge—perhaps curiosity would be a more appropriate term—which prompted him, as soon as he became caliph, to send the famous astronomer Mahommed b. Mūsā into Asia Minor to find out all about the Seven Sleepers which he discovered in the neighbourhood of Arabissus,[36] and Sallām the Interpreter to explore the situation of the famous wall of Gog and Magog, which he reached at the north-west frontier of China.[37] For these and other personal pursuits he raised money by forcing a number of high functionaries to disgorge their gains. In so vast an empire the governors and administrators had necessarily enjoyed an almost unrestricted power, and this had enabled them to accumulate wealth. Omar had already compelled them to furnish an account of their riches, and, when he found that they had abused their trust, to relinquish half to the state. As time went on, nomination to an office was more and more generally considered a step to wealth. During the reign of the Omayyads a few large fortunes were made thus. But with the increasing luxury after Mansur, the thirst for money became universal, and the number of honest officials lessened fast. Confiscation of property had been employed with success by Hārūn al-Rashīd after the disgrace of the Barmecides, and occasionally by his successors, but Wāthiq was the first to imprison high officials and fine them heavily on the specific charge of peculation.

The caliph also shared Mamun’s intolerance on the doctrinal question of the uncreated Koran. He carried his

zeal to such a point that, on the occasion of an exchange of Greek against Moslem prisoners in 845, he refused to receive those Moslem captives who would not declare their belief that the Koran was created. The orthodox in Bagdad prepared to revolt, but were discovered in time by the governor of the city. The ringleader Ahmad b. Naṣr al-Khozāʻī was seized and brought to Sāmarrā, where Wāthiq beheaded him in person. The only other event of importance in the reign of Wāthiq was a rising of the Arabian tribes in the environs of Medina, which the Turkish general Boghā with difficulty repressed. When he reached Sāmarrā with his prisoners, Wāthiq had just died (August 846). That the predominance of the praetorians was already established is clear from the fact that Wāthiq gave to two Turkish generals, Ashnās and Itākh respectively, the titular but lucrative supreme government of all the western and all the eastern provinces. In his days the soldiery at Sāmarrā was increased by a large division of Africans (Maghribīs).

10. *Reign of Motawakkil.*—As Wāthiq had appointed no successor the vizier Mahommed Zayyāt had cast his eye on his son Mahommed, who was still a child, but the generals Wasīf and Itākh, seconded by the upper cadi Ibn abī Da'ud, refused their consent, and offered the supreme power to Wāthiq's brother Ja'far, who at his installation adopted the name of *al-Motawakkil 'alā 'llāh* ("he who trusts in God"). The new caliph hated the vizier Zayyāt, who had opposed his election, and had him seized and killed with the same atrocious cruelty which the vizier himself had inflicted on others. His possessions, and those of others who had opposed the caliph's election, were confiscated. But the arrogance of Itākh, to whom he owed his Caliphate, became insufferable. So, with the perfidy of his race, the caliph took him off his guard, and had him imprisoned and killed at Bagdad. He was succeeded by Wasīf.

About this time an impostor named Mahmūd b. Faraj had set himself up as a prophet, claiming to be Dhu'l-Qarnain (Alexander the Great) risen from the dead. Asserting that Gabriel brought him revelations, he had contrived to attract twenty-seven followers. The caliph had him flogged, and compelled each of the twenty-seven to give him ten blows on the head with his fist. The "prophet" expired under the blows (850).

One of the first acts of Motawakkil was the release of all those who had been imprisoned for refusing to admit the dogma of the created Koran, and the strict order to abstain from any litigation about the Book of God. The upper cadi Ibn abī Da'ud, the leader of the movement against orthodoxy, who had stood in great esteem with Mamun and had fulfilled his high office under the reigns of Motasim and Wāthiq, had a stroke of paralysis in the year 848. His son Mahommed was put in his place till 851, when all the members of the family were arrested. They released themselves by paying the enormous sum of 240,000 dināars and 16,000,000 dirhems, which constituted nearly their whole fortune, and were then sent to Bagdad, where father and son died three years later. An orthodox upper cadi was named instead, and the dogma of the created Koran was declared heresy; therewith began a persecution of all the adherents of that doctrine and other Motazilite tenets. Orthodoxy triumphed, never again to lose its place as the state religion. Hand in hand with these reactionary measures came two others, one against Jews and Christians, one against the Shi'ites. The first caliph who imposed humiliating conditions on the Dhimmis, or Covenanters, who, on condition of paying a certain not over-heavy tribute, enjoyed the protection of the state and the free exercise of their cult, was Omar II., but this policy was not continued. A proposition by the cadi Abū Yūsuf to Hārūn al-Rashid to renew it had not been adopted. Motawakkil, in 850, formulated an edict by which these sectaries were compelled to wear a distinctive dress and to distinguish their houses by a figure of the devil nailed to the door, excluding them at the same time from all public employments, and forbidding them to send their children to Moslem schools. Nevertheless, he kept his Christian medical men, some of whom were high in favour. He showed his hatred for the Shi'ites by causing the mausoleum erected over the tomb of Hosain at Kerbela, together with all the buildings surrounding it, to be levelled to the ground and the site to be ploughed up, and by forbidding any one to visit the spot. A year before, a descendant of Hosain, Yahyā b. Omar, had been arrested and flogged on his orders. He escaped afterwards, rose in rebellion at Kufa in 864, and was killed in battle. It is reported that the caliph even permitted one of his buffoons to turn the person of Ali into mockery.

In the year 848-849 Ibn Ba'īth, who had rendered good service in the war against Bābak, but had for some cause been arrested, fled from Sāmarrā to Marand in Azerbaijan and revolted. Not without great difficulty Boghā, the Turkish general, succeeded in taking the town and making Ibn Ba'īth prisoner. He was brought before Motawakkil and died in prison. In the year 237 (A.D. 851-852) a revolt broke out in Armenia. Notwithstanding a vigorous resistance, Boghā subdued and pacified the province in the following year. In that same year, 852-853, the Byzantines made a descent on Egypt with 300 vessels. 'Anbasa the governor had ordered the garrison of Damietta to parade at the capital Fostāt. The denuded town was taken, plundered and burned. The Greeks then destroyed all the fortifications at the mouth of the Nile near Tinnis, and returned with prisoners and booty. The annual raids of Moslems and Greeks in the border districts of Asia Minor were attended with alternate successes, though on the whole the Greeks had the upper hand. In 856 they penetrated as far as Amid (Diārbekr), and returned with 10,000 prisoners. But in the year 859 the Greeks suffered a heavy defeat with losses of men and cattle, the emperor Michael himself was in danger, whilst the fleet of the Moslems captured and sacked Antalia. This was followed by a truce and an exchange of prisoners in the following year.

In 855 a revolt broke out in Homs (Emesa), where the harsh conditions imposed by the caliph on the Christians and Jews had caused great discontent. It was repressed after a vigorous resistance. A great many leading men were flogged to death, all churches and synagogues were destroyed and all the Christians banished.

In the year 851 the Boja (or Beja), a wild people living between the Red Sea and the Nile of Upper Egypt, the Blemmyes of the ancients, refused to pay the annual tribute, and invaded the land of the gold and emerald mines, so that the working of the mines was stopped. The caliph sent against them Mahommed al-Qommī, who subdued them in 856 and brought their king Ali Bābā to Sāmarrā before Motawakkil, on condition that he should be restored to his kingdom.

About this time Sijistan liberated itself from the supremacy of the Ṭāhirids. Ya'qūb b. Laith al-Saffār proclaimed himself amīr of that province in the year 860, and was soon after confirmed in this dignity by the caliph.

In 858 Motawakkil, hoping to escape from the arrogant patronage of Waṣīf, who had taken the place of Itākh as head of the Turkish guard, transferred his residence to Damascus. But the place did not agree with him, and he returned to Sāmarrā, where he caused a magnificent quarter to be built 3 m. from the city, which he called after his own name Ja'farīya, and on which he spent more than two millions of dinars (about £900,000). He found the means by following the example of his predecessor in depriving many officials of their ill-gotten gains. He contrived to enrol in his service nearly 12,000 men, for the greater part Arabs, in order to crush the Turks. In the

year of his elevation to the Caliphate, he had regulated the succession to the empire in his own family by designating as future caliphs his three sons, *al-Montaṣir billāh* ("he who seeks help in God"), *al-Mo'tazz billāh* ("he whose strength is of God"), and *al-Mowayyad billāh* ("he who is assisted by God"). By and by he conceived an aversion to his eldest son, and wished to supplant him by Motazz, the son of his favourite wife Qabīha. The day had been fixed on which Montasir, Waṣīf and several other Turkish generals were to be assassinated. But Waṣīf and Montasir had been informed, and resolved to anticipate him. In the night before, Shawwāl A.H. 247 (December 861), Motawakkil, after one of his wonted orgies, was murdered, together with his confidant, Fatḥ b. Khāqān. The official report, promulgated by his successor, was that Fatḥ b. Khāqān had murdered his master and had been punished for it by death. For the administrative system in this reign see MAHOMMEDAN INSTITUTIONS.

11. *Reign of Montasir.*—On the very night of his father's assassination Montasir had himself proclaimed caliph. He was a man of very feeble character, and a mere puppet in the hands of his vizier Ahmad b. Khaṣīb and the Turkish generals. He was compelled to send Wasif, the personal enemy of Ibn Khaṣīb, to the frontier for a term of four years, and then to deprive his two brothers Motazz and Mowayyad, who were not agreeable to them, of their right of succession. He died six months after, by poison, it is said.

12. *Reign of Mosta'īn.*—The Turkish soldiery, now the chief power in the state, chose, by the advice of Ibn Khaṣīb, in succession to Montasir, his cousin Ahmad, who took the title of *al-Mosta'īn billāh* ("he who looks for help to God"). In the reign of this feeble prince the Greeks inflicted serious losses on the Moslems in Asia Minor. A great many volunteers from all parts, who offered their services, were hunted down as rioters by the Turkish generals, who were wholly absorbed by their own interests. The party which had placed Mosta'īn on the throne, led by Ibn Khaṣīb and Otāmish, were soon overpowered by Waṣīf and Boghā. Ibn Khaṣīb was banished to Crete, Otāmish murdered. The superior party, however, maintained Mosta'īn on the throne, because they feared lest Motazz should take vengeance upon them for the murder of his father Motawakkil. But in the year 865 Waṣīf and Boghā fled with Mosta'īn to Bagdad, and Motazz was proclaimed caliph at Sāmarrā. A terrible war ensued; Mosta'īn was obliged to abdicate, and was killed in the following year.

In 864 a descendant of Ali, named Hasan b. Zaid, gained possession of Tabaristan and occupied the great city of Rai (Rey) near Teheran. A year later the province was reconquered by the Ṭāhirid governor of Khorasan, so that Hasan was obliged to retreat for refuge to the land of the Dailam. But he returned soon, and after many reverses ruled over Tabaristan and Jorjān for many years.

13. *Reign of Motazz.*—Motazz, proclaimed caliph at Bagdad in the first month of 252 (January 866), devoted himself to the object of freeing himself from the omnipotent Turkish generals, especially Waṣīf and Boghā, who had opposed his election. But such a task demanded an ability and energy which he did not possess. He was obliged to grant them amnesty and to recall them to Sāmarrā. He mistrusted also his brothers Mowayyad and Mowaffaq, who had interceded for them. He put the former to death and drove the latter into exile to Bagdad. Some time after he had the satisfaction of seeing Waṣīf killed by his own troops, and succeeded, a year later, in having Boghā assassinated. But a more difficult problem was the payment of the Turkish, Persian and African guards, which was said to have amounted in A.H. 252 to 200,000,000 dirhems[38] (about £6,500,000), or apparently twice the revenue derived from the land tax. As the provincial revenues annually decreased, it became impossible to pay this sum, and Ṣāliḥ the son of Waṣīf, in spite of the remonstrances of the caliph, confiscated the property of state officials. Upon a further demand, Motazz, having failed to procure money from his mother Qabīha, who was enormously rich, was seized upon and tortured, and died of starvation in prison (Shaaban 255, July 868).

The dismemberment of the empire continued fast in these years, and the caliph was compelled to recognize the virtual independence of the governors Ya'qūb the Saffārid (see SAFFĀRIDS and PERSIA, *History*, § B) in Seistan, and Ahmad b. Tūlūn in Egypt.

14. *Reign of Mohtadī.*—Immediately after the seizure of Motazz, the Turks, led by Ṣāliḥ b. Waṣīf, proclaimed as caliph one of the sons of Wāthiq with the title of al-Mohtadī billāh ("the guided by God"), who, however, refused to occupy the throne until his predecessor had solemnly abdicated. Mohtadī, who was a man of noble and generous spirit and had no lack of energy, began by applying the precarious measure of power which was left him to the reform of the court. He banished the musicians and singers, and forbade all kinds of games; he devoted himself to the administration of justice, and gave public audiences to the people for the redress of their grievances. At the same time he contrived to elevate the power of the Abnā, the descendants of those Persian soldiers who had established the dynasty of the Abbasids, in order to break the supremacy of the Turks and other mercenaries. But Mohtadī came too late, and the Turks did not leave him time to finish his work.

On the news of the conspiracy against Motazz, Mūsā, the son of the famous general Boghā,[39] then governor of Media (Jabal), ordered his deputy-general Mofliḥ to return at once from a proposed invasion of Dailam, and moved with his army towards Sāmarrā, notwithstanding the peremptory orders of the caliph. At his approach Ṣāliḥ, who was afraid of Mūsā, hid himself, but was soon discovered and killed. At that moment a Kharijite, named Mosāwir, who in 867 had risen in Mesopotamia and beaten more than one general of the government, took Balad and menaced Mosūl. Mūsā could not refuse to comply with the formal command of the caliph to march against him. During the absence of these troops, Mohtadī seems to have tried to get rid of the principal Turkish leaders. A brother of Musa and one of his best generals, Bāyikbeg (Baiekbāk), were killed, but the soldiery he had gained over for himself were not strong enough. Mohtadī was overwhelmed and killed, Rajab 256 (June 870).

15. *Reign of Motamid.*—Whether from weariness or from repentance, the Turkish soldiery discontinued for a time their hateful excesses, and their new leader, Mūsā b. Boghā, was without the greed and ambition of his predecessors. A son of Motawakkil was brought out of prison to succeed his cousin, and reigned for twenty-three years under the name of *al-Mo'tamid 'alā'llāh* ("he whose support is God"). He was a feeble, pleasure-loving monarch, but Mohtadī had regained for the Caliphate some authority, which was exercised by Obaidallah b. Khāqān, the able vizier of Mohtadī, and by Motamid's talented brother Abū Ahmad al-Mowaffaq; Mūsā b. Boghā himself remained till his death a staunch servant of the government. During the reign of Motamid great events took place. The great power long wielded by the Ṭāhirids, not only in the eastern provinces, but also at Bagdad itself, had been gradually diminishing, and came to an end in the year 873, when Ya'qūb the Saffārid occupied Nīshāpur and imprisoned Mahommed b. Ṭāhir with his whole family. The power of Ya'qūb then increased to such an extent that he was not content with the caliph's offer to recognize him as supreme in the provinces he had conquered, and military governor of Bagdad, but marched against Irak. The caliph himself, wearing the mantle and the staff of the Prophet, then went out against him, and after a vigorous resistance he was beaten by Mowaffaq, who had the command of the troops, and fled to Jondisāpūr in Khūzistān, where he died three years

later, leaving his empire to his brother ‘Amr. This prince maintained himself in power till the year 900, when he was beaten and taken prisoner by Ismā‘īl b. Ahmed the Sāmānid. The Sāmānids had been governors of Transoxiana from the time of Mamun, and after the fall of the Ṭāhirids, had been confirmed in this office by the caliph. After 287 (900) they were independent princes, and under their dominion these districts attained to high prosperity.

Motamid had also to deal with a rising of the negro slaves in the province of Basra, led by one Ali b. Mahommed, who called himself a descendant of Ali. It lasted from 869 to 883, and tasked the government to its utmost.[40]

In the west, Ahmad b. Tūlūn became a mighty prince, whose sway extended over Syria and a part of Mesopotamia. Motamid, who wished to free himself from the guardianship of his brother Mowaffaq, concerted with him a plan to emigrate to Egypt, Ahmad being himself angered against Mowaffaq on personal grounds. Motamid’s flight was stopped by his vizier Ibn Makhlad, and the caliph himself was reconducted to Sāmarrā as a prisoner in the year 882. From that time there was war between the Abbasids and the Ṭūlūnids. Ahmad died in 270 (884). His son Khomārūya succeeded him, and maintained himself in power till his death in 896, in which year his daughter was married to the caliph Motadid. Ten years later Egypt was conquered by a general of the caliph Moktafī.

During the reign of Motamid the emperor Basil I. conducted the war against the Moslems with great success, till in the year 270 (A.D. 884) his army suffered a terrible defeat near Tarsus, in which the greater part of the army, the commander Andreas, and many other patricians perished.

Motamid had appointed his son al-Mofawwid as successor to the Caliphate, and after him his brother Mowaffaq. When the latter died in the year 891, his son Aḅū ‘l-‘Abbās, *al-Mo‘taḍid* (“he who seeks his support in God”), was put in his place. Next year Mofawwid was compelled to abdicate in favour of his cousin. Shortly after Motamid died, Rajab 279 (October 892). Not long before these events, the seat of the Caliphate had been restored to Bagdad.

16. *Reign of Motadid*.—Motadid may be called, after Mansūr, the most able and energetic of all the Abbasid rulers. He took good care of the finances, reformed the administration, was an excellent commander in war, and maintained order as far as possible. The Kharijites in Mesopotamia, who for many years had molested the government, were finally crushed with the aid of their former ally Ḥamdān, who became the founder of the well-known dynasty of the Ḥamdānites. The mighty house of Abū Dolaf in the south-west of Media, which had never ceased to encroach on the Caliphate, was put down. The governor of Azerbaijan and Armenia, belonging to the powerful Turkish house of the Sājids or Sājites, whose loyalty was always doubtful, planned an invasion of Syria and Egypt. Motadid frustrated it by a quick movement. The citizens of Tarsus who were involved in the plot were severely punished. The chief punishment, however, the burning of the fleet, was a very impolitic measure, as it strengthened the hands of the Byzantines.

Almost simultaneously with the rising of the negro slaves in Basra there arose in the province of Kūfa the celebrated sect of the Carmathians (*q.v.*), Fātimites[41] or Isma‘ilites. This powerful sect, which save for a difference of opinion would have joined the negro rising, remained outwardly quiet during Motamid’s reign, but under Motadid the government began to have misgivings about them. Abū Sa‘īd al-Jannābī, who had founded a Carmathian state in Bahrein, the north-eastern province of Arabia (actually called Laḥsā), which could become dangerous for the pilgrim road as well as for the commerce of Basra, in the year 900 routed an army sent against him by Motadid, and warned the caliph that it would be safer to let the Carmathians alone. In the same year the real chief of the sect, whose abode had been discovered by the caliph, fled from Salamia in Syria, where he lived, to Africa, and hid himself at Sijilmāsa (in Tafilalt) in the far west, whence he reappeared ten years later at Kairawan as the Mahdi, the first caliph of the Fatimites.[42]

Motadid died in Rabia II. A.H. 289 (March 902), leaving the Caliphate to his son *al-Moktāfī billāh* (“he who sufficeth himself in God”).

17. *Reign of Moktafi*.—Moktafi inherited his father’s intrepidity, and seems to have had high personal qualities, but his reign of six years was a constant struggle against the Carmathians in Syria, who defeated the Syrian and Egyptian troops, and conquered Damascus and other cities. Moktafi led his troops in person, and his general, Mahommed b. Suleimān, gained a signal victory. Three of their chiefs were taken and put to death. But, to avenge their defeat, they lay in wait for the great pilgrim caravan on its return from Mecca in the first days of 294 (906), and massacred 20,000 pilgrims, making an immense booty. This horrible crime raised the whole Moslem world against them. Zikrūya their chief was defeated at last and perished.

After the defeat of the Syrian Carmathians, Mahommed b. Suleimān was sent by the caliph to Egypt, where he overthrew the dominion of the Tūlūnids. ‘Īsā b. Mahommed al-Naushari was made governor in their stead (905).

The war with the Byzantines was conducted with great energy during the reign of Moktafi. In the year 905 the Greek general Andronicus took Marash, and penetrated as far as Haleb (Aleppo), but the Moslems were successful at sea, and in 907 captured Iconium, whilst Andronicus went over to the caliph’s side, so that the Byzantine emperor sent an embassy to Bagdad to ask for a truce and an exchange of prisoners.

18. *Reign of Moqtadir*.—The sudden death of Moktafi, Dhu‘l-qa‘da 295 (August 908), was a fatal blow to the prestige of the Caliphate, which had revived under the successive governments of Mowaffaq, Motadid and himself. The new caliph, *al-Moqtadir billāh* (“the powerful through God”), a brother of Moktafi, was only thirteen years of age when he ascended the throne. Owing to his extreme youth many of the leading men at Bagdad rebelled and swore allegiance to Abdallah, son of the former caliph Motazz, a man of excellent character and of great poetical gifts; but the party of the house of Motadid prevailed, and the rival caliph was put to death. Moqtadir, though not devoid of noble qualities, allowed himself to be governed by his mother and her ladies and eunuchs. He began by squandering the 15,000,000 dinars which were in the treasury when his brother died in largesses to his courtiers, who, however, merely increased their demands. His very able vizier, the noble and disinterested Ali b. ‘Īsā, tried to check this foolish expenditure, but his efforts were more than counterbalanced by the vizier Ibn abi‘l-Forāt and the court. The most shameless bribery and the robbery of the well-to-do went together with the most extravagant luxury. The twenty-four years of Moqtadir’s reign are a period of rapid decay. The most important event in the reign was the foundation of the Fātimite dynasty, which reigned first in the Maghrib and then in Egypt for nearly three centuries (see Fatimites and Egypt: *History*, “Mahommedan”).

Far more dangerous, however, for the Caliphate of Bagdad at the time were the Carmathians of Bahrein, then guided by Abu Ṭāhir, the son of Abu Sa'īd Jannābi. In 311 (A.D. 923) they took and ransacked Basra; in the first month of the following year the great pilgrim caravan on its return from Mecca was overpowered; 2500 men perished, while an even larger number were made prisoners and brought to Lahsā, the residence of the Carmathian princes, together with an immense booty. The caravan which left Bagdad towards the end of this year returned in all haste before it had covered a third of the way. Then Kufa underwent the fate that had befallen Basra. In 313 (A.D. 926) the caravan was allowed to pass on payment of a large sum of money. The government of Bagdad resolved to crush the Carmathians, but a large army was utterly defeated by Abu Ṭāhir in 315 (927), and Bagdad was seriously threatened. Next year Mecca was taken and plundered; even the sacred Black Stone was transported to Lahsā, where it remained till 339 (950), when by the express order of the Imām, the Fātimite caliph, it was restored to the Ka'ba.

In 317 (929) a conspiracy was formed to dethrone Moqtadir, to which Mūnis, the chief commander of the army, at first assented, irritated by false reports. Very soon he withdrew, and though he could not prevent the plundering of the palace, and the proclamation as caliph of another son of Motadid with the title *al-Qāhir billāh* ("the victorious through God"), he rescued Moqtadir and his mother, and at the same time his imprisoned friend Ali b. 'Īsā, and brought them to his own house. A few days later, a counter-revolution took place; the leaders of the revolt were killed, and Moqtadir, against his wish, was replaced on the throne. In 320 (A.D. 932) Mūnis, discovering a court intrigue against him, set out for Mosul, expecting that the Hamdānids, who owed to him their power, would join him. Instead of doing this, they opposed him with a numerous army, but were defeated. Mūnis took Mosul, and having received reinforcements from all parts, marched against Bagdad. The caliph, who wished nothing more than to be reconciled to his old faithful servant, was forced to take arms against him, and fell in battle Shawwāl 320 (October 932), at the age of 38 years. His reign, which lasted almost twenty-five years, was in all respects injurious to the empire.

19. *Reign of Qāhir*.—After the victory Mūnis acted with great moderation and proclaimed a general amnesty. His own wish was to call Abu Ahmad, a son of Moktafi, or a son of Moqtadir, to the Caliphate, but the majority of generals preferring Qāhir because he was an adult man and had no mother at his side, he acquiesced, although he had a personal dislike for him, knowing his selfish and cruel character. Qāhir was a drunkard, and derived the money for his excesses from promiscuous confiscation. He ill-treated the sons of Moqtadir and Abu Ahmad, and ultimately assassinated his patrons Mūnis and Yalbak, whose guardianship he resented. In Jomada I. 322 (April 934) he was dethroned and blinded, and died in poverty seven years later.

During the last years of Moqtadir and the reign of Qāhir a new dynasty rose. Būya, the chief of a clan of the Dailam, a warlike people who inhabit the mountainous country south-west of the Caspian Sea, had served under the Sāmānids, and found a footing in the south of Media (Jabal), whence his three sons— well known under the titles they assumed at a later period: 'Imād addaula ("prop of the dynasty"), Rokn addaula ("pillar of the dynasty"), and Mo'izz addaula ("strengthener of the dynasty")—succeeded in subduing the province of Fārs, at the time of Qāhir's dethronement (see PERSIA: *History*).

20. *Reign of Radi*.—Moqtadir's son, who was then proclaimed caliph under the name of *ar-Rādī billāh* ("the content through God"), was pious and well-meaning, but inherited only the shadow of power. The vizier Ibn Moqla tried to maintain his authority at least in Irak and Mesopotamia, but without success. The treasury was exhausted, the troops asked for pay, the people in Bagdad were riotous. In this extremity the caliph bade Ibn Rāiq, who had made himself master of Basra and Wāsit, and had command of money and men, to come to his help. He created for him the office of Amīr al-Omarā, "Amir of the Amirs," which nearly corresponds to that of Mayor of the Palace among the Franks.[43] Thenceforth the worldly power of the Caliphate was a mere shadow. The empire was by this time practically reduced to the province of Bagdad; Khorasan and Transoxiana were in the hands of the Sāmānids, Fārs in those of the Būyids; Kirman and Media were under independent sovereigns; the Hāmdānids possessed Mesopotamia; the Sājids Armenia and Azerbaijan; the Ikshīdites Egypt; as we have seen, the Fātimites Africa, the Carmathians Arabia. The Amir al-Omarā was obliged to purchase from the latter the freedom of the pilgrimage to Mecca, at the price of a disgraceful treaty.

During the troubles of the Caliphate the Byzantines had made great advances; they had even taken Malatia and Samosata (Samsat). But the great valour of the Hamdanid prince Saif-addaula checked their march. The Greek army suffered two severe defeats and sued for peace.

21. *Reign of Mottaqi*.—Radi died in Rabia I. A.H. 329 (December 940). Another son of Moqtadir was then proclaimed caliph under the name of *al-Mottaqī billāh* ("he who guards himself by God"). At the time of his accession the Amīr al-Omarā was the Turkish general Bajkam, in whose favour Ibn Rāiq had been obliged to retire. Unfortunately Bajkam died soon after, and his death was followed by general anarchy. A certain Barīdī, who had carved out for himself a principality in the province of Basra, marched against Bagdad and made himself master of the capital, but was soon driven out by the Dailamite general Kūrtakīn. Ibn Rāiq came back and reinstated himself as Amīr al-Omarā. But Barīdī again laid siege to Bagdad, and Mottaqi fled to Nāsir addaula the Hamdānid prince of Mosul, who then marched against Bagdad, and succeeded in repelling Barīdī. In return he obtained the office of Amīr al-Omarā. But the Dailamite and Turkish soldiery did not suffer him to keep this office longer than several months. Tūzūn, a former captain of Bajkam, compelled him to return to Mosul and took his place. Mottaqi fled again to Mosul and thence to Rakka. The Ikshīd, sovereign of Egypt and Syria, offered him a refuge, but Tūzūn, fearing to see the caliph obtain such powerful support, found means to entice him to his tent, and had his eyes put out, Saphar 333 (October 944).

22. *Reign of Mostakfi*.—As successor Tūzūn chose *al-Mostakfī billāh* ("he who finds full sufficiency with God"), a son of Moktafi. This prince, still more than his predecessors, was a mere puppet in the hands of Tūzūn, who died a few months later, and his successor Ibn Shīrzād. Such was the weakness of the caliph that a notorious robber, named Hamdī, obtained immunity for his depredations by a monthly payment of 25,000 dinars. One of the Būyid princes, whose power had been steadily increasing, marched about this time against Bagdad, which he entered in Jomada I. A.H. 334 (December 945), and was acknowledged by the caliph as legal sovereign, under the title of Sultan. He assumed at this time the name of Mo'izz addaula. Mostakfi was soon weary of this new master, and plotted against him. At least Mo'izz addaula suspected him and deprived him of his eyesight, Jomada II. A.H. 334 (January 946). There were thus in Bagdad three caliphs who had been dethroned and blinded, Qāhir, Mottaqi and Mostakfi.

23. *Reign of Moti*.—Mo'izz addaula soon abandoned his original idea of restoring the title of caliph to one of the

descendants of Ali, fearing a strong opposition of the people, and also dreading lest this should lead to the recovery by the caliphs of their former supremacy. His choice fell on a son of Moqtadir, who took the title of *al-Moti' billāh* ("he who obeys God"). The sultan, reserving to himself all the powers and revenues of the Caliphate, allowed the caliph merely a secretary and a pension of 5000 dirhems a day. Though in public prayers and on the coins the name of the caliph remained as that of the supreme authority, he had in reality no authority out of the palace, so that the saying became proverbial, "he contents himself with sermon and coin."

The Hamdānid prince of Mosul, who began to think his possessions threatened by Mo'izz addaula, tried without success to wrest Bagdad from him, and was obliged to submit to the payment of tribute. He died in 358 (A.D. 969), and ten years later the power of this branch of the Hamdanids came to an end. The representative of the other branch, Saif addaula, the prince of Haleb (Aleppo), conducted the war against the Byzantines with great valour till his death in 356 (A.D. 967), but could not stop the progress of the enemy. His descendants maintained themselves, but with very limited power, till A.H. 413 (A.D. 1022).

Mo'izz addaula died in the same year as Saif addaula, leaving his power to his son Bakhtiyār 'Izz addaula, who lacked his father's energy and loved pleasure more than business.

While the Abbāsid dynasty was thus dying out in shame and degradation, the Fātimites, in the person of Mo'izz li-dīn-allah (or Mo'izz Abu Tamin Ma'add) ("he who makes God's religion victorious"), were reaching the highest degree of power and glory in spite of the opposition of the Carmathians, who left their old allegiance and entered into negotiations with the court of Bagdad, offering to drive back the Fātimites, on condition of being assisted with money and troops, and of being rewarded with the government of Syria and Egypt. The former condition was granted, but the caliph emphatically refused the latter demand, saying: "Both parties are Carmathians, they profess the same religion and are enemies of Islam." The Carmathians drove the Fātimites out of Syria, and threatened Egypt, but, notwithstanding their intrepidity, they were not able to cope with their powerful rival, who, however, in his turn could not bring them to submission. In 978-979 peace was made on condition that the Carmathians should evacuate Syria for an annual payment of 70,000 dinars. But the losses sustained by the Carmathians during that struggle had been enormous. Their power henceforward declined, and came to an end in A.H. 474 (A.D. 1081).

Mo'izz addaula, as we have seen, professed a great veneration for the house of Ali. He not only caused the mourning for the death of Hosain and other Shi'ite festivals to be celebrated at Bagdad, but also allowed imprecations against Moawiya and even against Mahomet's wife Ayesha and the caliphs Abu Bekr, Omar and Othman, to be posted up at the doors of the mosques. These steps annoyed the people and the Turkish soldiery, who were Sunnites, and led at last to an insurrection. Moti was compelled to abdicate, and Bakhtiyār was driven out of Bagdad Dhu'l-qa'da 363 (August 974).

24. *Reign of Tai.*—Moti left the empty title of caliph to his son *al-Tā'i li-amri'llāh* ("the obedient to the command of God"). The Turks who had placed him on the throne could not maintain themselves, but so insignificant was the person of the caliph that 'Adod addaula, who succeeded his cousin Bakhtiyār in Bagdad, did not think of replacing him by another. Under this prince, or king, as he was called, the power of the Būyids reached its zenith. His empire stretched from the Caspian to the Persian Sea, and in the west to the eastern frontier of Syria. He did his best to remedy the misery caused by the intestine Wars, repaired the ruined mosques and other public edifices, founded hospitals and libraries—his library in Shirāz was one of the wonders of the world—and improved irrigation. It was also he who built the mausoleum of Hosain at Kerbela, and that of Ali at Kufa. But after his death in the year 372 (A.D. 983), his sons, instead of following the example of their predecessors, the three sons of Būya, fought one against the other. In 380 (A.D. 990) the youngest of them, Bahā addaula, had the upper hand. This prince, who was as avaricious as he was ambitious, wishing to deprive the caliph Ta'i of his possessions, compelled him to abdicate A.H. 381 (A.D. 991).

25. *Reign of Qādir.*—A grandson of Moqtadir was then made caliph under the name of *al-Qādir billāh* ("the powerful through God"). The only deed of power, however, that is recorded of him, is that he opposed himself to the substitution of a Shi'ite head cadi for the Sunnite, so that Bahā addaula had to content himself with giving to the Shi'ites a special judge, to whom he gave the title of *naqīb* (superintendent). During this caliphate the Būyid princes were in continual war with one another. Meanwhile events were preparing the fall of their dynasty. In 350 (A.D. 961) a Turkish general of the Sāmānids had founded for himself a principality in Ghazni, arid at his death in 366 (A.D. 976) his successor Sabuktagin had conquered Bost in Sijistān and Qosdār in Baluchistan, beaten the Indian prince Diaya Pala, and been acknowledged as master of the lands west of the Indus. At his death in 387 his son Mahmud conquered the whole of Khorasan and Sijistān, with a great part of India. He then attacked the Būyids, and would have destroyed their dynasty but for his death in the year 421 (A.D. 1030).

In 389 (A.D. 999) Ilek-khān, the prince of Turkistan, took Bokhārā and made an end to the glorious state of the Sāmānids, the last prince of which was murdered in 395 (A.D. 1005). The Sāmānids had long been a rampart of the Caliphate against the Turks, whom they held under firm control. From their fall dates the invasion of the empire by that people. The greatest gainer for the moment was Mahmūd of Ghazni. In Mesopotamia and Irak several petty states arose on the ruins of the dominions of the Hamdānids and of the Abbasids.

Qādir died in the last month of A.H. 422 (November 1031). He is the author of some theological treatises.

26. *Reign of Qāim.*—He was succeeded by his son, who at his accession took the title of *al-Qāim bi-amri'llāh* ("he who maintains the cause of God"). During the first half of his long reign took place the development of the power of the Ghūzz, a great Turkish tribe, who took the name Seljuk from Seljuk their chief in Transoxiana. Already during the reign of Mahmūd large bodies had passed the Oxus and spread over Khorasan and the adjacent countries. In the time of his successor the bulk of the tribe followed, and in the year 429 (A.D. 1038) Toghrul Beg, their chief, beat the army of the Ghaznevids and made his entry into Nishapur. Thenceforth this progress was rapid (see SELJUKS). The situation in Bagdad had become so desperate that the caliph called Toghrul to his aid. This prince entered Bagdad in the month of Ramadan A.H. 447 (December 1055), and overthrew finally the dynasty of the Būyids.[44] In 449 (A.D. 1058) the caliph gave him the title of "King of the East and West." But in the following year, 450, during his absence, the Shi'ites made themselves masters of the metropolis, and proclaimed the Caliphate of the Fātimite prince Mostansir. They were soon overthrown by Toghrul, who was now supreme, and compelled the caliph to give him his daughter in marriage. Before the marriage, however, he died, and was succeeded by his nephew Alp Arslān, who died in 465 (25th December) (A.D. 1072). Qāim died two years later, Shaaban A.H. 467 (April 1075).

In the year 440 Mo'izz b. Bādīs, the Zeirid ruler of the Maghrib, made himself independent, and substituted in prayer the name of the Abbasid caliph for that of Mostansir. In order to punish him, the latter gave permission to the Arab tribes in Egypt to cross the Nile, and granted them possession of all the lands they should conquer. This happened in 442 (A.D. 1050) and was of the greatest significance for the subsequent fate of Africa.

27. *Reign of Moqtadi.*—In the first year of the Caliphate of *al-Moqtadī bi-amri'llāh* ("he who follows the orders of God"), a grandson of Qāim, the power of the Seljuk empire reached its zenith. All the eastern provinces, a great part of Asia Minor, Syria with the exception of a few towns on the shore, the main part of West Africa acknowledged the caliph of Bagdad as the Imām. Yemen had been subjected, and at Mecca and Medina his name was substituted in the public prayers for that of the Fātimite caliph. But after the death of Malik-Shah a contest for the sultanate took place. The caliph, who had in 1087 married the daughter of Malik-Shah, had been compelled two years after to send her back to her father, as she complained of being neglected by her husband. Just before his death, the Sultan had ordered him to transfer his residence from Bagdad to Basra. After his death he stayed and supported the princess Turkān Khātūn. This lost him his life. The day after Barki-yāroq's triumphant entry into Bagdad, Muharram 487 (February 1094), he died suddenly, apparently by poison.

28. *Reign of Mostazhir.*—*Al-Mostazhir billāh* ("he who seeks to triumph through God"), son of Moqtadi, was only sixteen years old when he was proclaimed caliph. His reign is memorable chiefly for the growing power of the Assassins (*q.v.*) and for the first Crusade (see Crusades). The Seljuk princes were too much absorbed by internal strife to concentrate against the new assailants. After the death of Barkiyāroq in November 1104, his brother Mahommed reigned till April 1118. His death was followed about four months later by that of Mostazhir.

29. *Reign of Mostarshid.*—*Al-Mostarshid billāh* ("he who asks guidance from God"), who succeeded his father in Rabia II. 512 (August 1118), distinguished himself by a vain attempt to reestablish the power of the caliph. Towards the end of the year 529 (October 1134) he was compelled to promise that he would confine himself to his palace and never again take the field. Not long after he was assassinated. About the same time Dobais was killed, a prince of the family of the Banu Mazyad, who had founded the Arabian state of Hillah in the vicinity of the ruins of Babel in 1102.

30. *Reign of Rāshid.*—*Al-Rāshid billāh* ("the just through God") tried to follow the steps of his father, with the aid of Zengī, the prince of Mosul. But the sultan Mas'ūd beat the army of the allies, took Bagdad and had Rāshid deposed (August 1136). Rāshid escaped, but was murdered two years later.

31. *Reign of Moqtafi.*—His successor *Al-Moqtafi li-amri'llāh* ("he who follows the orders of God"), son of Mostazhir, had better success. He was real ruler not only of the district of Bagdad, but also of the rest of Irak, which he subdued by force. He died in the month of Rabia II. 555 (March 1160). Under his reign the central power of the Seljuks was rapidly sinking. In the west of Atabeg (prince's guardian) Zengī, the prince of Mosul, had extended his dominion over Mesopotamia and the north of Syria, where he had been the greatest defender of Islam against the Franks. At his death in the year 541 (A.D. 1146), his noble son, the well-known Nūreddīn, who was called "the just king," continued his father's glorious career. Transoxiana was conquered by the heathen hordes of Khatā, who towards the end of 535 (A.D. 1141) under the king Ghurkhān defeated the great army of the Seljuk prince and compelled the Turkish tribes of the Ghuzz to cross the Oxus and to occupy Khorasan.

32. *Reign of Mostanjid.*—*Al-Mostanjid billāh* ("he who invokes help from God"), the son of Moqtafi, enlarged the dominion of the Caliphate by making an end to the state of the Mazyadites in Hillah. His allies were the Arabic tribe of the Montafiq, who thenceforth were powerful in southern Irak. The greatest event towards the end of his Caliphate was the conquest of Egypt by the army of Nūreddīn, the overthrow of the Fātimite dynasty, and the rise of Saladin. He was killed by his majordomo in Rabia II. 566 (December 1170).

33. *Reign of Mostadi.*—His son and successor *al-Mostadī' bi-amri'llāh* ("he who seeks enlightenment by the orders of God "), though in Egypt his name was now substituted in public prayers for that of the Fātimite caliph, was unable to obtain any real authority. By the death of Nūreddīn in 569 (A.D. 1174) Saladin's power became firmly rooted. The dynasty founded by him is called that of the Ayyūbites, after the name of his father Ayyūb. Mostadi died in the month of Dhu'l-qa'da 575 (March 1180).

34. *Reign of Nāsir.*—Quite a different man from his father was his successor *al-Nāsir li-dīni'llāh* ("he who helps the religion of God"). During his reign Jerusalem was reconquered by Saladin, 27 Rajab 583 (October 2nd, 1187). Not long before that event the well-known Spanish traveller Ibn Jubair visited the empire of Saladin, and came to Bagdad in 580, where he saw the caliph himself. Nāsir was very ambitious; he had added Khūzistān to his dominions, and desired to become also master of Media (Jabal, or Persian Irak, as it was called in the time of the Seljuks). Here, however, he came into conflict with the then mighty prince of Khwārizm (Khīva), who, already exasperated because the caliph refused to grant him the honours he asked for, resolved to overthrow the Caliphate of the Abbasids, and to place a descendant of Ali on the throne of Bagdad. In his anxiety, Nāsir took a step which brought the greatest misery upon western Asia, or at least accelerated its arrival.

In the depths of Asia a great conglomeration of east Turkish tribes (Tatars or Mongols), formed by a terrible warrior, known under his honorific title Jenghiz Khān, had conquered the northern provinces of China, and extended its power to the frontiers of the Transoxianian regions. To this heathen chief the Imām of the Moslems sent a messenger, inducing him to attack the prince of Khwārizm, who already had provoked the Mongolian by a disrespectful treatment of his envoys. Neither he nor the caliph had the slightest notion of the imminent danger they conjured up. When Nāsir died, Ramadan 622 (October 1225), the eastern provinces of the empire had been trampled down by the wild hordes, the towns burned, and the inhabitants killed without mercy.

35. *Reign of Zāhir.*—*Al-Zāhir bi-amri'llāh* ("the victorious through the orders of God") died within a year after his father's death, in Rajab 623 (July 1226). He and his son and successor are praised as beneficent and just princes.

36. *Reign of Mostansir.*—*Al-Mostansir billāh* ("he who asks help from God") was caliph till his death in Jornada II. 640 (December 1242). In the year 624 (1227) Jenghiz Khān died, but the Mongol invasion continued to advance with immense strides. The only man who dared, and sometimes with success, to combat them was Jelaleddin, the ex-king of Khwārizm, but after his death in 628 (A.D. 1231) all resistance was paralysed.

37. *Reign of Mostasim.*—*Al-Mosta'ṣim billāh* ("he who clings to God for protection"), son of Mostansir, the last caliph of Bagdad, was a narrow-minded, irresolute man, guided moreover by bad counsellors. In the last month of the year 653 (January 1256) Hulaku or Hulagu, the brother of the gteat khān of the Mongols, crossed the Oxus,

and began by destroying all the strongholds of the Ismā'īlīs. Then the turn of Bagdad came. On the 11th of Muharram 656 (January 1258) Hulaku arrived under the walls of the capital. In vain did Mostasim sue for peace. Totally devoid of dignity and heroism, he ended by surrendering and imploring mercy from the barbarian victor. On the 4th of Saphar (February 10th) he came with his retinue into the camp. The city was then given up to plunder and slaughter; many public buildings were burnt; the caliph, after having been compelled to bring forth all the hidden treasures of the family, was killed with two of his sons and many relations. With him expired the eastern Caliphate of the Abbasids, which had lasted 524 years, from the entry of Abu'I-Abbas into Kufa.

In vain, three years later, did Abu'I-Qasim Ahmad, a scion of the race of the Abbasids, who had taken refuge in Egypt with Bibars the Mameluke sultan, and who had been proclaimed caliph under the title *al-Mostanṣir billāh* ("he who seeks help from God"), make an effort to restore a dynasty which was now for ever extinct. At the head of an army he marched against Bagdad, but was defeated and killed before he reached that city. Then another descendant of the Abbasids, who also had found an asylum in Egypt, was proclaimed caliph at Cairo under the name of *al-Hākim bi-amrillāh* ("he who decides according to the orders of God"). His sons inherited his title, but, like their father, remained in Egypt without power or influence (see Egypt: *History*, "Mahommedan period"). This shadow of sovereignty continued to exist till the conquest of Egypt by the Turkish sultan Selim I., who compelled the last of them, Motawakkil, to abdicate in his favour (see Turkey: *History*). He died at Cairo, a pensionary of the Ottoman government, in 1538.

Another scion of the Abbasid family, Mahommed, a great-grandson of the caliph Mostansir, found at a later period a refuge in India, where the sultan of Delhi received him with the greatest respect, named him Makhdumzādeh, "the Master's son," and treated him as a prince. Ibn Batūta saw him when he visited India, and says that he was very avaricious. On his return to Bagdad the traveller found there a young man, son of this prince, who gained a single dirhem daily for serving as imām in a mosque, and did not get the least relief from his rich father. It seems that this Mahommed, or his son, emigrated later to Sumatra, where in the old Samūtra the graves of their descendants have been lately discovered.

(M. J. de G.)

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1 Throughout this article, well-known names of persons and places appear in their most familiar forms, generally without accents or other diacritical signs. For the sake of homogeneity the articles on these persons or places are also given under these forms, but in such cases, the exact forms, according to the system of transliteration adopted, are there given in addition.

2 See Noldeke, *Beiträge zur Kenntniss der Poesie der alten Araber* (1864), pp. 89 seq.

3 De Goeje, *Mémoires d'hist. et de géog. orient.* No. 2 (2nd ed., Leiden, 1864); Nöldeke, *D.M.Z.*, 1875, p. 76 sqq.; Balādhurī 137.

4 The accounts differ; see Balādhurī 305. The chronology of the conquests is in many points uncertain.

5 Balādhurī 315 sq.; Tabarī. i. 1068.

6 He sought to make the whole nation a great host of God; the Arabs were to be soldiers and nothing else. They were forbidden to acquire landed estates in the conquered countries; all land was either made state property or was restored to the old owners subject to a perpetual tribute which provided pay on a splendid scale for the army.

7 Nöldeke, *Tabari*, 246. To Omar is due also the establishment of the Era of the Flight (Hegira).

8 Even in the list of the slain at the battle of Honain the Emigrants are enumerated along with the Meccans and Koreish, and distinguished from the men of Medina.

9 It was the same opposition of the spiritual to the secular nobility that afterwards showed itself in the revolt of the sacred cities against the Omayyads. The movement triumphed with the elevation of the Abbasids to the throne. But, that the spiritual nobility was fighting not for principle but for personal advantage was as apparent in Ali's hostilities against Zobair and Ṭalḥa, as in that of the Abbasids against the followers af Ali.

10 Or, at least, so they thought. The history of the letter to 'Abdallah b. abī Sarḥ seems to have been a trick played on the caliph, who suspected Ali of having had a hand in it.

11 Ma'ad is in the genealogical system the father of the Moḍar and the Rab'īa tribes. Qais is the principal branch of the Moḍar.

12 The Arabs always call them Rūm, *i.e.* Romans.

13 A single genealogist, Abu Yaqazān, says that he was a legitimate son of Abu Sofiān, and that his mother was Asmā, daughter of A'war. But all others call his mother Somayya, who is said to have been a slave-girl of Hind, the wife of Abu Sofiān, and who became later also the mother of Abu Bakra. We cannot make out whether Abu Sofiān acknowledged him as his son or not. At a later period, the Abbasid caliph Mahdi had the names of Ziyād and his descendants struck off the rolls of the Koreish; but, after his death, the persons concerned gained over the chief of the rolls office, and had their names replaced in the lists (see Tabari iii. 479).

14 Aghāni xx. p. 13, Ibn abi Osaibia i. p. 118.

15 Tabari ii. p. 82.

16 See Chodzko, *Théâtre persan* (Paris, 1878).

17 Dozy took *communis* for a gloss to *civiliter*

18 Formerly the capital of the homonymous province of Syria; it lies a day's march west from Haleb (Aleppo).

19 This account of the conquest is based partly on the researches of Dozy, but mainly on those of Saavedra in his *Estudio sobre la Invasion de los Arabes en España* (Madrid, 1892). Some of the details, however, *e.g.* the battle near Tamames and the part played by the sons of Witiza, are based, not on documentary evidence, but on probable inferences. For other accounts of the deaths of Musa and Abdalaziz see Sir Wm. Muir, *Caliphate* (London, 1891), pp. 368-9.

20 Solaiman is the Arabic form of Solomon. The prophecy is to be found in the *Kitāb al-Oyūn*, p. 24; cf. Tabari ii. p. 1138.

21 Seyid Ameer Ali, *A Critical Examination of the Life and Teachings of Mahomet*, pp. 341-343.

22 Cf. Van Vloten, *Recherches sur la domination arabe, le Chiitisme et les croyances messianiques sous le Khalifat des Omayades* (Amsterdam, 1894), p. 63 seq.

23 Cf. Wellhausen, *Die Kampfe der Araber mit den Rom. in der Zeit der Umaijiden* (Göttingen, 1901), p. 31.

24 Bayān i. p. 42; Dozy, *Histoire des musulmans d'Espagne*, i. p. 246, names the place Bacdoura or Nafdoura, the Spanish

chronist Nauam.

25 Dozy i. p. 268.

26 Merwan has been nicknamed *al-Ja'di* and *al-Ḥimār* (the Ass). As more than one false interpretation of these names has been given, it is not superfluous to cite here Qaisarānī (ed. de Jong, p. 31), who says on good authority that a certain al-Ja'd b. Durham, killed under the reign of Hishām for heretical opinions, had followers in Mesopotamia, and that, when Merwan became caliph, the Khorasanians called him a Ja'd, pretending that all'Ja'd had been his teacher. As to al-Ḥimār this was substituted also by the Khorasanians for his usual title, al-Faras, "the race-horse."

27 The Arabic word for "shedder of blood," *as-Saffāh*, which by that speech became a name of the caliph, designates the liberal host who slaughters his camels for his guests. European scholars have taken it unjustly in the sense of the bloodthirsty, and found in it an allusion to the slaughter of the Omayyads and many others. At the same time, it was not without much bloodshed that Abū'l-Abbas finally established his power.

28 The rule of the caliphs in Morocco, which had never been firmly established, had already, in 740, given place to that of independent princes (see MOROCCO, *History*).

29 This Hāshimīya near Kufa is not to be confused with that founded by Abu'l-Abbas near Anbar.

30 Cf. G. le Strange, *Baghdad during the Abbasid Caliphate* (Oxford, 1900).

31 Tabari iii. p. 443 seq.

32 The first citizens of Medina who embraced Islam were called Anṣār ("helpers").

33 On this event, see a remarkable essay by Barbier de Meynard in the *Journal Asiatique* for March-April, 1869.

34 Cf. W.M. Patton, *Ahmed ibn Hanbal and the Mihna* (Leiden, 1897); and article MAHOMMEDAN RELIGION.

35 See M.J. de Goeje, *Memoire sur les migrations des Ziganes travers l'Asie* (Leiden, 1903); also GIPSIES.

36 See M.J. de Goeje, "De legende der Zevenslapers van Efeze," *Versl. en Meded. der K. Akad. v. Wetensch. Afd. Letterk.* 4e Reeks, iii., 1900.

37 See M.J. de Goeje, "De muur van Gog en Magog," *Versl. en Meded.* 3e Reeks, v., 1888.

38 "Dinars" in the text of Tabari iii. 1685, must be an error for "dirhems."

39 This Boghā was called al-Kabir, or major; the ally of Waṣīf, a man of much inferior consideration, al-Saghir, or minor.

40 See Nöldeke, *Orientalische Skizzen*, pp. 155 seq.

41 For the connexion between Carmathians and Fatimites see under FATIMITES.

42 M.J. de Goeje, *Mémoire sur les Carmathes du Bahraïn et les Fatimides* (Leiden, 1886).

43 See Defrémery, *Mémoire sur les Emirs al-Omara* (Paris, 1848).

44 Henceforward the history of the Caliphate is largely that of the Seljuk princes (see SELJUKS).

CALIVER, a firearm used in the 16th century. The word is an English corruption of "calibre," and arises from the "arquebus of calibre," that is, of standard bore, which replaced the older arquebus. "Caliver," therefore, is practically synonymous with "arquebus." The heavier musket, fired from a rest, replaced the caliver or arquebus towards the close of the century.

CALIXTUS, or CALLISTUS, the name of three popes.

CALIXTUS I., pope from 217 to 222, was little known before the discovery of the book of the *Philosophumena*. From this work, which is in part a pamphlet directed against him, we learn that Calixtus was originally a slave and engaged in banking. Falling on evil times, he was brought into collision with the Jews, who denounced him as a Christian and procured his exile to Sardinia. On his return from exile he was pensioned by Pope Victor, and, later, was associated by Pope Zephyrinus in the government of the Roman church. On the death of Zephyrinus (217) he was elected in his place and occupied the papal chair for five years. His theological adversary Hippolytus, the author of the *Philosophumena*, accused him of having favoured the medalist or Patripassian doctrines both before and after his election. Calixtus, however, condemned Sabellius, the most prominent champion of that system. Hippolytus accused him also of certain relaxations of discipline. It appears that Calixtus reduced the penitential severities applied until his time to those guilty of adultery and other analogous sins. Under Calixtus and his two immediate successors, Hippolytus was the leader of a schismatic group, organized by way of protest against the election of Calixtus. Calixtus died in 222, in circumstances obscured by legends. In the time of Constantine the Roman church reckoned him officially among the martyr popes.

(L. D.*)

CALIXTUS II. (d. 1124), pope from 1119 to 1124, was Guido, a member of a noble Burgundian family, who became archbishop of Vienne about 1088, and belonged to the party which favoured reform in the Church. In September 1112, after Pope Paschal II. had made a surrender to the emperor Henry V., Guido called a council at Vienne, which declared against lay investiture, and excommunicated Henry. In February 1119 he was chosen pope at Cluny in succession to Gelasius II., and in opposition to the anti-pope Gregory VIII., who was in Rome. Soon after his consecration he opened negotiations with the emperor with a view to settling the dispute over investiture. Terms of peace were arranged, but at the last moment difficulties arose and the treaty was abandoned; and in October 1119 both emperor and anti-pope were excommunicated at a synod held at Reims. The journey of Calixtus to Rome early in 1120 was a triumphal march. He was received with great enthusiasm in the city, while Gregory, having fled to Sutri, was delivered into his hands and treated with great ignominy. Through the efforts

of some German princes negotiations between pope and emperor were renewed, and the important Concordat of Worms made in September 1122 was the result. This treaty, made possible by concessions on either side, settled the investiture controversy, and was confirmed by the Lateran council of March 1123. During his short reign Calixtus strengthened the authority of the papacy in southern Italy by military expeditions, and restored several buildings within the city of Rome. During preparations for a crusade he died in Rome on the 13th or 14th of December 1124.

See M. Maurer, *Pabst Calixt II.* (Munich, 1889); U. Robert, *Hisloire du pape Calixte II.* (Paris, 1891); and A. Hauck's *Realencyklopädie*, Band iii. (Leipzig, 1897).

CALIXTUS III. (*c.* 1378-1458), pope from 1455 to 1458, was a Spaniard named Alphonso de Borgia, or Borja. A native of Xativa, he gained a great reputation as a jurist, becoming professor at Lerida; in 1429 he was made bishop of Valencia, and in 1444 a cardinal, owing his promotion mainly to his close friendship with Alphonso V., king of Aragon and Sicily. Chosen pope in April 1455, he was very anxious to organize a crusade against the Turks, and having sold many of his possessions, succeeded in equipping a fleet. Neither the princes nor the people of Europe, however, were enthusiastic in this cause, and very little result came from the pope's exertions. During his papacy Calixtus became involved in a quarrel with his former friend, Alphonso of Aragon, now also king of Naples, and after the king's death in June 1458 he refused to recognize his illegitimate son, Ferdinand, as king of Naples, asserting that this kingdom was a fief of the Holy See. This pope was notorious for nepotism, and was responsible for introducing his nephew, Rodrigo Borgia, afterwards Pope Alexander VI., to Rome. He died on the 6th of August 1458.

See A. Hauck's *Realencyklopädie*, Band iii. (Leipzig, 1897).

CALIXTUS, GEORG (1586-1656), Lutheran divine, was born at Medelby, a village of Schleswig, in 1586. After studying philology, philosophy and theology at Helmstädt, Jena, Giessen, Tübingen and Heidelberg, he travelled through Holland, France and England, where he became acquainted with the leading Reformers. On his return in 1614 he was appointed professor of theology at Helmstädt by the duke of Brunswick, who had admired the ability he displayed when a young man in a dispute with the Jesuit Augustine Turrianus. In 1613 he published a book, *Disputationes de Praecipuis Religionis Christianae Capitibus*, which provoked the hostile criticism of orthodox scholars; in 1619 he published his *Epitome theologiae*, and some years later his *Theologia Moralis* (1634) and *De Arte Nova Nihusii*. Roman Catholics felt them to be aimed at their own system, but they gave so great offence to Lutherans as to induce Statius Buscher to charge the author with a secret leaning to Romanism. Scarcely had he refuted the accusation of Buscher, when, on account of his intimacy with the Reformed divines at the conference of Thorn (1645), and his desire to effect a reconciliation between them and the Lutherans, a new charge was preferred against him, principally at the instance of Abraham Calovius (1612-1686), of a secret attachment to Calvinism. In fact, the great aim of his life was to reconcile Christendom by removing all unimportant differences. The disputes to which this attitude gave rise, known in the Church as the Syncretistic controversy, lasted during the whole lifetime of Calixtus, and distracted the Lutheran church, till a new controversy arose with P.J. Spener and the Pietists of Halle. Calixtus died in 1656.

There is a monograph on Calixtus by E.L.T. Henke (2 vols., 1853-1856); see also Isaak Dorner, *Gesch. d. protest. Theol.* pp. 606-624; and especially Herzog-Hauck, *Realencyklopädie*.

CALL (from Anglo-Saxon *ceallian*, a common Teutonic word, cf. Dutch *kallen*, to talk or chatter), to speak in a loud voice, and particularly to attract some one's attention by a loud utterance. Hence its use for a visit at a house, where the name of the occupier, to whom the visit was made, was called aloud, in early times, to indicate the presence of the visitor. It is thus transferred to a short stay at a place, but usually with the idea of a specific purpose, as in "port of call," where ships stop in passing. Connected with the idea of summoning by name are such uses as "roll-call" or "call-over," where names are called over and answered by those present; similar uses are the "call to the bar," the summoning at an Inn of Court of those students qualified to practise as barristers, and the "call within the bar" to the appointment of king's counsel. In the first case the "bar" is that which separates the benchers from the rest of the body of members of the Inn, in the other the place in a court of law within which only king's counsel, and formerly serjeants-at-law, are allowed to plead. "Call" is also used with a particular reference to a divine summons, as of the calling of the apostles. It is thus used in nonconformist churches of the invitation to serve as minister a particular congregation or chapel. It is from this sense of a *vocatio* or summons that the word "calling" is used, not only of the divine vocation, but of a man's ordinary profession, occupation or business. In card games "call" is used, in poker, of the demand that the hand of the highest bettor be exposed or seen, exercised by that player who equals his bet; in whist or bridge, of a certain method of play, the "call" for a suit or for trumps on the part of one partner, to which the other is expected to respond; and in many card games for the naming of a card, irregularly exposed, which is laid face up on the table, and may be thus "called" for, at any point the opponent may choose.

"Call" is also a term on the English and American stock exchanges for a contract by which, in consideration of a certain sum, an "option" is given by the person making or signing the agreement to another named therein or his order or to bearer, to "call" for a specified amount of stock at a certain day for a certain price. A "put," which is the reverse of a "call," is the option of selling (putting) stock at a certain day for a certain price. A combined option of either calling or putting is termed a "straddle," and sometimes on the American stock exchange a "spread-eagle." (See further STOCK EXCHANGE.) The word is also used, in connexion with joint-stock companies, to signify a demand for instalments due on shares, when the capital of the company has not been demanded or "called" up at once. (See COMPANY.)

CALLANDER, a police burgh of Perthshire, Scotland, 16 m. north-west of Stirling by the Caledonian railway. Pop. (1901) 1458. Situated on the north bank of the Teith, here crossed by a three-arched bridge, and sheltered by a ridge of wooded hills, it is in growing repute as a health resort. A mile and a half north-east are the Falls of Bracklinn (Gaelic, “white-foaming pool”), formed by the Keltie, which takes a leap of 50 ft. down the red sandstone gorge on its way to the Teith. Two miles north-west of Callander is the Pass of Leny, “the gate of the Highlands,” and farther in the same direction is Loch Lubnaig, on the shores of which stand the ruins of St Bride’s chapel. Callander owes much of its prosperity to the fact that it is the centre from which the Trossachs is usually visited, the route being that described in Scott’s *Lady of the Lake*. The ascent of Ben Ledi is commonly made from the town.

CALLAO, a city, port and coast department of Peru, 8½ m. west of Lima, in 12° 04′ S., 77° 13′ W. Pop. (1905) 31,128, of whom 3349 were foreigners. The department includes the city and its environs, Bellavista and La Punta, and the neighbouring islands, San Lorenzo, Fronton, the Palominos, &c., and covers an area of 14½ sq. m. Callao is the principal port of the republic, its harbour being a large bay sheltered by a tongue of land on the south called La Punta, and by the islands of San Lorenzo and Fronton. The anchorage is good and safe, and the harbour is one of the best on the Pacific coast of South America. The city stands on the south side of the bay, and is built on a flat point of land only 8 ft. above sea-level. The houses are for the most part low and cheaply built, and the streets are narrow, badly paved, irregular and dirty. The climate is good and the coast is swept by cool ocean breezes, the average temperatures ranging from 65° to 77° F., but notwithstanding this, Callao has a bad reputation for fevers and contagious diseases, chiefly because of its insanitary condition. Its noteworthy public buildings are the custom-house and its storehouses which occupy the old quadrangular fortress built by the Spanish government between 1770 and 1775, and cover 15 acres, the prefecture, the military and naval offices and barracks, the post-office, three Catholic churches, a hospital, market, three clubs and some modern commercial houses. The present city is half a mile north of the site of the old town, which was destroyed by an earthquake and tidal wave in 1746. For a short time the commercial interests of the stricken city centred at Bellavista, 1¼ m. east, where wheat granaries were built and still remain, but later the greater convenience of a waterside site drew the merchants and population back to the vicinity of the submerged town. The importance of Callao in colonial times, when it was the only open port south of Panama, did not continue under the new political order, because of the unsettled state of public affairs and the loss of its monopoly. This decline in its prosperity was checked, and the modern development of the port began, when a railway was built from Callao into the heart of the Andes, and Callao is now an important factor in the development of copper-mining. The port is connected with Lima by two railways and an electric tramway, with Oroya by railway 138 m. long, and with Cerro de Pasco by railway 221 m. A short railway also runs from the port to the Bellavista storehouses. The port is provided with modern harbour improvements, consisting of sea-walls of concrete blocks, two fine docks with berthing spaces for 30 large vessels, and a large floating-dock (300 ft. long on the blocks and capable of receiving vessels up to 21 ft. draught and 5000 tons weight), which was built in Glasgow and was sent out to Callao in 1863. The docks are provided with gas and electric lights, 18 steam cranes for loading and discharging vessels, a triple line of railway and a supply of fresh water. Callao was formerly the headquarters in South America of the Pacific Steam Navigation Co., Ltd. (incorporated 1840), but Valparaiso now occupies that position. There are, owing perhaps to the proximity of Lima, few industrial establishments in the city; among them are a large sugar refinery, some flour-mills, a brewery, a factory for making effervescent drinks, and a number of foundries and repair shops. Being a port of the first class, Callao is an important distributing centre for the coasting trade, in which a large number of small vessels are engaged. The foreign steamship companies making it a regular port of call are the Pacific Steam Navigation Co. (British), the Compañia Sud-America (Chilean), the Kosmos and Roland lines (German), the Merchants line (New York), and a Japanese line from the ports of Japan and China. A subsidized Peruvian line is also contemplated to ply between the Pacific ports of South America with an eventual extension of the service to Europe. The arrivals from and clearances for foreign ports in 1907 were as follows:—

	Steamers.		Sailing Vessels.	
	No.	Tonnage.	No.	Tonnage.
Arrivals	518	937,302	924	174,165
Clearances	517	937,706	931	163,365

The exports from Callao are guano, sugar, cotton, wool, hides, silver, copper, gold and forest products, and the imports include timber and other building materials, cotton and other textiles, general merchandise for personal, household and industrial uses, railway material, coal, kerosene, wheat, flour and other food stuffs. The maintenance of peace and order, and the mining development of the interior, have added to the trade and prosperity of the port.

The history of Callao has been exceptionally eventful. It was founded in 1537, two years after Pizarro had founded Lima. As the port of that capital and the only open port below Panama it grew rapidly in importance and wealth. It was raised to the dignity of a city in 1671. The appearance of Sir Francis Drake in the bay in 1578 led to the fortification of the port, which proved strong enough to repel an attack by the Dutch in 1624. The city was completely destroyed and partly submerged by the great earthquake of the 28th of October 1746, in which about 6000 persons perished. The new city was strongly fortified and figured prominently in the struggle for independence, and also in the various revolutions which have convulsed the republic. Its political autonomy dates from 1836, when it was made a coast department. The Callao fortifications were bombarded by a Spanish fleet under Admiral Mendez Nuñez on the 2nd of May 1866, when there were heavy losses both in lives and material. Again, in 1880, the city was bombarded by the Chileans, though it was almost defenceless, and fell into the possession of the invaders after the capture of Lima in the following year. Before the surrender all the Peruvian naval vessels in the harbour were sunk, to prevent their falling into the possession of the enemy.

CALLCOTT, SIR AUGUSTUS WALL (1779-1844), English landscape painter, was born at Kensington in 1779 and died there in 1844. His first study was music; and he sang for several years in the choir of Westminster Abbey. But at the age of twenty he had determined to give up music, and had exhibited his first painting at the Royal Academy. He gradually rose to distinction, and was elected an associate in 1807 and an academician in 1810. In 1827 he received the honour of knighthood; and, seven years later, was appointed surveyor of the royal pictures. His two principal subject pictures—"Raphael and the Fornarina," and "Milton dictating to his Daughters," are much inferior to his landscapes, which are placed in the highest class by their refined taste and quiet beauty.

His wife, MARIA, Lady Callcott (1786-1844), whom he married in 1827, was a daughter of Admiral Dundas and widow of Captain Thomas Graham, R.N. (d. 1822). With her first husband she travelled in India, South Africa and South America, where she acted for some time as teacher of Donna Maria, who became queen of Portugal in 1826; and in the company of her second husband she spent much time in the south of Europe. She published accounts of her visits to India (1812), and to the environs of Rome (1820); *Memoirs of Poussin* (1820); a *History of France*; a *History of Spain* (1828); *Essays toward a History of Painting* (1836); *Little Arthur's History of England* (1836); and the *Scripture Herbal* (1842).

CALLCOTT, JOHN WALL (1766-1821), English musician, brother of Sir Augustus Callcott, was born at Kensington on the 20th of November 1766. At the age of seven he was sent to a neighbouring day-school, where he continued for five years, studying chiefly Latin and Greek. During this time he frequently went to Kensington church, in the repairs of which his father was employed, and the impression he received on hearing the organ of that church seems to have roused his love for music. The organist at that time was Henry Whitney, from whom Callcott received his first musical instruction. He did not, however, choose music as a profession, as he wished to become a surgeon. But on witnessing a surgical operation he found his nervous system so seriously affected by the sight, that he determined to devote himself to music. His intimacy with Dr Arnold and other leading musicians of the day procured him access to artistic circles; he was deputy organist at St George the Martyr, Queen Square, Bloomsbury, from 1783 to 1785, in which year his successful competition for three out of the four prize medals offered by the "Catch Club" soon spread his reputation as composer of glees, catches, canons and other pieces of concerted vocal music. The compositions with which he won these medals were—the catch "O beauteous fair," the canon "Blessed is he," and the glee "Dull repining sons of care." In these and other similar compositions he displays considerable skill and talent, and some of his glees retain their popularity at the present day. In 1787 Callcott helped Dr Arnold and others to form the "Glee Club." In 1789 he became one of the two organists at St Paul's, Covent Garden, and from 1793 to 1802 he was organist to the Asylum for Female Orphans. As an instrumental composer Callcott never succeeded, not even after he had taken lessons from Haydn. But of far greater importance than his compositions are his theoretical writings. His *Musical Grammar*, published in 1806 (3rd ed., 1817), was long considered the standard English work of musical instruction, and in spite of its being antiquated when compared with modern standards, it remains a scholarly and lucid treatment of the rudiments of the art. Callcott was a much-esteemed teacher of music for many years. In 1800 he took his degree of Mus.D. at Oxford, where fifteen years earlier he had received his degree of bachelor of music, and in 1805 he succeeded Dr Crotch as musical lecturer at the Royal Institution. Towards the end of his life his artistic career was twice interrupted by the failure of his mental powers. He died at Bristol after much suffering on the 15th of May 1821. A posthumous collection of his most favourite vocal pieces was published in 1824 with a memoir of his life by his son-in-law, William Horsley, himself a composer of note.

Callcott's son, WILLIAM HUTCHINS CALLCOTT (1807-1882), inherited to a large extent the musical gifts of his father. His song, "The last man," and his anthem, "Give peace in our time, O Lord," were his best-known compositions.

CALLIAS, tyrant of Chalcis in Euboea. With the assistance of Philip II. of Macedon, which he hoped to obtain, he contemplated the subjugation of the whole island. But finding that Philip was unwilling to help him, Callias had recourse to the Athenians, although he had previously (350 B.C.) been engaged in hostilities with them. With the support of Demosthenes, he was enabled to conclude an alliance with Athens, and the tribute formerly paid by Eretria and Oreus to Athens was handed over to him. But his plan of uniting the whole of Euboea under his rule, with Chalcis as capital, was frustrated by Philip, who set up tyrants chosen by himself at Eretria and Oreus. Subsequently, when Philip's attention was engaged upon Thrace, the Athenians in conjunction with Callias drove out these tyrants, and Callias thus became master of the island (Demosthenes, *De Pace*, p. 58; *Epistola Philippi*, p. 159; Diod. Sic. xvi. 74). At the end of his life he appears to have lived at Athens, and Demosthenes proposed to confer the citizenship upon him (Aeschines, *Contra Ctesiphontem*, 85, 87).

CALLIAS and **HIPPONICUS,** two names borne alternately by the heads of a wealthy and distinguished Athenian family. During the 5th and 4th centuries B.C. the office of *daduchus* or torch-bearer at the Eleusinian

mysteries was the hereditary privilege of the family till its extinction. The following members deserve mention.

1. Callias, the second of the name, fought at the battle of Marathon (490) in priestly attire. Some time after the death of Cimon, probably about 445 B.C., he was sent to Susa to conclude with Artaxerxes, king of Persia, a treaty of peace afterwards misnamed the "peace of Cimon." Cimon had nothing to do with it, and he was totally opposed to the idea of peace with Persia (see Cimon). At all events Callias's mission does not seem to have been successful; he was indicted for high treason on his return to Athens and sentenced to a fine of fifty talents.

See Herodotus vii. 151; Diod. Sic. xii. 4; Demosthenes, *De Falsa Legatione*, p. 428; Grote recognizes the treaty as a historical fact, *History of Greece*, ch. xlv., while Curtius, bk. iii. ch. ii., denies the conclusion of any formal treaty; see also Ed. Meyer, *Forschungen*, ii.; J.B. Bury in *Hermathena*, xxiv. (1898).

2. Hipponicus, son of the above. Together with Eurymedon he commanded the Athenian forces in the incursion into Boeotian territory (426 B.C.) and was slain at the battle of Delium (424). His wife, whom he divorced, subsequently became the wife of Pericles; one of his daughters, Hipparete, married Alcibiades; another, the wife of Theodorus, was the mother of the orator Isocrates.

See Thucydides iii. 91; Diod. Sic. xii. 65; Andocides, *Contra Alcibiadem*, 13.

3. Callias, son of the above, the black sheep of the family, was notorious for his profligacy and extravagance, and was ridiculed by the comic poets as an example of a degenerate Athenian (Aristophanes, *Frogs*, 429, *Birds*, 283, and schol. Andocides, *De Mysteriis*, 110-131). The scene of Xenophon's *Symposium* and Plato's *Protagoras* was laid at his house. He was reduced to a state of absolute poverty and, according to Aelian (*Var. Hist.* iv. 23), committed suicide, but there is no confirmation of this. In spite of his dissipated life he played a certain part in public affairs. In 392 he was in command of the Athenian hoplites at Corinth, when the Spartans were defeated by Iphicrates. In 371 he was at the head of the embassy sent to make terms with Sparta. The peace which was the result was called after him the "peace of Callias."

See Xenophon, *Hellenica*, iv. 5, vi. 3; and Delian League.

CALLIMACHUS, an Athenian sculptor of the second half of the 5th century B.C. Ancient critics associate him with Calamis, whose relative he may have been. He is given credit for two inventions, the Corinthian column and the running borer for drilling marble. The most certain facts in regard to him are that he sculptured some dancing Laconian maidens, and made a golden lamp for the Erechtheum (about 408 B.C.); and that he used to spoil his works by over-refinement and excessive labour.

CALLIMACHUS, Greek poet and grammarian, a native of Cyrene and a descendant of the illustrious house of the Battiadae, flourished about 250 B.C. He opened a school in the suburbs of Alexandria, and some of the most distinguished grammarians and poets were his pupils. He was subsequently appointed by Ptolemy Philadelphus chief librarian of the Alexandrian library, which office he held till his death (about 240). His *Pinakes* (tablets), in 120 books, a critical and chronologically arranged catalogue of the library, laid the foundation of a history of Greek literature. According to Suidas, he wrote about 800 works, in verse and prose; of these only six hymns, sixty-four epigrams and some fragments are extant; a considerable fragment of the *Hecale*, an idyllic epic, has also been discovered in the Rainer papyri (see Kenyon in *Classical Review*, November 1893). His *Coma Berenices* is only known from the celebrated imitation of Catullus. His *Aitia* (causes) was a collection of elegiac poems in four books, dealing with the foundation of cities, religious ceremonies and other customs. According to Quintilian (*Instit.* x. i. 58) he was the chief of the elegiac poets; his elegies were highly esteemed by the Romans, and imitated by Ovid, Catullus and especially Propertius. The extant hymns are extremely learned, and written in a laboured and artificial style. The epigrams, some of the best specimens of their kind, have been incorporated in the Greek Anthology. Art and learning are his chief characteristics, unrelieved by any real poetic genius; in the words of Ovid (*Amores*, i. 15)—

"Quamvis ingenio non valet, arte valet."

Editions.—Hymns, epigrams and fragments (the last collected by Bentley) by J.A. Ernesti (1761), and O. Schneider (1870-1873) (with elaborate indices and excursuses); hymns and epigrams, by A. Meineke (1861), and U. Wilamowitz-Möllendorff (1897). See *Neue Bruchstücke aus der Hekale des Kallimachus*, by T. Gomperz (1893); also G. Knaack, *Callimachea* (1896); A. Bertrami, *Gl' Inni di Callimacho e il Nomo di Terpandro* (1896); K. Kuiper, *Studia Callimachea* (1896); A. Hamette, *Les Épigrammes de Callimaque: étude critique et litteraire* (Paris, 1907). There are English translations (verse) by W. Dodd (1755) and H.W. Tytler (1793); (prose) by J. Banks (1856). See also Sandys, *Hist. of Class. Schol.* i. (ed. 1906), p. 122.

CALLINUS of Ephesus, the oldest of the Greek elegiac poets and the creator of the political and warlike elegy. He is supposed to have flourished between the invasion of Asia Minor by the Cimmerii and their expulsion by Alyattes (630-560 B.C.). During his lifetime his own countrymen were also engaged in a life-and-death struggle with the Magnesians. These two events give the key to his poetry, in which he endeavours to rouse the indolent Ionians to a sense of patriotism. Only scanty fiagments of his poems remain; the longest of these (preserved in

Stobaeus, *Florilegium*, li. 19) has even been ascribed to Tyrtaeus.

Edition of the fragments by N. Bach (1831), and in Bergk, *Poetae Lyrici Graeci* (1882). On the date of Callinus, see the histories of Greek literature by Mure and Müller; G.H. Bode, *Geschichte der hellenischen Dichtkunst*, ii. pt. i. (1838); and G. Geiger, *De Callini Aetate* (1877), who places him earlier, about 642.

CALLIOPE, the muse of epic poetry, so named from the sweetness of her vioce (Gr. κάλλος, beauty; ὄψ, voice). In Hesiod she was the last of the nine sisters, but yet enjoyed a supremacy over the others. (See also Muses, The.)

CALLIRRHOE, in Greek legend, second daughter of the river-god Achelous and wife of Alcmaeon (*q.v.*). At her earnest request her husband induced Phegeus, king of Psophis in Arcadia, and the father of his first wife Arsinoë (or Alphesiboea), to hand over to him the necklace and peplus (robe) of Harmonia (*q.v.*), that he might dedicate them at Delphi to complete the cure of his madness. When Phegeus discovered that they were really meant for Callirrhoe, he gave orders for Alcmaeon to be waylaid and killed (Apollodorus iii. 7, 2. 5-7; Thucydides ii. 102). Callirrhoe now implored the gods that her two young sons might grow to manhood at once and avenge their father's death. This was granted, and her sons Amphoterus and Acarnan slew Phegeus with his two sons, and returning with the necklace and peplus dedicated them at Delphi (Ovid, *Metam.* ix. 413).

CALLISTHENES (*c.* 360-328 B.C.), of Olynthus, Greek historian, a relative and pupil of Aristotle, through whose recommendation he was appointed to attend Alexander the Great in his Asiatic expedition. He censured Alexander's adoption of oriental customs, inveighing especially against the servile ceremony of adoration. Having thereby greatly offended the king, he was accused of being privy to a treasonable conspiracy and thrown into prison, where he died from torture or disease. His melancholy end was commemorated in a special treatise (Καλλισθένης ἢ περὶ πένθους) by his friend Theophrastus, whose acquaintance he made during a visit to Athens. Callisthenes wrote an account of Alexander's expedition, a history of Greece from the peace of Antalcidas (387) to the Phocian war (357), a history of the Phocian war and other works, all of which have perished. The romantic life of Alexander, the basis of all the Alexander legends of the middle ages, originated during the time of the Ptolemies, but in its present form belongs to the 3rd century A.D. Its author is usually known as pseudo-Callisthenes, although, in the Latin translation by Julius Valerius Alexander Polemius (beginning of the 4th century) it is ascribed to a certain Aesopus; Aristotle, Antisthenes, Onesicritus and Arrian have also been credited with the authorship. There are also Syrian, Armenian and Slavonic versions, in addition to four Greek versions (two in prose and two in verse) in the middle ages (see Krumbacher, *Geschichte der byzantinischen Litteratur*, 1897, p. 849). Valerius's translation was completely superseded by that of Leo, arch-priest of Naples in the 10th century, the so-called *Historia de Preliis*.

See *Scriptores rerum Alexandri Magni* (by C.W. Müller, in the Didot edition of Arrian, 1846), containing the genuine fragments and the text of the pseudo-Callisthenes, with notes and introduction; A. Westermann, *De Callisthene Olynthio et Pseudo-Callisthene Commentatio* (1838-1842); J. Zacher, *Pseudo-Callisthenes* (1867); W. Christ, *Geschichte der griechischen Litteratur* (1898), pp. 363, 819; article by Edward Meyer in Ersch and Gruber's *Allgemeine Encyklopädie*; A. Ausfeld, *Zur Kritik des griechischen Alexanderromans* (Bruchsal, 1894); Plutarch, *Alexander*, 52-55; Arrian, *Anab.* iv. 10-14; Diog. Laërtius v. I; Quintus Curtius viii. 5-8; Suidas *s.v.* See also Alexander The Great (*ad fin.*). For the Latin translations see Teuffel-Schwabe, *Hist. of Roman Literature* (Eng, trans.), § 399; and M. Schanz, *Geschichte der römischen Litteratur*, iv. i., p.43.

CALLISTO, in Greek mythology, an Arcadian nymph, daughter of Lycaon and companion of Artemis. She was transformed into a bear as a penalty for having borne to Zeus a son, Arcas, the ancestor of the Arcadians. Hera, Zeus and Artemis are all mentioned as the authors of the transformation. Arcas, when hunting, encountered the bear Callisto, and would have shot her, had not Zeus with swift wind carried up both to the skies, where he placed them as a constellation. In another version, she was slain by Artemis. Callisto was originally only an epithet of the Arcadian Artemis herself.

See Apollodorus iii. 8; Ovid, *Metam.* ii. 381-530; R. Franz, *De Callistus fabula* (1890), which deals exhaustively with the various forms of the legend.

CALLISTRATUS, Alexandrian grammarian, flourished at the beginning of the 2nd century B.C. He was one of the pupils of Aristophanes of Byzantium, who were distinctively called Aristophanei. Callistratus chiefly devoted

himself to the elucidation of the Greek poets; a few fragments of his commentaries have been preserved in the various collections of scholia and in Athenaeus. He was also the author of a miscellaneous work called Συμμικτά used by the later lexicographers, and of a treatise on courtesans (Athenaeus iii. 125 B, xiii. 591 D). He is not to be confused with Callistratus, the pupil and successor of Isocrates and author of a history of Heraclea in Pontus.

See R. Schmidt, *De Callistrato Aristophaneo*, appended to A. Nauck's *Aristophanis Byzantii Fragmenta* (1848); also C.W. Müller, *Fragmenta Historicorum Graecorum*, iv. p. 353 note.

CALLISTRATUS, an Athenian poet, only known as the author of a hymn in honour of Harmodius (*q.v.*) and Aristogeiton. This ode, which is to be found in Athenaeus (p. 695), has been beautifully translated by Thomas Moore.

CALLISTRATUS, Greek sophist and rhetorician, probably flourished in the 3rd century. He wrote Ἐκφράσεις, descriptions of fourteen works of art in stone or brass by distinguished artists. This little work, which is written in a dry and affected style, without any real artistic feeling, is usually edited with the Εἰκόνες of Philostratus.

Edition by Schenkl-Reisch (Teubner series, 1902); see also C.G. Heyne, *Opuscula Academica*, v. pp. 196-221, with commentary on the *Descriptiones*; F. Jacobs, *Animadversiones criticae in Callistrati statuas* (1797).

CALLISTRATUS of Aphidnae, Athenian orator and general in the 4th century B.C. For many years, as *prostates*, he supported Spartan interests at Athens. On account of the refusal of the Thebans to surrender Oropus, which on his advice they had been allowed to occupy temporarily, Callistratus, despite his magnificent defence (which so impressed Demosthenes that he resolved to study oratory), was condemned to death, 361 B.C. He fled to Methone in Macedonia, and on his return to Athens in 355 he was executed.

See Xenophon, *Hellenica*, iii. 3, vi. 2; Lycurgus, *In Leocr.* 93.

CALLOT, JACQUES (1592-1635), French engraver, was born at Nancy in Lorraine, where his father, Jean Callot, was a herald-at-arms. He early discovered a very strong predilection for art, and at the age of twelve quitted home without his father's consent, and set out for Rome where he intended to prosecute his studies. Being utterly destitute of funds he joined a troop of Bohemians, and arrived in their company at Florence. In this city he had the good fortune to attract the notice of a gentleman of the court, who supplied him with the means of study; but he removed in a short time to Rome, where, however, he was recognized by some relatives, who immediately compelled him to return home. Two years after this, and when only fourteen years old, he again left France contrary to the wishes of his friends, and reached Turin before he was overtaken by his elder brother, who had been despatched in quest of him. As his enthusiasm for art remained undiminished after these disappointments, he was at last allowed to accompany the duke of Lorraine's envoy to the papal court. His first care was to study the art of design, of which in a short time he became a perfect master. Philip Thomasin instructed him in the use of the graver, which, however, he ultimately abandoned, substituting the point as better adapted for his purposes. From Rome he went to Florence, where he remained till the death of Cosimo II., the Maecenas of these times. On returning to his native country he was warmly received by the then duke of Lorraine, who admired and encouraged him. As his fame was now spread abroad in various countries of Europe, many distinguished persons gave him commissions to execute. By the Infanta Isabella, sovereign of the Low Countries, he was commissioned to engrave a design of the siege of Breda; and at the request of Louis XIII. he designed the siege of Rochelle and the attack on the Isle of Ré. When, however, in 1631 he was desired by that monarch to execute an engraving of the siege of Nancy, which he had just taken, Callot refused, saying, "I would rather cut off my thumb than do anything against the honour of my prince and of my country"; to which Louis replied that the duke of Lorraine was happy in possessing such subjects as Callot. Shortly after this he returned to his native place, from which the king failed to allure him with the offer of a handsome pension. He engraved in all about 1600 pieces, the best of which are those executed in aquafortis. No one ever possessed in a higher degree the talent for grouping a large number of figures in a small space, and of representing with two or three bold strokes the expression, action and peculiar features of each individual. Freedom, variety and *naiveté* characterize all his pieces. His Fairs, his Miseries of War, his Sieges, his Temptation of St Anthony and his Conversion of St Paul are the best-known of his plates.

See also Edouard Meaume, *Recherches sur la vie de Jacques Callot* (1860).

CALLOVIAN (from *Callovium*, the Latinized form of Kellaways, a village not far from Chippenham in Wiltshire), in geology, the name introduced by d'Orbigny for the strata which constitute the base of the Oxfordian or lowermost stage of the Middle Oolites. The term used by d'Orbigny in 1844 was "Kellovien," subsequently altered to "Callovien" in 1849; William Smith wrote "Kellaways" or "Kelloways Stone" towards the close of the 18th century. In England it is now usual to speak of the Kellaways Beds; these comprise (1) the Kellaways Rock, alternating clays and sands with frequent but irregular concretionary calcareous sandstones, with abundant fossils; and (2) a lower division, the Kellaways Clay, which often contains much selenite but is poor in fossils. The lithological characters are impersistent, and the sandy phase encroaches sometimes more, sometimes less, upon the true Oxford Clay. The rocks may be traced from Wiltshire into Bedfordshire, Lincolnshire and Yorkshire, where they are well exposed in the cliffs at Scarborough and Gristhorpe, at Hackness (90 ft.), Newtondale (80 ft.) and Kepwick (100 ft.). In Yorkshire, however, the Callovian rocks lie upon a somewhat higher palaeontological horizon than in Wiltshire. In England, *Kepplerites calloviensis* is taken as the zone fossil; other common forms are *Cosmoceras modiolare*, *C. gowerianum*, *Belemnites oweni*, *Ancyloceras calloviense*, *Nautilus calloviensis*, *Avicula ovalis*, *Gryphaea bilobata*, &c.

On the European continent the "Callovien" stage is used in a sense that is not exactly synonymous with the English Callovian; it is employed to embrace beds that lie both higher and lower in the time-scale. Thus, the continental Callovien includes the following zones:—

Upper Callovien (Divesien)	Zone of *Peltoceras athleta*, *Cosmoceras Duncani*, *Quenstedtoceras Lamberti* and *Q. mariae.*
Lower Callovien	Zone of *Reineckia anceps*, *Stephanoceras coronatum* and *Cosmoceras jason* and a lower zone of *C. gowerianum* and *Macrocephalites macrocephalus*.

Rocks of Callovian age (according to the continental classification) are widely spread in Europe, which, with the exception of numerous insular masses, was covered by the Callovian Sea. The largest of these land areas lay over Scandinavia and Finland, and extended eastward as far as the 40th meridian. In arctic regions these rocks have been discovered in Spitzbergen, Franz Josef Land, the east coast of Greenland, and Siberia. They occur in the Hebrides and Skye and in England as indicated above. In France they are well exposed on the coast of Calvados between Trouville and Dives, where the marls and clays are 200 ft. thick. In the Ardennes clays bearing pyrites and oolitic limonite are about 30 ft. thick. Around Poitiers the Callovian is 100 ft. thick, but the formation thins in the direction of the Jura.

Clays and shales with ferruginous oolites represent the Callovian of Germany; while in Russia the deposits of this age are mainly argillaceous. In North America Callovian fossils are found in California; in South America in Bolivia. In Africa they have been found in Algeria and Morocco, in Somaliland and Zanzibar, and on the west coast of Madagascar. In India they are represented by the shales and limestones of the Chari series of Cutch. Callovian rocks are also recorded from New Guinea and the Moluccas.

See JURASSIC; also A. de Lapparent, *Traité de géologie*, vol. ii. (5th ed., 1906), and H.B. Woodward, "The Jurassic Rocks of Britain," *Mem. Geol. Survey*, vol. v.

(J. A. H.)

CALM, an adjective meaning peaceful, quiet; particularly used of the weather, free from wind or storm, or of the sea, opposed to rough. The word appears in French *calme*, through which it came into English, in Spanish, Portuguese and Italian *calma*. Most authorities follow Diez (*Etym. Wörterbuch der romanischen Sprachen*) in tracing the origin to the Low Latin *cauma*, an adaptation of Greek καῦμα, burning heat, καίειν, to burn. The Portuguese *calma* has this meaning as well as that of quiet. The connexion would be heat of the day, rest during that period, so quiet, rest, peacefulness. The insertion of the *l*, which in English pronunciation disappears, is probably due to the Latin *calor*, heat, with which the word was associated.

CALMET, ANTOINE AUGUSTIN (1672-1757), French Benedictine, was born at Mesnil-la-Horgne on the 26th of February 1672. At the age of seventeen he joined the Benedictine order, and in 1698 was appointed to teach theology and philosophy at the abbey of Moyen-Moutier. He was successively prior at Lay, abbot at Nancy and of Sénones in Lorraine. He died in Paris on the 25th of October 1757. The erudition of Calmet's exegetical writings won him a reputation that was not confined to the Roman Catholic Church, but they have failed to stand the test of modern scholarship. The most noteworthy are:—*Commentaire de la Bible* (Paris, 23 vols. 1707-1716), and *Dictionnaire historique, géographique, critique, chronologique et littéral de la Bible* (Paris, 2 vols., 1720). These and numerous other works and editions of the Bible are known only to students, but as a pioneer in a branch of Biblical study which received a wide development in the 19th century, Calmet is worthy of remembrance. As a historical writer he is best known by his *Histoire ecclésiastique et civile de la Lorraine* (Nancy, 1728), founded on original research and various useful works on Lorraine, of which a full list is given In Vigouroux's *Dictionnaire de la Bible*.

See A. Digot, *Notice biographique et littéraire sur Dom Augustin Calmet* (Nancy, 1860).

CALNE, a market town and municipal borough in the Chippenham parliamentary division of Wiltshire, England, 99 m. west of London by the Great Western railway. Pop. (1901) 3457. Area, 356 acres. It lies in the valley of the Calne, and is surrounded by the high table-land of Salisbury Plain and the Marlborough Downs. The church of St Mark has a nave with double aisles, and massive late Norman pillars and arches. The tower, which fell in 1628, was perhaps rebuilt by Inigo Jones. Other noteworthy buildings are a grammar school, founded by John Bentley in 1660, and the town-hall. Bacon-curing is the staple industry, and there are flour, flax and paper mills. The manufacture of broadcloth, once of great importance, is almost extinct. Calne is governed by a mayor, four aldermen and twelve councillors.

In the 10th century Calne (*Canna*, *Kalne*) was the site of a palace of the West-Saxon kings. Calne was the scene of the synod of 978 when, during the discussion of the question of celibacy, the floor suddenly gave way beneath the councillors, leaving Archbishop Dunstan alone standing upon a beam. Here also a witenagemot was summoned in 997. In the Domesday Survey Calne appears as a royal borough; it comprised forty-seven burgesses and was not assessed in hides. In 1565 the borough possessed a gild merchant, at the head of which were two gild stewards. Calne claimed to have received a charter from Stephen and a confirmation of the same from Henry III., but no record of these is extant, and the charter actually issued to the borough by James II. in 1687 apparently never came into force. The borough returned two members to parliament more or less irregularly from the first parliament of Edward I. until the Reform Bill of 1832. From this date the borough returned one member only until, by the Redistribution of Seats Act of 1885, the privilege was annulled. In 1303 Lodovicus de Bello Monte, prebendary of Salisbury, obtained a grant of a Saturday market at the manor of Calne, and a three days' fair at the feast of St Mary Magdalene; the latter was only abandoned in the 19th century. Calne was formerly one of the chief centres of cloth manufacture in the west of England, but the industry is extinct.

CALOMEL, a drug consisting of mercurous chloride, mercury subchloride, Hg_2Cl_2, which occurs in nature as the mineral horn-quicksilver, found as translucent crystals belonging to the tetragonal system, with an adamantine lustre, and a dirty white grey or brownish colour. The chief localities are Idria, Obermoschel, Horowitz in Bavaria and Almaden in Spain. It was used in medicine as early as the 16th century under the names *Draco mitigatus, Manna metallorum, Aquila alba, Mercurius dulcis*; later it became known as calomel, a name probably derived from the Greek καλός, beautiful, and μέλας, black, in allusion to its blackening by ammonia, or from καλός and μέλι, honey, from its sweet taste. It may be obtained by heating mercury in chlorine, or by reducing mercuric chloride (corrosive sublimate) with mercury or sulphurous acid. It is manufactured by heating a mixture of mercurous sulphate and common salt in iron retorts, and condensing the sublimed calomel in brick chambers. In the wet way it is obtained by precipitating a mercurous salt with hydrochloric acid. Calomel is a white powder which sublimes at a low red heat; it is insoluble in water, alcohol and ether. Boiling with stannous chloride solution reduces it to the metal; digestion with potassium iodide gives mercurous iodide. Nitric acid oxidizes it to mercuric nitrate, while potash or soda decomposes it into mercury and oxygen. Long continued boiling with water gives mercury and mercuric chloride; dilute hydrochloric acid or solutions of alkaline chlorides convert it into mercuric chloride on long boiling.

The molecular weight of mercurous chloride has given occasion for much discussion. E. Mitscherlich determined the vapour density to be 8.3 (air = 1), corresponding to HgCl. The supporters of the formula Hg_2Cl_2 pointed out that dissociation into mercury and mercuric chloride would give this value, since mercury is a monatomic element. After contradictory evidence as to whether dissociation did or did not occur, it was finally shown by Victor Meyer and W. Harris (1894) that a rod moistened with potash and inserted in the vapour was coloured yellow, and so conclusively proved dissociation. A. Werner determined the molecular weights of mercurous, cuprous and silver bromides, iodides and chlorides in pyridine solution, and obtained results pointing to the formula HgCl, etc. However, the double formula, Hg_2Cl_2, has been completely established by H.B. Baker (*Journ. Chem. Soc.*, 1900, 77, p. 646) by vapour density determinations of the absolutely dry substance.

Calomel possesses certain special properties and uses in medicine which are dealt with here as a supplement to the general discussion of the pharmacology and therapeutics of mercury (*q.v.*). Calomel exerts remote actions in the form of mercuric chloride. The specific value of mercurous chloride is that it exerts the valuable properties of mercuric chloride in the safest and least irritant manner, as the active salt is continuously and freshly generated in small quantities. Its pharmacopeial preparations are the "Black wash," in which calomel and lime react to form mercurous oxide, a pill still known as "Plummer's pill" and an ointment. Externally the salt has not any particular advantage over other mercurial compounds, despite the existence of the official ointment. Internally the salt is given in doses—for an adult of from one-half to five grains. It is an admirable aperient, acting especially on the upper part of the intestinal canal, and causing a slight increase of intestinal secretion. The stimulant action occurring high up in the canal (duodenum and jejunum), it is well to follow a dose of calomel with a saline purgative a few hours afterwards. The special value of the drug as an aperient depends on its antiseptic power and its stimulation of the liver. The stools are dark green, containing calomel, mercuric sulphide and bile which, owing to the antiseptic action, has not been decomposed. The salt is often used in the treatment of syphilis, but is probably less useful than certain other mercurial compounds. It is also employed for fumigation; the patient sits naked with a blanket over him, on a cane-bottomed chair, under which twenty grains of calomel are volatilized by a spirit-lamp; in about twenty minutes the calomel is effectually absorbed by the skin.

CALONNE, CHARLES ALEXANDRE DE (1734-1803), French statesman, was born at Douai of a good family. He entered the profession of the law, and became in succession advocate to the general council of Artois, *procureur* to the parlement of Douai, master of requests, then intendant of Metz (1768) and of Lille (1774). He seems to have been a man of great business capacity, gay and careless in temperament, and thoroughly

unscrupulous in political action. In the terrible crisis of affairs preceding the French Revolution, when minister after minister tried in vain to replenish the exhausted royal treasury and was dismissed for want of success, Calonne was summoned to take the general control of affairs. He assumed office on the 3rd of November 1783. He owed the position to Vergennes, who for three years and a half continued to support him; but the king was not well disposed towards him, and, according to the testimony of the Austrian ambassador, his reputation with the public was extremely poor. In taking office he found "600 millions to pay and neither money nor credit." At first he attempted to develop the latter, and to carry on the government by means of loans in such a way as to maintain public confidence in its solvency. In October 1785 he recoined the gold coinage, and he developed the *caisse d' escompte*. But these measures failing, he proposed to the king the suppression of internal customs, duties and the taxation of the property of nobles and clergy. Turgot and Necker had attempted these reforms, and Calonne attributed their failure to the malevolent criticism of the parlements. Therefore he had an assembly of "notables" called together in January 1787. Before it he exposed the deficit in the treasury, and proposed the establishment of a *subvention territoriale*, which should be levied on all property without distinction. This suppression of privileges was badly received by the privileged notables. Calonne, angered, printed his reports and so alienated the court. Louis XVI. dismissed him on the 8th of April 1787 and exiled him to Lorraine. The joy was general in Paris, where Calonne, accused of wishing to augment the imposts, was known as "Monsieur Deficit." In reality his audacious plan of reforms, which Necker took up later, might have saved the monarchy had it been firmly seconded by the king. Calonne soon afterwards passed over to England, and during his residence there kept up a polemical correspondence with Necker on the finances. In 1789, when the states-general were about to assemble, he crossed over to Flanders in the hope of being allowed to offer himself for election, but he was sternly forbidden to enter France. In revenge he joined the *émigré* party at Coblenz, wrote in their favour, and expended nearly all the fortune brought him by his wife, a wealthy widow. In 1802, having again taken up his abode in London, he received permission from Napoleon to return to France. He died on the 30th of October 1802, about a month after his arrival in his native country.

See Ch. Gomel, *Les Causes financières de la Révolution* (Paris, 1893); R. Stourm, *Les Finances de l'ancien régime et de la Révolution* (2 vols., Paris, 1885); Susane, *La Tactique financière de Calonne*, with bibliography (Paris, 1902).

CALORESCENCE (from the Lat. *calor*, heat), a term invented by John Tyndall to describe an optical phenomenon, the essential feature of which is the conversion of rays belonging to the dark infra-red portion of the spectrum into the more refrangible visible rays, *i.e.* heat rays into rays of light. Such a transformation had not previously been observed, although the converse phenomenon, *i.e.* the conversion of short waves of light into longer or less refrangible waves, had been shown by Sir G.G. Stokes to occur in fluorescent bodies. Tyndall's experiments, however, were carried out on quite different lines, and have nothing to do with fluorescence (*q.v.*). His method was to sift out the long dark waves which are associated with the short visible waves constituting the light of the sun or of the electric arc and to concentrate the former to a focus. If the eye was placed at the focus, no sensation of light was observed, although small pieces of charcoal or blackened platinum foil were immediately raised to incandescence, thus giving rise to visible rays.

The experiment is more easily carried out with the electric light than with sunlight, as the former contains a smaller proportion of visible rays. According to Tyndall, 90% of the radiation from the electric arc is non-luminous. The arc being struck in the usual way between two carbons, a concave mirror, placed close behind it, caused a large part of the radiation to be directed through an aperture in the camera and concentrated to a focus outside. In front of the aperture were placed a plate of transparent rock-salt, and a flat cell of thin glass containing a solution of iodine in carbon bisulphide. Both rock-salt and carbon bisulphide are extremely transparent to the luminous and also to the infra-red rays The iodine in the solution, however, has the property of absorbing the luminous rays, while transmitting the infra-red rays copiously, so that in sufficient thicknesses the solution appears nearly black. Owing to the inflammable nature of carbon bisulphide, the plate of rock-salt was found to be hardly a sufficient protection, and Tyndall surrounded the iodine cell with an annular vessel through which cold water was made to flow. Any small body which was a good absorber of dark rays was rapidly heated to redness when placed at the focus. Platinized platinum (platinum foil upon which a thin film of platinum had been deposited electrolytically) and charcoal were rendered incandescent, black paper and matches immediately inflamed, ordinary brown paper pierced and burned, while thin white blotting-paper, owing to its transparency to the invisible rays, was scarcely tinged. A simpler arrangement, also employed by Tyndall, is to cause the rays to be reflected outwards parallel to one another, and to concentrate them by means of a small flask, containing the iodine solution and used as a lens, placed some distance from the camera. The rock-salt and cold water circulation can then be dispensed with.

Since the rays used by Tyndall in these experiments are similar to those emitted by a heated body which is not hot enough to be luminous, it might be thought that the radiation, say from a hot kettle, could be concentrated to a focus and employed to render a small body luminous. It would, however, be impossible by such means to raise the receiving body to a higher temperature than the source of radiation. For it is easy to see that if, by means of lenses of rock-salt or mirrors, we focused all or nearly all the rays from a small surface on to another surface of equal area, this would not raise the temperature of the second surface above that of the first; and we could not obtain a greater concentration of rays from a large heated surface, since we could not have all parts of the surface simultaneously in focus. The desired result could be obtained if it were possible, by reflection or otherwise, to cause two different rays to unite without loss and pursue a common path. Such a result must be regarded as impossible of attainment, as it would imply the possibility of heat passing from one body to another at a higher temperature, contrary to the second law of thermodynamics (*q.v.*). Tyndall used the dark rays from a luminous source, which are emitted in a highly concentrated form, so that it was possible to obtain a high temperature, which was, however, much lower than that of the source.

A full account of Tyndall's experiments will be found in his *Heat, a Mode of Motion*.

(J. R. C.)

CALORIMETRY, the scientific name for the measurement of quantities of heat (Lat. *calor*), to be distinguished from thermometry, which signifies the measurement of temperature. A calorimeter is any piece of apparatus in which heat is measured. This distinction of meaning is purely a matter of convention, but it is very rigidly observed. Quantities of heat may be measured indirectly in a variety of ways in terms of the different effects of heat on material substances. The most important of these effects are (*a*) rise of temperature, (*b*) change of state, (*c*) transformation of energy.

§ 1. The rise of temperature of a body, when heat is imparted to it, is found to be in general nearly proportional to the quantity of heat added. The *thermal capacity* of a body is measured by the quantity of heat required to raise its temperature one degree, and is necessarily proportional to the mass of the body for bodies of the same substance under similar conditions. The *specific heat* of a substance is sometimes defined as the thermal capacity of unit mass, but more often as the ratio of the thermal capacity of unit mass of the substance to that of unit mass of water at some standard temperature. The two definitions are identical, provided that the thermal capacity of unit mass of water, at a standard temperature, is taken as the unit of heat. But the specific heat of water is often stated in terms of other units. In any case it is necessary to specify the temperature, and sometimes also the pressure, since the specific heat of a substance generally depends to some extent on the external conditions. The methods of measurement, founded on rise of temperature, may be classed as *thermometric methods,* since they depend on the observation of change of temperature with a thermometer. The most familiar of these are the method of mixture and the method of cooling.

§ 2. The *Method of Mixture* consists in imparting the quantity of heat to be measured to a known mass of water, or some other standard substance, contained in a vessel or calorimeter of known thermal capacity, and in observing the rise of temperature produced, from which data the quantity of heat may be found as explained in all elementary text-books. This method is the most generally convenient and most readily applicable of calorimetric methods, but it is not always the most accurate, for various reasons. Some heat is generally lost in transferring the heated body to the calorimeter; this loss may be minimized by performing the transference rapidly, but it cannot be accurately calculated or eliminated. Some heat is lost when the calorimeter is raised above the temperature of its enclosure, and before the final temperature is reached. This can be roughly estimated by observing the rate of change of temperature before and after the experiment, and assuming that the loss of heat is directly proportional to the duration of the experiment and to the average excess of temperature. It can be minimized by making the mixing as rapid as possible, and by using a large calorimeter, so that the excess of temperature is always small. The latter method was generally adopted by J.P. Joule, but the rise of temperature is then difficult to measure with accuracy, since it is necessarily reduced in nearly the same proportion as the correction. There is, however, the advantage that the correction is rendered much less uncertain by this procedure, since the assumption that the loss of heat is proportional to the temperature-excess is only true for small differences of temperature. Rumford proposed to eliminate this correction by starting with the initial temperature of the calorimeter as much below that of its enclosure as the final temperature was expected to be above the same limit. This method has been very generally recommended, but it is really bad, because, although it diminishes the absolute magnitude of the correction, it greatly increases the uncertainty of it and therefore the probable error of the result. The coefficient of heating of a calorimeter when it is below the temperature of its surroundings is seldom, if ever, the same as the coefficient of cooling at the higher temperature, since the convection currents, which do most of the heating or cooling, are rarely symmetrical in the two cases, and moreover, the duration of the two stages is seldom the same. In any case, it is desirable to diminish the loss of heat as much as possible by polishing the exterior of the calorimeter to diminish radiation, and by suspending it by non-conducting supports, inside a polished case, to protect it from draughts. It is also very important to keep the surrounding conditions as constant as possible throughout the experiment. This may be secured by using a large water-bath to surround the apparatus, but in experiments of long duration it is necessary to use an accurate temperature regulator. The method of lagging the calorimeter with cotton-wool or other non-conductors, which is often recommended, diminishes the loss of heat considerably, but renders it very uncertain and variable, and should never be used in work of precision. The bad conductors take so long to reach a steady state that the rate of loss of heat at any moment depends on the past history more than on the temperature of the calorimeter at the moment. A more serious objection to the use of lagging of this kind is the danger of its absorbing moisture. The least trace of damp in the lagging, or of moisture condensed on the surface of the calorimeter, may produce serious loss of heat by evaporation. This is another objection to Rumford’s method of cooling the calorimeter below the surrounding temperature before starting. Among minor difficulties of the method may be mentioned the uncertainty of the thermal capacity of the calorimeter and stirrer, and of the immersed portion of the thermometer. This is generally calculated by assuming values for the specific heats of the materials obtained by experiment between 100° C. and 20° C. Since the specific heats of most metals increase rapidly with rise of temperature, the values so obtained are generally too high. It is best to make this correction as small as possible by using a large calorimeter, so that the mass of water is large in proportion to that of metal. Analogous difficulties arise in the application of other calorimetric methods. The accuracy of the work in each case depends principally on the skill and ingenuity of the experimentalist in devising methods of eliminating the various sources of error. The form of apparatus usually adopted for the method of mixtures is that of Regnault with slight modifications, and figures and descriptions are given in all the text-books. Among special methods which have been subsequently developed there are two which deserve mention as differing in principle from the common type. These are (1) the constant temperature method, (2) the continuous flow method.

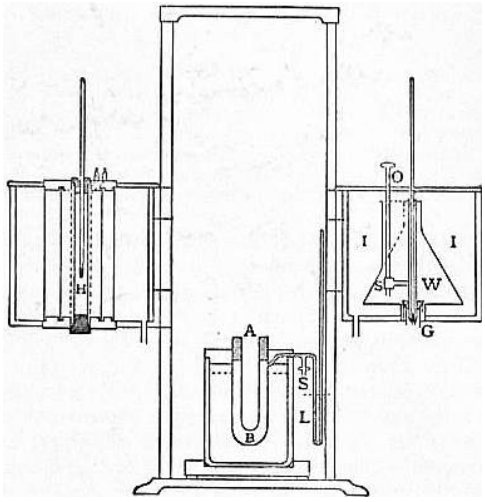

FIG. 1.

The *constant temperature method of mixtures* was proposed by N. Hesehus (*Jour. Phys.*, 1888, vii. p. 489). Cold water at a known temperature is added to the calorimeter, immediately after dropping in the heated substance, at such a rate as to keep the temperature of the calorimeter constant, thus eliminating the corrections for the water equivalent of the calorimeter and the external loss of heat. The calorimeter is surrounded by an air-jacket connected to a petroleum gauge which indicates any small change of temperature in the calorimeter, and enables the manipulator to adjust the supply of cold water to compensate it. The apparatus as arranged by F.A. Waterman is shown in fig. 1 (*Physical Review,* 1896, iv. p. 161). A is the calorimetric tube, B the air-jacket and L the gauge. H is an electric heater for raising the body to a suitable temperature, which can swing into place directly over the calorimeter. W is a conical can containing water cooled by ice I nearly to 0°, which is swung over the calorimeter as soon as the hot body has been introduced and the heater removed. The cold water flow is regulated by a tap S with a long handle O, and its temperature is taken by a delicate thermometer with its bulb at G. The method is interesting, but the manipulations and observations involved are more troublesome than with the ordinary type of calorimeter, and it may be doubted whether any advantage is gained in accuracy.

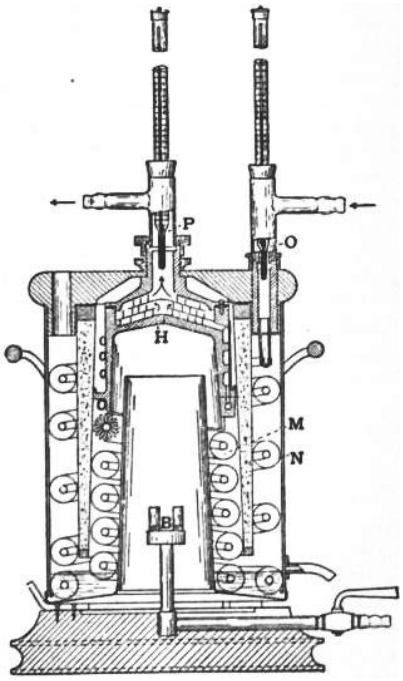

FIG. 2.

The *continuous flow method* is specially applicable to the important case of calorific value of gaseous fuel, where a large quantity of heat is continuously generated at a nearly uniform rate by combustion. Fig. 2 illustrates a recent type of gas calorimeter devised by C.V. Boys (*Proc. R.S.,* 1906, A. 77, p. 122). The heated products of combustion from the burner B impinge on a metal box H, through which water is circulating, and then pass downwards and outwards through a spiral cooler which reduces them practically to the atmospheric temperature. A steady stream of water enters the apparatus by the inflow thermometer O, flows through the spiral coolers N and M, and finally through the box H, where it is well mixed before passing the outflow thermometer P. As soon as a steady state is reached, the difference of temperature between the outflow and inflow thermometers, multiplied by the current of water in grammes per minute gives the heat per minute supplied by combustion. The gas current is simultaneously observed by a suitable meter, which, with subsidiary corrections for pressure, temperature, &c., gives the necessary data for deducing calorific value.

A continuous flow calorimeter has been used by the writer for measuring quantities of heat conveyed by conduction (see CONDUCTION OF HEAT), and also for determining the variation of the specific heat of water. In the latter case two steady currents of water at different temperatures, say 0° and 100° are passed through an equalizer, and the resulting temperature measured without mixing the currents, which are then separately determined by weighing. This is a very good method of comparing the mean specific heats over two ranges of temperature such as 0-50, and 50-100, or 0-20 and 20-40, but it is not so suitable as the electric method described below for obtaining the actual specific heat at any point of the range.

§ 3. *Method of Cooling.*—A common example of this method is the determination of the specific heat of a liquid by filling a small calorimeter with the liquid, raising it to a convenient temperature, and then setting it to cool in an enclosure at a steady temperature, and observing the time taken to fall through a given range when the conditions have become fairly steady. The same calorimeter is afterwards filled with a known liquid, such as water, and the time of cooling is observed through the same range of temperature, in the same enclosure, under the same conditions. The ratio of the times of cooling is equal to the ratio of the thermal capacities of the calorimeter and its contents in the two cases. The advantage of the method is that there is no transference or mixture; the defect is that the whole measurement depends on the assumption that the rate of loss of heat is the same in the two cases, and that any variation in the conditions, or uncertainty in the rate of loss, produces its full effect in the result, whereas in the previous case it would only affect a small correction. Other sources of uncertainty are, that the rate of loss of heat generally depends to some extent on the rate of fall of temperature, and that it is difficult to take accurate observations on a rapidly falling thermometer. As the method is usually practised, the calorimeter is made very small, and the surface is highly polished to diminish radiation. It is better to use a fairly large calorimeter to diminish the rate of cooling and the uncertainty of the correction for the water equivalent. The surface of the calorimeter and the enclosure should be permanently blackened so as to increase the loss of heat by radiation as much as possible, as compared with the losses by convection and conduction,

which are less regular. For accurate work it is essential that the liquid in the calorimeter should be continuously stirred, and also in the enclosure, the lid of which must be water-jacketed, and kept at the same steady temperature as the sides. When all these precautions are taken, the method loses most of the simplicity which is its chief advantage. It cannot be satisfactorily applied to the case of solids or powders, and is much less generally useful than the method of mixture.

§ 4. *Method of Fusion.*—The methods depending on change of state are theoretically the simplest, since they do not necessarily involve any reference to thermometry, and the corrections for external loss of heat and for the thermal capacity of the containing vessels can be completely eliminated. They nevertheless present peculiar difficulties and limitations, which render their practical application more troublesome and more uncertain than is usually supposed. They depend on the experimental fact that the quantity of heat required to produce a given change of state (*e.g.* to convert one gramme of ice at 0° C. into water at 0° C., or one gramme of water at 100° C. into steam at 100° C.) is always the same, and that there need be no change of temperature during the process. The difficulties arise in connexion with the determination of the quantities of ice melted or steam condensed, and in measuring the latent heat of fusion or vaporization in terms of other units for the comparison of observations. The earlier forms of ice-calorimeter, those of Black, and of Laplace and Lavoisier, were useless for work of precision, on account of the impossibility of accurately estimating the quantity of water left adhering to the ice in each case. This difficulty was overcome by the invention of the Bunsen calorimeter, in which the quantity of ice melted is measured by observing the diminution of volume, but the successful employment of this instrument requires considerable skill in manipulation. The sheath of ice surrounding the bulb must be sufficiently continuous to prevent escape of heat, but it must not be so solid as to produce risk of strain. The ideal condition is difficult to secure. In the practical use of the instrument it is not necessary to know both the latent heat of fusion of ice and the change of volume which occurs on melting; it is sufficient to determine the change of volume per calorie, or the quantity of mercury which is drawn into the bulb of the apparatus per unit of heat added. This can be determined by a direct calibration, by inserting a known quantity of water at a known temperature and observing the contraction, or weighing the mercury drawn into the apparatus. In order to be independent of the accuracy of the thermometer employed for observing the initial temperature of the water introduced, it has been usual to employ water at 100° C., adopting as unit of heat the “mean calorie,” which is one-hundredth part of the heat given up by one gramme of water in cooling from 100° to 0° C. The weight of mercury corresponding to the mean calorie has been determined with considerable care by a number of observers well skilled in the use of the instrument. The following are some of their results:—Bunsen, 15.41 mgm.; Velten, 15.47 mgm.; Zakrevski, 15.57 mgm.; Staub, 15.26 mgm. The explanation of these discrepancies in the fundamental constant is not at all clear, but they may be taken as an illustration of the difficulties of manipulation attending the use of this instrument, to which reference has already been made. It is not possible to deduce a more satisfactory value from the latent heat and the change of density, because these constants are very difficult to determine. The following are some of the values deduced by well-known experimentalists for the latent heat of fusion:—Regnault, 79.06 to 79.24 calories, corrected by Person to 79.43; Person, 79.99 calories; Hess, 80.34 calories; Bunsen, 80.025 calories. Regnault, Person and Hess employed the method of mixture which is probably the most accurate for the purpose. Person and Hess avoided the error of water sticking to the ice by using dry ice at various temperatures below 0° C., and determining the specific heat of ice as well as the latent heat of fusion. These discrepancies might, no doubt, be partly explained by differences in the units employed, which are somewhat uncertain, as the specific heat of water changes rapidly in the neighbourhood of 0° C; but making all due allowance for this, it remains evident that the method of ice-calorimetry, in spite of its theoretical simplicity, presents grave difficulties in its practical application.

One of the chief difficulties in the practical use of the Bunsen calorimeter is the continued and often irregular movement of the mercury column due to slight differences of temperature, or pressure between the ice in the calorimeter and the ice bath in which it is immersed. C.V. Boys (*Phil. Mag.*, 1887, vol. 24, p. 214) showed that these effects could be very greatly reduced by surrounding the calorimeter with an outer tube, so that the ice inside was separated from the ice outside by an air space which greatly reduces the free passage of heat. The present writer has found that very good results may be obtained by enclosing the calorimeter in a vacuum jacket (as illustrated in fig. 3), which practically eliminates conduction and convection. If the vacuum jacket is silvered inside, radiation also is reduced to such an extent that, if the vacuum is really good, the external ice bath may be dispensed with for the majority of purposes. If the inner bulb is filled with mercury instead of water and ice, the same arrangement answers admirably as a Favre and Silbermann calorimeter, for measuring small quantities of heat by the expansion of the mercury.

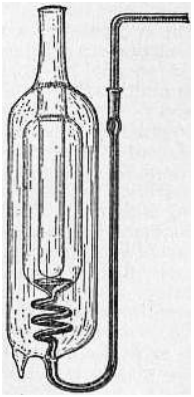

Fig. 3.

The question has been raised by E.L. Nichols (*Phys. Rev.* vol. 8, January 1899) whether there may not be different modifications of ice with different densities, and different values of the latent heat of fusion. He found for natural pond-ice a density 0.9179 and for artificial ice 0.9161. J. Vincent (*Phil. Trans.* A. 198, p. 463) also found a density .9160 for artificial ice, which is probably very nearly correct. If such variations of density exist, they may introduce some uncertainty in the absolute values of results obtained with the ice calorimeter, and may account for some of the discrepancies above enumerated.

§ 5. The *Method of Condensation* was first successfully applied by J. Joly in the construction of his steam calorimeter, a full description of which will be found in text-books. The body to be tested is placed in a special scale-pan, suspended by a fine wire from the arm of a balance inside an enclosure which can be filled with steam at atmospheric pressure. The temperature of the enclosure is carefully observed before admitting steam. The weight of steam condensed on the body gives a means of calculating the quantity of heat required to raise it from the atmospheric temperature up to 100° C. in terms of the latent heat of vaporization of steam at 100° C. There can be no appreciable gain or loss of heat by radiation, if the admission of the steam is sufficiently rapid, since the walls of the enclosure are maintained at 100° C., very nearly. The thermal capacity of the scale-pan, &c., can be determined by a separate experiment, or, still better, eliminated by the differential method of counterpoising with an exactly similar arrangement on the other arm of the balance. The method requires very delicate weighing, as one calorie corresponds to less than two milligrammes of steam condensed; but the successful application of the method to the very difficult problem of measuring the specific heat of a gas at constant volume, shows that these and other difficulties have been very skilfully overcome. The application of the method appears to be practically limited to the measurements of specific heat between the atmospheric temperature and 100° C. The results depend on the value assumed for the latent heat of steam, which Joly takes as 536.7 calories,

following Regnault. Joly has himself determined the mean specific heat of water between 12° and 100° C. by this method, in terms of the latent heat of steam as above given, and finds the result .9952. Assuming that the mean specific heat of water between 12° and 100° is really 1.0011 in terms of the calorie at 20° C. (see table, p. 66), the value of the latent heat of steam at 100° C., as determined by Joly, would be 540.2 in terms of the same unit. The calorie employed by Regnault is to some extent uncertain, but the difference is hardly beyond the probable errors of experiment, since it appears from the results of recent experiments that Regnault made an error of the same order in his determination of the specific heat of water at 100° C.

§ 6. *Energy Methods.*—The third general method of calorimetry, that based on the transformation of some other kind of energy into the form of heat, rests on the general principle of the conservation of energy, and on the experimental fact that all other forms of energy are readily and completely convertible into the form of heat. It is therefore often possible to measure quantities of heat indirectly, by measuring the energy in some other form and then converting it into heat. In addition to its great theoretical interest, this method possesses the advantage of being frequently the most accurate in practical application, since energy can be more accurately measured in other forms than in that of heat. The two most important varieties of the method are (*a*) mechanical, and (*b*) electrical. These methods have reached their highest development in connexion with the determination of the mechanical equivalent of heat, but they may be applied with great advantage in connexion with other problems, such as the measurement of the variation of specific heat, or of latent heats of fusion or vaporization.

§ 7. *Mechanical Equivalent of Heat.*—The phrase “mechanical equivalent of heat” is somewhat vague, but has been sanctioned by long usage. It is generally employed to denote the number of units of mechanical work or energy which, when completely converted into heat without loss, would be required to produce one heat unit. The numerical value of the mechanical equivalent necessarily depends on the particular units of heat and work employed in the comparison. The British engineer prefers to state results in terms of foot-pounds of work in any convenient latitude per pound-degree-Fahrenheit of heat. The continental engineer prefers kilogrammetres per kilogramme-degree-centigrade. For scientific use the C.G.S. system of expression in ergs per gramme-degree-centigrade, or “calorie,” is the most appropriate, as being independent of the value of gravity. A more convenient unit of work or energy, in practice, on account of the smallness of the erg, is the *joule,* which is equal to 10.7 ergs, or one *watt-second* of electrical energy. On account of its practical convenience, and its close relation to the international electrical units, the *joule* has been recommended by the British Association for adoption as the absolute unit of heat. Other convenient practical units of the same kind would be the *watt-hour,* 3600 joules, which is of the same order of magnitude as the kilo-calorie, and the *kilowatt-hour,* which is the ordinary commercial unit of electrical energy.

§ 8. *Joule.*—The earlier work of Joule is now chiefly of historical interest, but his later measurements in 1878, which were undertaken on a larger scale, adopting G.A. Hirn’s method of measuring the work expended in terms of the torque and the number of revolutions, still possess value as experimental evidence. In these experiments (see fig. 4) the paddles were revolved by hand at such a speed as to produce a constant torque on the calorimeter *h*, which was supported on a float *w* in a vessel of water *v*, but was kept at rest by the couple due to a pair of equal weights *k* suspended from fine strings passing round the circumference of a horizontal wheel attached to the calorimeter. Each experiment lasted about forty minutes, and the rise of temperature produced was nearly 3° C. The calorimeter contained about 5 kilogrammes of water, so that the rate of heat-supply was about 6 calories per second. Joule’s final result was 772.55 foot-pounds at Manchester per pound-degree-Fahrenheit at a temperature of 62° F., but individual experiments differed by as much as 1%. This result in C.G.S. measure is equivalent to 4.177 joules per calorie at 16.5° C., on the scale of Joule’s mercury thermometer. His thermometers were subsequently corrected to the Paris scale by A. Schuster in 1895, which had the effect of reducing the above figure to 4.173.

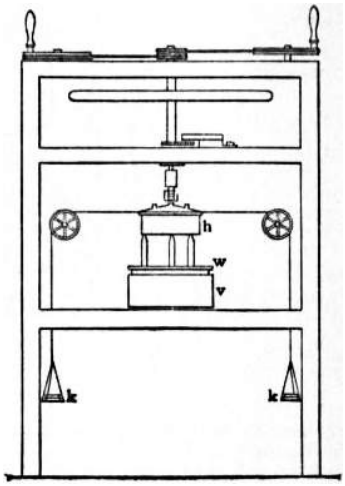

Fig. 4.

§ 9. *Rowland.*—About the same time H.A. Rowland (*Proc. Amer. Acad.* xv. p. 75, 1880) repeated the experiment, employing the same method, but using a larger calorimeter (about 8400 grammes) and a petroleum motor, so as to obtain a greater rate of heating (about 84 calories per second), and to reduce the importance of the uncertain correction for external loss of heat. Rowland’s apparatus is shown in fig. 5. The calorimeter was suspended by a steel wire, the torsion of which made the equilibrium stable. The torque was measured by weights O and P suspended by silk ribbons passing over the pulleys *n* and round the disk *kl*. The power was transmitted to the paddles by bevel wheels, *f*, *g*, rotating a spindle passing through a stuffing box in the bottom of the calorimeter. The number of revolutions and the rise of temperature were recorded on a chronograph drum. He paid greater attention to the important question of thermometry, and extended his researches over a much wider range of temperature, namely 5° to 35° C. His experiments revealed for the first time a diminution in the specific heat of water with rise of temperature between 0° and 30° C., amounting to four parts in 10.000 per 1° C. His thermometers were compared with a mercury thermometer standardized in Paris, and with a platinum thermometer standardized by Griffiths. The result was to reduce the coefficient of diminution of specific heat at 15° C. by nearly one half, but the absolute value at 20° C. is practically unchanged. Thus corrected his values are as follows:—

Temperature	10°	15°	20°	25°	30°	35°
Joules per cal.	4.197	4.188	4.181	4.176	4.175	4.177

These are expressed in terms of the hydrogen scale, but the difference from the nitrogen scale is so small as to be within the limits of experimental error in this particular case. Rowland himself considered his results to be probably correct to one part in 500, and supposed that the greatest uncertainty lay in the comparison of the scale of his mercury thermometer with the air thermometer. The subsequent correction, though not carried out strictly under the conditions of the experiment, showed that the order of accuracy of his work about the middle of the range from 15° to 25° was at least 1 in 1000, and probably 1 in 2000. At 30° he considered that, owing to the increasing magnitude and uncertainty of the radiation correction, there “might be a small error in the direction of making the equivalent too great, and that the specific heat might go on decreasing to even 40° C.” The results considered with reference to the variation of the specific heat of water are shown in the curve marked Rowland in Fig. 6.

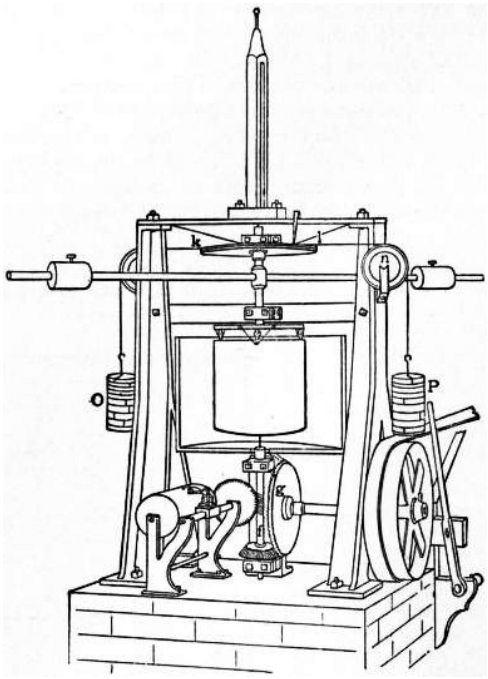

FIG. 5.

§ 10. *Osborne Reynolds and W.H. Moorby (Phil. Trans.,* 1897, p. 381) determined the mechanical equivalent of the mean thermal unit between 0° and 100° C., on a very large scale, with a Froude-Reynolds hydraulic brake and a steam-engine of 100 h.p. This brake is practically a Joule calorimeter, ingeniously designed to churn the water in such a manner as to develop the greatest possible resistance. The admission of water at 0° C. to the brake was controlled by hand in such a manner as to keep the outflow nearly at the boiling-point, the quantity of water in the brake required to produce a constant torque being regulated automatically, as the speed varied, by a valve worked by the lifting of the weighted lever attached to the brake.

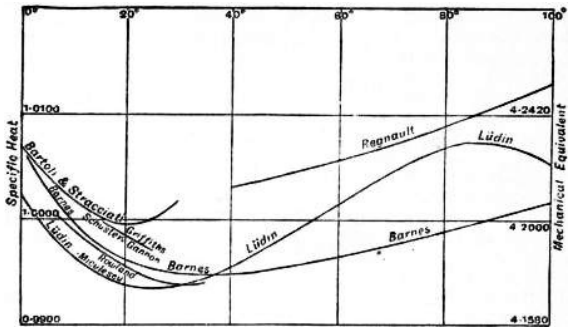

FIG. 6.

The accompanying illustration (fig. 7) shows the brake lagged with cotton-wool, and the 4-ft. lever to which the weights are suspended. The power of the brake may be estimated by comparison with the size of the rope pulley seen behind it on the same shaft. With 300 pounds on a 4-ft. lever at 300 revolutions per minute, the rate of generation of heat was about 12 kilo-calories per second. In spite of the large range of temperature, the correction for external loss of heat amounted to only 5%, with the brake uncovered, and was reduced to less than 2% by lagging. This is the special advantage of working on so large a scale with so rapid a generation of heat. But, for the same reason, the method necessarily presents peculiar difficulties, which were not overcome without great pains and ingenuity. The principal troubles arose from damp in the lagging which necessitated the rejection of several trials, and from dissolved air in the water, causing loss of heat by the formation of steam. Next to the radiation loss, the most uncertain correction was that for conduction of heat along the 4-in. shaft. These losses were as far as possible eliminated by combining the trials in pairs, with different loads on the brake, assuming that the heat-loss would be the same in the heavy and light trials, provided that the external temperature and the gradient in the shaft, as estimated from the temperature of the bearings, were the same. The values deduced in this manner for the equivalent agreed as closely as could be expected considering the impossibility of regulating the external condition of temperature and moisture with any certainty in an engine-room. The extreme variation of results in any one series was only from 776.63 to 779.46 ft.-pounds, or less than ½%. This variation may have been due to the state of the lagging, which Moorby distrusted in spite of the great reduction of the heat-loss, or it may have been partly due to the difficulty of regulating the speed of the engine and the water-supply to the brake in such a manner as to maintain a constant temperature in the outflow, and avoid variations in the heat capacity of the brake. Since hand regulation is necessarily discontinuous, the speed and the temperature were constantly varying, so that it was useless to take readings nearer than the tenth of a degree. The largest variation recorded in the two trials of which full details are given, was 4·9° F. in two minutes in the outflow temperature, and four or five revolutions per minute on the speed. These variations, so far as they were of a purely accidental nature, would be approximately eliminated on the mean of a large number of trials, so that the accuracy of the final result would be of a higher order than might be inferred from a comparison of separate pairs of trials. Great pains were taken to discuss and eliminate all the sources of constant error which could be foreseen. The results of the light trials with 400 ft.-pounds on the brake differ slightly from those with 600 ft.-pounds. This might be merely accidental, or it might indicate some constant difference in the conditions requiring further investigation. It would have been desirable, if possible, to have tried the effect of a larger range of variation in the experimental conditions of load and speed, with a view to detect the existence of constant errors; but owing to the limitations imposed by the use of a steam-engine, and the difficulty of securing steady conditions of running, this proved to

be impossible. There can be no doubt, however, that the final result is the most accurate direct determination of the value of the mean calorie between 0° and 100° C. in mechanical units. Expressed in joules per calorie the result is 4.1832, which agrees very closely with the value found by Rowland as the mean over the range 15° to 20° C. The value 4.183 is independently confirmed in a remarkable manner by the results of the electrical method described below, which give 4.185 joules for the mean calorie, if Rowland's value is assumed as the starting-point, and taken to be 4.180 joules at 20° C.

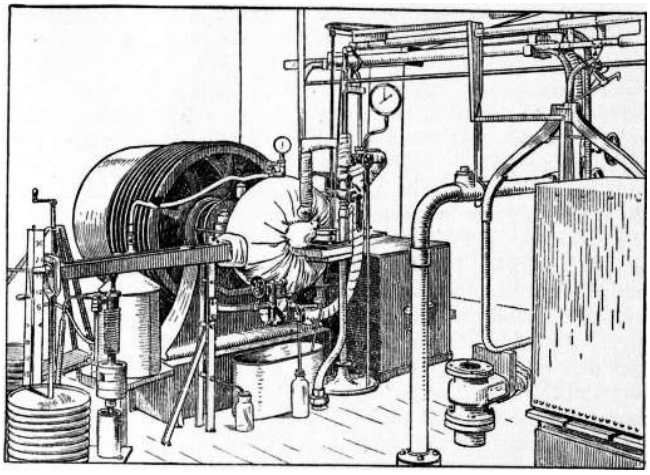

FIG. 7.

§ 11. *Electrical Methods.*—The value of the international electrical units has by this time been so accurately determined in absolute measure that they afford a very good, though indirect, method of determining the mechanical equivalent of heat. But, quite apart from this, electrical methods possess the greatest value for calorimetry, on account of the facility and accuracy of regulating and measuring the quantity of heat supplied by an electric current. The frictional generation of heat in a metallic wire conveying a current can be measured in various ways, which correspond to slightly different methods. By Ohm's law, and by the definition of difference of electric pressure or potential, we obtain the following alternative expressions for the quantity of heat H in joules generated in a time T seconds by a current of C amperes flowing in a wire of resistance R ohms, the difference of potential between the ends of the wire being E = CR volts:—

$$H = ECT = C^2RT = E^2T/R \qquad (1).$$

The method corresponding to the expression C^2RT was adopted by Joule and by most of the early experimentalists. The defects of the earlier work from an electrical point of view lay chiefly in the difficulty of measuring the current with sufficient accuracy owing to the imperfect development of the science of electrical measurement. These difficulties have been removed by the great advances since 1880, and in particular by the introduction of accurate standard cells for measurements of electrical pressure. 65

§ 12. *Griffiths.*—The method adopted by E.H. Griffiths (*Phil. Trans.,* 1893, p. 361), whose work threw a great deal of light on the failure of previous observers to secure consistent results, corresponded to the last expression E^2T/R, and consisted in regulating the current by a special rheostat, so as to keep the potential difference E on the terminals of the resistance *R* balanced against a given number of standard Clark cells of the Board of Trade pattern. The resistance *R* could be deduced from a knowledge of the temperature of the calorimeter and the coefficient of the wire. But in order to obtain trustworthy results by this method he found it necessary to employ very rapid stirring (2000 revolutions per minute), and to insulate the wire very carefully from the liquid to prevent leakage of the current. He also made a special experiment to find how much the temperature of the wire exceeded that of the liquid under the conditions of the experiment. This correction had been neglected by previous observers employing similar methods. The resistance *R* was about 9 ohms, and the potential difference E was varied from three to six Clark cells, giving a rate of heat-supply about 2 to 6 watts. The water equivalent of the calorimeter was about 85 grammes, and was determined by varying the quantity of water from 140 to 260 or 280 grammes, so that the final results depended on a difference in the weight of water of 120 to 140 grammes. The range of temperature in each experiment was 14° to 26° C. The rate of rise was observed with a mercury thermometer standardized by comparison with a platinum thermometer under the conditions of the experiment. The time of passing each division was recorded on an electric chronograph. The duration of an experiment varied from about 30 to 70 minutes. Special observations were made to determine the corrections for the heat supplied by stirring, and that lost by radiation, each of which amounted to about 10% of the heat-supply. The calorimeter C, fig. 8, was gilded, and completely surrounded by a nickel-plated steel enclosure B, forming the bulb of a mercury thermo-regulator, immersed in a large water-bath maintained at a constant temperature. In spite of the large corrections the results were extremely consistent, and the value of the temperature-coefficient of the diminution of the specific heat of water, deduced from the observed variation in the rate of rise at different points of the range 15° to 25°, agreed with the value subsequently deduced from Rowland's experiments over the same range, when his thermometers were reduced to the same scale. Griffiths' final result for the average value of the calorie over this range was 4.192 joules, taking the E.M.F. of the Clark cell at 15° C. to be 1.4342 volts. The difference from Rowland's value, 4.181, could be explained by supposing the E.M.F. of the Clark cells to have in reality been 1.4323 volts, or about 2 millivolts less than the value assumed. Griffiths subsequently applied the same method to the measurement of the specific heat of aniline, and the latent heat of vaporization of benzene and water.

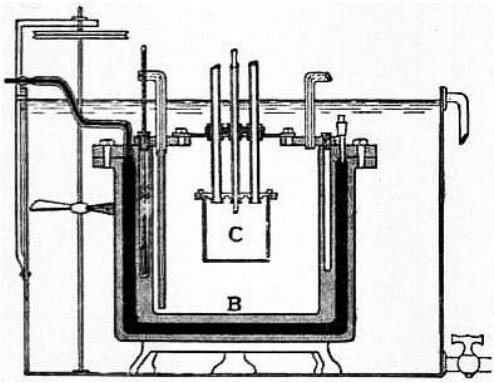

FIG. 8.

§ 13. *Schuster and Gannon.*—The method employed by A. Schuster and W. Gannon for the determination of the specific heat of water in terms of the international electric units (*Phil. Trans.* A, 1895, p. 415) corresponded to the expression ECT, and differed in many essential details from that of Griffiths. The current through a platinoid resistance of about 31 ohms in a calorimeter containing 1500 grammes of water was regulated so that the potential difference on its terminals was equal to that of twenty Board of Trade Clark cells in series. The duration of an experiment was about ten minutes, and the product of the mean current and the time, namely CT, was measured by the weight of silver deposited in a voltameter, which amounted to about 0.56 gramme. The uncertainty due to the correction for the water equivalent was minimized by making it small (about 27 grammes) in comparison with the water weight. The correction for external loss was reduced by employing a small rise of temperature (only 2.22°), and making the rate of heat-supply relatively rapid, nearly 24 watts. The platinoid coil was insulated from the water by shellac varnish. The wire had a length of 760 cms., and the potential difference on its terminals was nearly 30 volts. The rate of stirring adopted was so slow that the heat generated by it could be neglected. The result found was 4.191 joules per calorie at 19° C. This agrees very well with Griffiths considering the difficulty of measuring so small a rise of temperature at 2° with a mercury thermometer. Admitting that the electro-chemical equivalent of silver increases with the age of the solution, a fact subsequently discovered, and that the E.M.F. of the Clark cell is probably less than 1.4340 volts (the value assumed by Schuster and Gannon), there is no difficulty in reconciling the result with that of Rowland.

§ 14. *H.L. Callendar and H.T. Barnes* (*Brit. Assoc. Reports,* 1897 and 1899) adopted an entirely different method of calorimetry, as well as a different method of electrical measurement. A steady current of liquid, Q grammes per second, of specific heat, Js joules per degree, flowing through a fine tube, A B, fig. 9, is heated by a steady electric current during its passage through the tube, and the difference of temperature dθ between the inflowing and the outflowing liquid is measured by a single reading with a delicate pair of differential platinum thermometers at A and B. The difference of potential E between the ends of the tube, and the electric current C through it, are measured on an accurately calibrated potentiometer, in terms of a Clark cell and a standard resistance. If hdθ is the radiation loss in watts we have the equation,

$$EC = JsQd\theta + hd\theta \qquad (2).$$

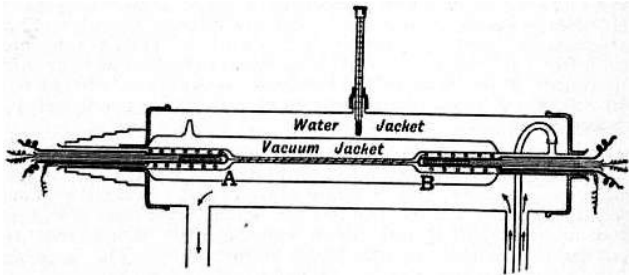

FIG. 9.

The advantage of this method is that all the conditions are steady, so that the observations can be pushed to the limit of accuracy and sensitiveness of the apparatus. The water equivalent of the calorimeter is immaterial, since there is no appreciable change of temperature. The heat-loss can be reduced to a minimum by enclosing the flow-tube in a hermetically sealed glass vacuum jacket. Stirring is effected by causing the water to circulate spirally round the bulbs of the thermometers and the heating conductor as indicated in the figure. The conditions can be very easily varied through a wide range. The heat-loss $hd\theta$ is determined and eliminated by varying the flow of liquid and the electric current simultaneously, in such a manner as to secure approximately the same rise of temperature for two or more widely different values of the flow of liquid. An example taken from the *Electrician*, September 1897, of one of the earliest experiments by this method on the specific heat of mercury will make the method clearer. The flow-tube was about 1 metre long and 1 millim. in diameter, coiled in a short spiral inside the vacuum jacket. The outside of the vacuum jacket was immersed in a water jacket at a steady temperature equal to that of the inflowing mercury.

SPECIFIC HEAT OF MERCURY BY CONTINUOUS ELECTRIC METHOD

Flow of Hg.	Rise of Temp.	Watts.	Heat-loss.	Specific Heat.
gm./sec.	dθ	EC	hdθ	Per gm. deg.
8.753	11.764	14.862	0.655	.13780 joules
4.594	12.301	7.912	0.865	.03297 cals.

It is assumed as a first approximation that the heat-loss is proportional to the rise of temperature dθ, provided

that dθ is nearly the same in both cases, and that the distribution of temperature in the apparatus is the same for the same rise of temperature whatever the flow of liquid. The result calculated on these assumptions is given in the last column in joules, and also in calories of 20° C. The heat-loss in this example is large, nearly 4.5% of the total supply, owing to the small flow and the large rise of temperature, but this correction was greatly reduced in subsequent observations on the specific heat of water by the same method. In the case of mercury the liquid itself can be utilized to conduct the electric current. In the case of water or other liquids it is necessary to employ a platinum wire stretched along the tube as heating conductor. This introduces additional difficulties of construction, but does not otherwise affect the method. The absolute value of the specific heat deduced necessarily depends on the absolute values of the electrical standards employed in the investigation. But for the determination of relative values of specific heats in terms of a standard liquid, or of the variations of specific heat of a liquid, the method depends only on the constancy of the standards, which can be readily and accurately tested. The absolute value of the E.M.F. of the Clark cells employed was determined with a special form of electrodynamometer (Callendar, *Phil. Trans.* A. 313, p. 81), and found to be 1.4334 volts, assuming the ohm to be correct. Assuming this value, the result found by this method for the specific heat of water at 20° C. agrees with that of Rowland within the probable limits of error.

§ 15. *Variation of Specific Heat of Water.*—The question of the variation of the specific heat of water has a peculiar interest and importance in connexion with the choice of a thermal unit. Many of the uncertainties in the reduction of older experiments, such as those of Regnault, arise from uncertainty in regard to the unit in terms of which they are expressed, which again depends on the scale of the particular thermometer employed in the investigation. The first experiments of any value were those of Regnault in 1847 on the specific heat of water between 110° C. and 192° C. They were conducted on a very large scale by the method of mixture, but showed discrepancies of the order of 0.5%, and the calculated results in many cases do not agree with the data. This may be due merely to deficient explanation of details of tabulation. We may probably take the tabulated values as showing correctly the rate of variation between 110° and 190° C., but the values in terms of any particular thermal unit must remain uncertain to at least 0.5% owing to the uncertainties of the thermometry. Regnault himself adopted the formula,

$$s = 1 + 0.00004t + 0.0000009t^2 \text{ (Regnault)}, \qquad (3)$$

for the specific heat s at any temperature t C. in terms of the specific heat at 0° C. taken as the standard. This formula has since been very generally applied over the whole range 0° to 200° C., but the experiments could not in reality give any information with regard to the specific heat at temperatures below 100° C. The linear formula proposed by J. Bosscha from an independent reduction of Regnault's experiments is probably within the limits of accuracy between 100° and 200° C., so far as the mean rate of variation is concerned, but the absolute values require reduction. It may be written—

$$s = S_{100} + .00023(t - 100) \quad \text{(Bosscha-Regnault)} \qquad (4).$$

The work of L. Pfaundler and H. Platter, of G.A. Hirn, of J.C. Jamin and Amaury, and of many other experimentalists who succeeded Regnault, appeared to indicate much larger rates of increase than he had found, but there can be little doubt that the discrepancies of their results, which often exceeded 5%, were due to lack of appreciation of the difficulties of calorimetric measurements. The work of Rowland by the mechanical method was the first in which due attention was paid to the thermometry and to the reduction of the results to the absolute scale of temperature. The agreement of his corrected results with those of Griffiths by a very different method, left very little doubt with regard to the rate of diminution of the specific heat of water at 20° C. The work of A. Bartoli and E. Stracciati by the method of mixture between 0° and 30° C., though their curve is otherwise similar to Rowland's, had appeared to indicate a minimum at 20° C., followed by a rapid rise. This lowering of the minimum was probably due to some constant errors inherent in their method of experiment. The more recent work of Lüdin, 1895, under the direction of Prof. J. Pernet, extended from 0° to 100° C., and appears to have attained as high a degree of excellence as it is possible to reach by the employment of mercury thermometers in conjunction with the method of mixture. His results, exhibited in fig. 6, show a minimum at 25° C., and a maximum at 87° C., the values being .9935 and 1.0075 respectively in terms of the mean specific heat between 0° and 100° C. He paid great attention to the thermometry, and the discrepancies of individual measurements at any one point nowhere exceed 0.3%, but he did not vary the conditions of the experiments materially, and it does not appear that the well-known constant errors of the method could have been completely eliminated by the devices which he adopted. The rapid rise from 25° to 75° may be due to radiation error from the hot water supply, and the subsequent fall of the curve to the inevitable loss of heat by evaporation of the boiling water on its way to the calorimeter. It must be observed, however, that there is another grave difficulty in the accurate determination of the specific heat of water near 100° C. by this method, namely, that the quantity actually observed is not the specific heat *at* the higher temperature t, but the *mean specific heat* over the range 18° to t. The specific heat itself can be deduced only by differentiating the curve of observation, which greatly increases the uncertainty. The peculiar advantage of the electric method of Callendar and Barnes, already referred to, is that the specific heat itself is determined over a range of 8° to 10° at each point, by adding accurately measured quantities of heat to the water at the desired temperature in an isothermal enclosure, under perfectly steady conditions, without any possibility of evaporation or loss of heat in transference. These experiments, which have been extended by Barnes over the whole range 0° to 100°, agree very well with Rowland and Griffiths in the rate of variation at 20° C., but show a rather flat minimum of specific heat in the neighbourhood of 38° to 40° C. At higher points the rate of variation is very similar to that of Regnault's curve, but taking the specific heat at 20° as the standard of reference, the actual values are nearly 0.56% less than Regnault's. It appears probable that his values for higher temperatures may be adopted with this reduction, which is further confirmed by the results of Reynolds and Moorby, and by those of Lüdin. According to the electric method, the whole range of variation of the specific heat between 10° and 80° is only 0.5%. Comparatively simple formulae, therefore, suffice for its expression to 1 in 10,000, which is beyond the limits of accuracy of the observations. It is more convenient in practice to use a few simple formulae, than to attempt to represent the whole range by a single complicated expression:—

Below 20° C. $s = 0.9982 + 0.0000045(t - 40)^2 - 0.0000005(t - 20)^3$.

From 20° to 60°, $s = 0.9982 + 0.0000045(t - 40)^2$ (5).

Above 60° to 200° $\begin{cases} s = 0.9944 + .00004t + 0.0000009t^2 & \text{(Regnault corrd.)} \\ s = 1.000 + 0.00022(t - 60) & \text{(Bosscha corrd.)} \end{cases}$

The addition of the cubic term below 20° is intended to represent the somewhat more rapid change near the

freezing-point. This effect is probably due, as suggested by Rowland, to the presence of a certain proportion of ice molecules in the liquid, which is also no doubt the cause of the anomalous expansion. Above 60° C. Regnault's formula is adopted, the absolute values being simply diminished by a constant quantity 0.0056 to allow for the probable errors of his thermometry. Above 100° C., and for approximate work generally, the simpler formula of Bosscha, similarly corrected, is probably adequate.

The following table of values, calculated from these formulae, is taken from the *Brit. Assoc. Report,* 1899, with a slight modification to allow for the increase in the specific heat below 20° C. This was estimated in 1899 as being equivalent to the addition of the constant quantity 0.20 to the values of the total heat h of the liquid as reckoned by the parabolic formula (5). This quantity is now, as the result of further experiments, added to the values of h, and also represented in the formula for the specific heat itself by the cubic term.

SPECIFIC HEAT OF WATER IN TERMS OF UNIT AT 20° C. 4.180 JOULES

t° C.	Joules.	s.	h	Rowland.
0°	4.208	1.0094	0	0
5°	4.202	1.0054	5.037	5.037
10°	4.191	1.0027	10.056	10.058
15°	4.184	1.0011	15.065	15.068
20°	4.180	1.0000	20.068	20.071
25°	4.177	0.9992	25.065	25.067
30°	4.175	0.9987	30.060	30.057
35°	4.173	0.9983	35.052	35.053
40°	4.173	0.9982	40.044	
50°	4.175	0.9987	50.028	
60°	4.180	1.0000	60.020	
70°	4.187	1.0016	70.028	
80°	4.194	1.0033	80.052	
90°	4.202	1.0053	90.095	Shaw
100°	4.211	1.0074	100.158	Regnault
120°	4.231	1.0121	120.35	120.73
140°	4.254	1.0176	140.65	140.88
160°	4.280	1.0238	161.07	161.20
180°	4.309	1.0308	181.62	182.14
200°	4.341	1.0384	202.33	
220°	4.376	1.0467	223.20	

The unit of comparison in the following table is taken as the specific heat of water at 20° C. for the reasons given below. This unit is taken as being 4.180 joules per gramme-degree-centigrade on the scale of the platinum thermometer, corrected to the absolute scale as explained in the article THERMOMETRY, which has been shown to be practically equivalent to the hydrogen scale. The value 4.180 joules at 20° C. is the mean between Rowland's corrected result 4.181 and the value 4.179, deduced from the experiments of Reynolds and Moorby on the assumption that the ratio of the mean specific heat 0° to 100° to that at 20° is 1.0016, as given by the formulae representing the results of Callendar and Barnes. This would indicate that Rowland's corrected values should, if anything, be lowered. In any case the value of the mechanical equivalent is uncertain to at least 1 in 2000.

The mean specific heat, over any range of temperature, may be obtained by integrating the formulae between the limits required, or by taking the difference of the corresponding values of the total heat *h*, and dividing by the range of temperature. The quantity actually observed by Rowland was the total heat. It may be remarked that starting from the same value at 5°, for the sake of comparison, Rowland's values of the total heat agree to 1 in 5000 with those calculated from the formulae. The values of the total heat observed by Regnault, as reduced by Shaw, also show a very fair agreement, considering the uncertainty of the units. It must be admitted that it is desirable to redetermine the variation of the specific heat above 100° C. This is very difficult on account of the steam-pressure, and could not easily be accomplished by the electrical method. Callendar has, however, devised a continuous method of mixture, which appears to be peculiarly adapted to the purpose, and promises to give more certain results. In any case it may be remarked that formulae such as those of Jamin, Henrichsen, Baumgartner, Winkelmann or Dieterici, which give far more rapid rates of increase than that of Regnault, cannot possibly be reconciled with his observations, or with those of Reynolds and Moorby, or Callendar and Barnes, and are certainly inapplicable above 100° C.

§ 16. *On the Choice of the Thermal Unit.*—So much uncertainty still prevails on this fundamental point that it cannot be passed over without reference. There are three possible kinds of unit, depending on the three fundamental methods already given: (1) the thermometric unit, or the thermal capacity of unit mass of a standard substance under given conditions of temperature and pressure on the scale of a standard thermometer. (2) The latent-heat unit, or the quantity of heat required to melt or vaporize unit mass of a standard substance under given conditions. This unit has the advantage of being independent of thermometry, but the applicability of these methods is limited to special cases, and the relation of the units to other units is difficult to determine. (3) The absolute or mechanical unit, the quantity of heat equivalent to a given quantity of mechanical or electrical energy. This can be very accurately realized, but is not so convenient as (1) for ordinary purposes.

In any case it is necessary to define a thermometric unit of class (1). The standard substance must be a liquid. Water is always selected, although some less volatile liquid, such as aniline or mercury, would possess many advantages. With regard to the scale of temperature, there is very general agreement that the absolute scale as realized by the hydrogen or helium thermometer should be adopted as the ultimate standard of reference. But as the hydrogen thermometer is not directly available for the majority of experiments, it is necessary to use a secondary standard for the practical definition of the unit. The electrical resistance thermometer of platinum presents very great advantages for this purpose over the mercury thermometer in point of reproducibility, accuracy and adaptability to the practical conditions of experiment. The conditions of use of a mercury thermometer in a calorimetric experiment are necessarily different from those under which its corrections are determined, and this difference must inevitably give rise to constant errors in practical work. The primary consideration in the definition of a unit is to select that method which permits the highest order of accuracy in comparison and verification. For this reason the definition of the thermal unit will in the end probably be referred

to a scale of temperature defined in terms of a standard platinum thermometer.

There is more diversity of opinion with regard to the question of the standard temperature. Many authors, adopting Regnault's formula, have selected 0° C. as the standard temperature, but this cannot be practically realized in the case of water, and his formula is certainly erroneous at low temperatures. A favourite temperature to select is 4° C., the temperature of maximum density, since at this point the specific heat at constant volume is the same as that at constant pressure But this is really of no consequence, since the specific heat at constant volume cannot be practically realized. The specific heat at 4° could be accurately determined at the mean over the range 0° to 8° keeping the jacket at 0° C. But the change appears to be rather rapid near 0°, the temperature is inconveniently low for ordinary calorimetric work, and the unit at 4° would be so much larger than the specific heat at ordinary temperatures that nearly all experiments would require reduction. The natural point to select would be that of minimum specific heat, but if this occurs at 40° C. it would be inconveniently high for practical realization except by the continuous electrical method. It was proposed by a committee of the British Association to select the temperature at which the specific heat was 4.200 joules, leaving the exact temperature to be subsequently determined. It was supposed at the time, from the original reduction of Rowland's experiments, that this would be nearly at 10° C., but it now appears that it may be as low is 5° C., which would be inconvenient. This is really only an absolute unit in disguise, and evades the essential point, which is the selection of a standard temperature for the water thermometric unit. A similar objection applies to selecting the temperature at which the specific heat is equal to its mean value between 0° and 100°. The mean calorie cannot be accurately realized in practice in any simple manner, and is therefore unsuitable as a standard of comparison. Its relation to the calorie at any given temperature, such as 15° or 20°, cannot be determined with the same degree of accuracy as the ratio of the specific heat at 15° to that at 20°, if the scale of temperature is given. The most practical unit is the calorie at 15° or 20° or some temperature in the range of ordinary practice. The temperature most generally favoured is 15°, but 20° would be more suitable for accurate work. These units differ only by 11 parts in 10,000 according to Callendar and Barnes, or by 13 in 10,000 according to Rowland and Griffiths, so that the difference between them is of no great importance for ordinary purposes. But for purposes of definition it would be necessary to take the mean value of the specific heat *over a given range* of temperature, preferably at least 10°, rather than the specific heat *at a point* which necessitates reference to some formula of reduction for the rate of variation. The specific heat at 15° would be determined with reference to the mean over the range 10° to 20°, and that at 20° from the range 15° to 25°. There can be no doubt that the range 10° to 20° is too low for the accurate thermal regulation of the conditions of the experiment. The range 15° to 25° would be much more convenient from this point of view, and a mean temperature of 20° is probably nearest the average of accurate calorimetric work. For instance 20° is the mean of the range of the experiments of Griffiths and of Rowland, and is close to that of Schuster and Gannon. It is readily attainable at any time in a modern laboratory with adequate heating arrangements, and is probably on the whole the most suitable temperature to select.

§ 17. *Specific Heat of Gases.*—In the case of solids and liquids under ordinary conditions of pressure, the external work of expansion is so small that it may generally be neglected; but with gases or vapours, or with liquids near the critical point, the external work becomes so large that it is essential to specify the conditions under which the specific heat is measured. The most important cases are, the specific heats (1) at constant volume; (2) at constant pressure; (3) at saturation pressure in the case of a liquid or vapour. In consequence of the small thermal capacity of gases and vapours per unit volume at ordinary pressures, the difficulties of direct measurement are almost insuperable except in case (2). Thus the direct experimental evidence is somewhat meagre and conflicting, but the question of the relation of the specific heats of gases is one of great interest in connexion with the kinetic theory and the constitution of the molecule. The well-known experiments of Regnault and Wiedemann on the specific heat of gases at constant pressure agree in showing that the *molecular specific heat,* or the thermal capacity of the molecular weight in grammes, is approximately independent of the temperature and pressure in case of the more stable diatomic gases, such as H_2, O_2, N_2, CO, &c., and has nearly the same value for each gas. They also indicate that it is much larger, and increases considerably with rise of temperature, in the case of more condensible vapours, such as Cl_2, Br_2, or more complicated molecules, such as CO_2, N_2O, NH_3, C_2H_4. The direct determination of the specific heat at constant volume is extremely difficult, but has been successfully attempted by Joly with his steam calorimeter, in the case of air and CO_2. Employing pressures between 7 and 27 atmospheres, he found that the specific heat of air between 10° and 100° C. increased very slightly with increase of density, but that of CO_2 increased nearly 3% between 7 and 21 atmospheres. The following formulae represent his results for the specific heat *s* at constant volume in terms of the density *d* in gms. per c. c.:—

$$\text{Air, } s = 0.1715 + 0.028d,$$
$$CO_2, \; s = 0.165 + 0.213d + 0.34d^2.$$

§ 18. *Ratio of Specific Heats.*—According to the elementary kinetic theory of an ideal gas, the molecules of which are so small and so far apart that their mutual actions may be neglected, the kinetic energy of translation of the molecules is proportional to the absolute temperature, and is equal to $\frac{3}{2}$ of pv, the product of the pressure and the volume, per unit mass. The expansion per degree at constant pressure is $v/\theta = R/p$. The external work of expansion per degree is equal to R, being the product of the pressure and the expansion, and represents the difference of the specific heats S - s, at constant pressure and volume, assuming as above that the internal work of expansion is negligible. If the molecules are supposed to be like smooth, hard, elastic spheres, incapable of receiving any other kind of energy except that of translation, the specific heat at constant volume would be the increase per degree of the kinetic energy namely $3pv/2\theta - 3R/2$, that at constant pressure would be 5R/2, and the ratio of the specific heats would be $\frac{5}{3}$ or 1.666. This appears to be actually the case for monatomic gases such as mercury vapour (Kundt and Warburg, 1876), argon and helium (Ramsay, 1896). For diatomic or compound gases Clerk Maxwell supposed that the molecule would also possess energy of rotation, and endeavoured to prove that in this case the energy would be equally divided between the six degrees of freedom, three of translation and three of rotation, if the molecule were regarded as a rigid body incapable of vibration-energy. In this case we should have s = 3R, S = 4R, $S/s = \frac{4}{3} = 1.333$. In 1879 Maxwell considered it one of the greatest difficulties which the kinetic theory had yet encountered, that in spite of the many other degrees of freedom of vibration revealed by the spectroscope, the experimental value of the ratio *S/s* was 1.40 for so many gases, instead of being less than $\frac{4}{3}$. Somewhat later L. Boltzmann suggested that a diatomic molecule regarded as a rigid dumb-bell or figure of rotation, might have only five effective degrees of freedom, since the energy of rotation about the axis of symmetry could not be altered by collisions between the molecules. The theoretical value of the ratio S/s in this case would be the required $\frac{7}{5}$. For a rigid molecule on this theory the smallest value possible would be $\frac{4}{3}$. Since

much smaller values are found for more complex molecules, we may suppose that, in these cases, the energy of rotation of a polyatomic molecule may be greater than its energy of translation, or else that heat is expended in splitting up molecular aggregates, and increasing energy of vibration. A hypothesis doubtfully attributed to Maxwell is that each additional atom in the molecule is equivalent to two extra degrees of freedom. From an m-atomic molecule we should then have S/s = 1 + 2/(2m + 1). This gives a series of ratios $^5/_3$, $^7/_5$, $^9/_7$, $^{11}/_9$, &c., for 1, 2, 3, 4, &c., atoms in the molecule, values which fall within the limits of experimental error in many cases. It is not at all clear, however, that energy of vibration should bear a constant ratio to that of translation, although this would probably be the case for rotation. For the simpler gases, which are highly diathermanous and radiate badly even at high temperature, the energy of vibration is probably very small, except under the special conditions which produce luminosity in flames and electric discharges. For such gases, assuming a constant ratio of rotation to translation, the specific heat at low pressures would be very nearly constant. For more complex molecules the radiative and absorptive powers are known to be much greater. The energy of vibration may be appreciable at ordinary temperatures, and would probably increase more rapidly than that of translation with rise of temperature, especially near a point of dissociation. This would account for an increase of S, and a diminution of the ratio S/s, with rise of temperature which apparently occurs in many vapours. The experimental evidence, however, is somewhat conflicting, and further investigations are very desirable on the variation of specific heat with temperature. Given the specific heat as a function of the temperature, its variation with pressure may be determined from the characteristic equation of the gas. The direct methods of measuring the ratio S/s, by the velocity of sound and by adiabatic expansion, are sufficiently described in many text-books.

§ 19. *Atomic and Molecular Heats.*—The ideal atomic heat is the thermal capacity of a gramme-atom in the ideal state of monatomic gas at constant volume. This would be nearly three calories. For a diatomic gas, the molecular heat would be nearly five calories, or the atomic heat of a gas in the diatomic state would be 2.5. Estimated at constant pressure the atomic heat would be 3.5. Some authors adopt 2.5 and some 3.5 for the ideal atomic heat. The atomic heat of a metal in the solid state is in most cases larger than six calories at ordinary temperatures. Considering the wide variations in the physical condition and melting points, the comparatively close agreement of the atomic heats of the metals at ordinary temperatures, known as Dulong and Petit's Law, is very remarkable. The specific heats as a rule increase with rise of temperature, in some cases, *e.g.* iron and nickel, very rapidly. According to W.A. Tilden (*Phil. Trans.,* 1900), the atomic heats of pure nickel and cobalt, as determined from experiments at the boiling-points of O_2, and CO_2, diminish so rapidly at temperatures below 0° C. as to suggest that they would reach the value 2.42 at the absolute zero. This is the value of the minimum of atomic heat calculated by Perry from diatomic hydrogen, but the observations themselves might be equally well represented by taking the imaginary limit 3, since the quantity actually observed is the mean specific heat between 0° and −182.5° C. Subsequent experiments on other metals at low temperatures did not indicate a similar diminution of specific heat, so that it may be doubted whether the atomic heats really approach the ideal value at the absolute zero. No doubt there must be approximate relations between the atomic and molecular heats of similar elements and compounds, but considering the great variations of specific heat with temperature and physical state, in alloys, mixtures or solutions, and in allotropic or other modifications, it would be idle to expect that the specific heat of a compound could be accurately deduced by any simple additive process from that of its constituents.

Authorities.—Joule's *Scientific Papers* (London, 1890); Ames and Griffiths, *Reports to the International Congress* (Paris, 1900), "On the Mechanical Equivalent of Heat," and "On the Specific Heat of Water"; Griffiths, *Thermal Measurement of Energy* (Cambridge, 1901); Callendar and Barnes, *Phil. Trans.* A, 1901, "On the Variation of the Specific Heat of Water"; for combustion methods, see article Thermochemistry, and treatises by Thomsen, Pattison-Muir and Berthelot; see also articles Thermodynamics and Vaporization.

(H. L. C.)

CALOVIUS, ABRAHAM (1612-1686), German Lutheran divine, was born at Mohrungen in east Prussia, on the 16th of April 1612. After studying at Königsberg, in 1650 he was appointed professor of theology at Wittenberg, where he afterwards became general superintendent and primarius. He died on the 25th of February 1686. Calovius was the most noteworthy of the champions of Lutheran orthodoxy in the 17th century. He strongly opposed the Catholics, Calvinists and Socinians, attacked in particular the reconciliation policy or "syncretism" of Georg Calixtus (cf. the *Consensus repetitus fidei vere lutheranae,* 1665), and as a writer of polemics he had few equals. His chief dogmatic work, *Systema locorum theologicorum* (12 vols. 1655-1677), represents the climax of Lutheran scholasticism. In his *Biblia Illustrata* (4 vols.), written from the point of view of a very strict belief in inspiration, his object is to refute the statements made by Hugo Grotius in his Commentaries. His *Historia Syncretistica* (1682) was suppressed.

CALPURNIUS, TITUS, Roman bucolic poet, surnamed Siculus from his birthplace or from his imitation of the style of the Sicilian Theocritus, most probably flourished during the reign of Nero. Eleven eclogues have been handed down to us under his name, of which the last four, from metrical considerations and express MS. testimony, are now generally attributed to Nemesianus (*q.v.*), who lived in the time of the emperor Carus and his sons (latter half of the 3rd century A.D.). Hardly anything is known of the life of Calpurnius; we gather from the poems themselves (in which he is obviously represented by "Corydon") that he was in poor circumstances and was on the point of emigrating to Spain, when "Meliboeus" came to his aid. Through his influence Calpurnius apparently secured a post at Rome. The time at which Calpurnius lived has been much discussed, but all the indications seem to point to the time of Nero. The emperor is described as a handsome youth, like Mars and Apollo, whose accession marks the beginning of a new golden age, prognosticated by the appearance of a comet, doubtless the same that appeared some time before the death of Claudius; he exhibits splendid games in the amphitheatre (probably the wooden amphitheatre erected by Nero in 57); and in the words

maternis causam qui vicit Iulis[1] (i. 45),

there is a reference to the speech delivered in Greek by Nero on behalf of the Ilienses (Suetonius, *Nero*, 7; Tacitus, *Annals*, xii. 58), from whom the Julii derived their family.[2] Meliboeus, the poet's patron, has been variously identified with Columella, Seneca the philosopher, and C. Calpurnius Piso. Although the sphere of Meliboeus's literary activity (as indicated in iv. 53) suits none of these, what is known of Calpurnius Piso fits in well with what is said of Meliboeus by the poet, who speaks of his generosity, his intimacy with the emperor, and his interest in tragic poetry. His claim is further supported by the poem *De Laude Pisonis* (ed. C.F. Weber, 1859) which has come down to us without the name of the author, but which there is considerable reason for attributing to Calpurnius.[3] The poem exhibits a striking similarity with the eclogues in metre, language and subject-matter. The author of the *Laus* is young, of respectable family and desirous of gaining the favour of Piso as his Maecenas. Further, the similarity between the two names can hardly be accidental; it is suggested that the poet may have been adopted by the courtier, or that he was the son of a freedman of Piso. The attitude of the author of the *Laus* towards the subject of the panegyric seems to show less intimacy than the relations between Corydon and Meliboeus in the eclogues, and there is internal evidence that the *Laus* was written during the reign of Claudius (Teuffel-Schwabe, *Hist, of Rom. Lit.* § 306, 6).

Mention may here be made of the fragments of two short hexameter poems in an Einsiedeln MS., obviously belonging to the time of Nero, which if not written by Calpurnius, were imitated from him.

Although there is nothing original in Calpurnius, he is "a skilful literary craftsman." Of his models the chief is Virgil, of whom (under the name of Tityrus) he speaks with great enthusiasm; he is also indebted to Ovid and Theocritus. Calpurnius is "a fair scholar, and an apt courtier, and not devoid of real poetical feeling. The bastard style of pastoral cultivated by him, in which the description of nature is made the writer's pretext, while ingenious flattery is his real purpose, nevertheless excludes genuine pleasure, and consequently genuine poetical achievement. He may be fairly compared to the minor poets of the reign of Anne" (Garnett). 69

Calpurnius was first printed in 1471, together with Silius Italicus and has been frequently republished, generally with Gratius Faliscus and Nemesianus. The separate authorship of the eclogues of Calpurnius and Nemesianus was established by M. Haupt's *De Carminibus bucolicis Calpurnii et Nemesiani* (1854). Editions by H. Schenkl (1885), with full introduction and *index verborum*, and by C.H. Keene (1887), with introduction, commentary and appendix. English verse translation by E.J.L. Scott (1891); see H.E. Butler, *Post-Augustan Poetry* (Oxford, 1909), pp. 150 foil., and F. Skutsch in Pauly-Wissowa's *Realencyclopädie*, iii. 1 (1897).

(J. H. F.)

1 *Iulis* for *in ulnis* according to the best MS. tradition.

2 According to Dr R. Garnett (and Mr Greswell, as stated in Conington's *Virgil*, i. p. 123, note) the emperor referred to is the younger Gordian (A.D. 238). His arguments in favour of this will be found in the article on Calpurnius by him in the 9th edition of the *Encyclopaedia Britannica* and in the *Journal of Philology*, xvi., 1888; see in answer J.P. Postgate, "The Comet of Calpurnius Siculus" in *Classical Review*, June 1902. Dean Merivale (*Hist. of the Romans under the Empire*, ch. 60) and Pompei, "Intorno al Tempo del Poeta Calpurnio" in *Atti del Istituto Veneto*, v. 6 (1880), identify the amphitheatre with the Colosseum (Flavian amphitheatre) and assign Calpurnius to the reign of Domitian.

3 It has been variously ascribed to Virgil, Ovid, Lucan, Statius and Saleius Bassus.

CALTAGIRONE, a city and episcopal see of the province of Catania, Sicily, situated 1999 ft. above sea-level, 36 m. S.W. of Catania direct (55 m. by rail). Pop. (1881) 25,978; (1901) town 35,116; commune 45,956. It is well built, and is said to be the most civilized provincial town in Sicily. Extensive Sicel cemeteries have been explored to the north of the town (*Not. Scavi*, 1904, 65), and a Greek necropolis of the 6th and 5th centuries B.C. has been found to the south-east (*ibid.* 132). Remains of buildings of Roman date have also been discovered; but the name of the ancient city which stood here is unknown. The present name is a corruption of the Saracen *Kalat-al-Girche* (the castle of Girche, the chieftain who fortified it).

CALTANISETTA, a town and episcopal see of Sicily, the capital of a province of the same name, 60 m. S.E. of Palermo direct and 83 m. by rail, situated 1930 ft. above sea-level. Pop. (1901) 43,303. The town is of Saracenic origin, as its name *Kalat-al-Nisa*, the "Ladies' Castle," indicates, and some ruins of the old castle (called *Pietrarossa*) still exist. Otherwise the town contains no buildings of artistic or historical interest, but it commands striking views. It is the centre of the Sicilian sulphur industry and the seat of a royal school of mines. Two miles east is the interesting Norman abbey of S. Spirito.

CALTROP (from the Mid. Eng. *calketrappe*, probably derived from the Lat. *calx*, a heel, and *trappa*, Late Lat. for a snare), an iron ball, used as an obstacle against cavalry, with four spikes so arranged, that however placed in or on the ground, one spike always points upwards. It is also the botanical name for several species of thistles.

CALUIRE-ET-CUIRE, a town of eastern France, in the department of Rhone, 2½ m. N. by E. of Lyons by rail. Pop. (1906) 9255. It has manufactures of coarse earthenware and hard-ware, copper and bronze foundries and nursery-gardens.

CALUMET (Norm. Fr. form of *chalumet*, from Lat. *calamus*, a reed), the name given by the French in Canada to the “peace-pipe” of the American Indians. This pipe occupied among the tribes a position of peculiar symbolic significance, and was the object of profound veneration. It was smoked on all ceremonial occasions, even on declarations of war, but its special use was at the making of treaties of peace. It was usually about 2½ ft. long, and in the west the bowl was made of red pipes tone (catlinite), a fine-grained, easily-worked stone of a rich red colour found chiefly in the Côteau des Prairies west of Big Stone Lake, Dakota. The quarries were formerly neutral ground among the warring Indian tribes, many sacred traditions being associated with the locality and its product (Longfellow, *Hiawatha*, i.). The pipe stem was of reed decorated with eagles’ quills or women’s hair. Native tobacco mixed with willow-bark or sumac leaves was smoked. The pipe was offered as a supreme proof of hospitality to distinguished strangers, and its refusal was regarded as a grievous affront. In the east and south-east, the bowl was of white stone, sometimes pierced with several stem holes so that many persons might smoke at once.

See Joseph D. Macguire (exhaustive report,640 pages), “Pipes and Smoking Customs of the American Aborigines” in *Smithsonian Report* (American Bureau of Ethnology) for 1897, vol. i.; and authorities quoted in *Handbook of American Indians* (Washington, 1907).

CALUMPIT, a town of the province of Bulacán, Luzon, Philippine Islands, at the junction of the Quiñgua river with the Rio Grande de la Pampanga, about 25 m. N.W. of Manila. Pop. (1903) 13,897. It is served by the Manila & Dagupan railway, and the bridge across the Rio Grande is one of the longest in the Philippines. The surrounding country is a fertile plain, producing large quantities of rice, as well as sugar, Indian corn and a variety of fruits. Calumpit has a large rice-mill and one of the largest markets in the Philippines. The bridge, convent and church of the town were fired and completely destroyed by insurgent troops in 1899. The language is Tagalog.

CALVADOS, a department of north-western France, formed in 1790 out of Bessin, Cinglais, Hiémois, Bocage, the Campagne de Caen, Auge and the western part of Lieuvin. Pop. (1906) 403,431. Area, 2197 sq. m. It received its name from a ledge of rocks, stretching along the coast for a distance of about 15 m. between the mouths of the rivers Orne and Vire. It is bounded N. by the English Channel, E. by the department of Eure, S. by that of Orne, W. by that of Manche. The Bocage, or south-western part of the department, is elevated, being crossed from south-east to north-west by the hills of Normandy, the highest of which is 1197 ft.; the rest of the surface is gently undulating, and consists of extensive valleys watered by numerous streams which fall into the English Channel. The coast, formed by cliffs, sandy beaches or reefs, is generally inaccessible, except at the mouths of the principal rivers, such as the Touques, the Dives, the Orne and the Vire, which are navigable at high tide for several miles inland. Trouville is the chief of the numerous coast resorts. The climate, though humid and variable, is healthy. The raising of cattle, sheep and horses is the mainstay of the agriculture of the department. Pasture is good and abundant in the east and north-west, and there is a large export trade in the butter, eggs and cheese (Camembert, Livarot, Pont l’Evêque) of these districts, carried on by Honfleur, Isigny and other ports. The plain of Caen is a great centre for horse breeding. Wheat, oats, barley, colza and potatoes are the chief crops. The orchards of Auge and Bessin produce a superior kind of cider, of which upwards of 40,000,000 gallons are made in the department; a large quantity of cider brandy (eau-de-vie de Calvados) is distilled. Poultry to a considerable amount is sent to the Paris markets, and there is a large output of honey and wax. The spinning and weaving of wool and cotton are the chief industries. Besides these, paper-mills, oil-mills, tanneries, saw-mills, shipbuilding yards, rope-works, dye-works, distilleries and bleach-fields, scattered throughout the department, give employment to a number of hands. There are productive iron-mines and building-stone, slate and lime are plentiful. Fisheries, chiefly of lobster, oyster (Courseulles), herring and mackerel, are prosecuted. Coal, timber, grain, salt-fish and cement are among the imports; exports include iron, dairy products and sand. Caen and Honfleur are the most important commercial ports. There is a canal 9 m. in length from Caen to Ouistreham on the coast. The department is served by the Ouest-État railway. It is divided into the six arrondissements (38 cantons, 763 communes) of Caen, Falaise, Bayeux, Vire, Lisieux and Pont l’Evêque. Caen, the capital, is the seat of a court of appeal and the centre of an *académie* (educational division). The department forms the diocese of Bayeux, in the ecclesiastical province of Rouen, and belongs to the region of the III. army-corps. The other principal towns are Falaise, Lisieux, Condé-sur-Noireau, Vire, Honfleur and Trouville (*q.v.*).

Amongst the great number of medieval churches which the department possesses, the fine Gothic church of St. Pierre-sur-Dives is second in importance only to those of Lisieux and Bayeux; that of Norrey, a good example of the Norman-Gothic style, and that of Tour-en-Bessin, in which Romanesque and Gothic architecture are mingled, are of great interest. Fontaine-Henri has a fine château of the 15th and 16th centuries.

CALVART, DENIS (1540-1619), Flemish painter, was born at Antwerp. After studying landscape-painting for some time in his native city he went to Bologna, where he perfected himself in the anatomy of the human form under Prospero Fontana, and so completely lost the mannerism of Flemish art that his paintings appear to be the work of an Italian. From Bologna he went to Rome, where he assisted Lorenzo Sabbatini (1533-1577) in his works for the papal palace, and devoted much of his time to copying and studying the works of Raphael. He ultimately returned to Bologna and founded a school, of which the greatest ornaments are Guido and Domenichino. His works are especially admired for the power of grouping and colouring which they display.

CALVARY, the conventional English rendering of the *calvaria* of the Vulgate, the Latin version of the Greek κράνιον, both meaning "skull" and representing the Hebrew Golgotha, the name given to the scene of Christ's crucifixion. The term "a Calvary" is applied to a sculptured representation of the Crucifixion, either inside a church, or adjoining one in the open air. There are many examples of the latter in France, Italy and Spain. Among the most important are the Sacro Monte (1486) at Varallo in Piedmont, and those at Guimiliau (1581), Plougastel (1602), St Thegonnec (1610), and Pleyben near Quimper (1670), in Brittany, all in good preservation.

CALVÉ EMMA (1864-), Spanish operatic soprano, was born at Madrid, and trained in Paris, making her first important appearance in opera at Brussels in 1882. She sang mainly in Paris for some years, but in 1892 was first engaged at Covent Garden, London, and at once became famous as the most vivid Carmen (in Bizet's opera) of the day.

CALVERLEY, CHARLES STUART (1831-1884), English poet and wit, and the literary father of what may be called the university school of humour, was born at Martley in Worcestershire on the 22nd of December 1831. His father, the Rev. Henry Blayds, resumed in 1852 the old family name of Calverley, which his grandfather had exchanged for Blayds in 1807. It was as Charles Stuart Blayds that most of the son's university distinctions were attained. He went up to Balliol from Harrow in 1850, and was soon known in Oxford as the most daring and most high-spirited undergraduate of his time. He was a universal favourite, a delightful companion, a brilliant scholar and the playful enemy of all "dons." In 1851 he won the Chancellor's prize for Latin verse, and it is said that the entire exercise was written in an afternoon, when his friends had locked him into his rooms, declining to let him out till he had finished what they were confident would prove the prize poem. A year later he took his name off the books, to avoid the consequences of a college escapade, and migrated to Christ's College, Cambridge. Here he was again successful in Latin verse, and remains the unique example of an undergraduate who has won the Chancellor's prize at both universities. In 1856 he took second place in the first class in the Classical Tripos. He was elected fellow of Christ's (1858), published *Verses and Translations* in 1862, and was called to the bar in 1865. Owing to an accident while skating he was prevented from following up a professional career, and during the last years of his life he was an invalid. His *Translations into English and Latin* appeared in 1866; his *Theocritus translated into English Verse* in 1869; *Fly Leaves* in 1872; and *Literary Remains* in 1885. He died on the 17th of February 1884. Calverley was one of the most brilliant men of his day; and, had he enjoyed health, might have achieved distinction in any career he chose. Constitutionally indolent, he was endowed with singular gifts in every department of culture; he was a scholar, a musician, an athlete and a brilliant talker. What is left us marks only a small portion of his talent, but his sparkling, dancing verses, which have had many clever imitators, are still without a rival in their own line. His humour was illumined by good nature; his satire was keen but kind; his laughter was of that human sort which is often on the verge of tears. Imbued with the classical spirit, he introduced into the making of light verse the polish and elegance of the great masters, and even in its most whimsical mood his verse is raised to the level of poetry by the saving excellence of style.

His *Complete Works,* with a biographical notice by Sir W.J. Sendall, appeared in 1901.

(A. Wa.)

CALVERT, the name of three English artists: Charles (1785-1852), a well-known landscape-painter; Edward (1803-1883), an important wood-engraver and follower of Blake; and Frederick, an excellent topographical draughtsman, whose work in water-colour is represented at the Victoria and Albert Museum, and who published a volume of *Picturesque Views in Staffordshire and Shropshire* (1830).

CALVERT, FREDERICK CRACE (1819-1873), English chemist, was born in London on the 14th of November

1819. From about 1836 till 1846 he lived in France, where, after a course of study at Paris, he became manager of some chemical works, later acting as assistant to M.E. Chevreul. On his return to England he settled in Manchester as a consulting chemist, and was appointed professor of chemistry at the Royal Institution in that city. Devoting himself almost entirely to industrial chemistry, he gave much attention to the manufacture of coal-tar products, and particularly carbolic acid, for the production of which he established large works in Manchester in 1865. Besides contributing extensively to the English and French scientific journals, he published a work on *Dyeing and Calico-Printing*. He died in Manchester on the 24th of October 1873.

CALVERT, SIR HARRY, BART. (*c.* 1763-1826), British general, was probably born early in 1763 at Hampton, near London. He was educated at Harrow, and at the age of fifteen entered the army. In the following year he served with his regiment in America, being present at the siege of Charleston, and serving through the campaign of Lord Cornwallis which ended with the surrender of Yorktown. From 1781 to 1783 he was a prisoner of war. Returning to England in 1784, he next saw active service in 1793-1794 in the Low Countries, where he was aide-de-camp to the duke of York, and in 1795 was engaged on a confidential mission to Brunswick and Berlin. In 1799, having already served as deputy adjutant general, he was made adjutant general, holding the post till 1818. In this capacity he effected many improvements in the organization and discipline of the service. He greatly improved the administration of the army medical and hospital department, introduced regimental schools, developed the two existing military colleges (since united at Sandhurst), and was largely responsible for the founding of the Duke of York's school, Chelsea. In recognition of his work as adjutant general he was made a G.C.B. (1815), and, on retiring from office, received a baronetcy (1818). In 1820 he was made governor of Chelsea hospital. He died on the 3rd of September 1826, at Middle Claydon, Buckinghamshire.

CALVES' HEAD CLUB, a club established shortly after his death in derision of the memory of Charles I. Its chief meeting was held on the 30th of each January, the anniversary of the king's execution, when the dishes served were a cod's head to represent the individual, Charles Stuart; a pike representing tyranny; a boar's head representing the king preying on his subjects; and calves' heads representing Charles as king and his adherents. On the table an axe held the place of honour. After the banquet a copy of the king's *Ikon Basilike* was burnt, and the toast was "To those worthy patriots who killed the tyrant." After the Restoration the club met secretly. The first mention of it is in a tract reprinted in the *Harleian Miscellany* entitled "The Secret History of the Calves' Head Club." The club survived till 1734, when the diners were mobbed owing to the popular ill-feeling which their outrages on good taste provoked, and the riot which ensued put a final stop to the meetings.

CALVI, a sea-port in Corsica, capital of an arrondissement in the N.W. of the island, 112 m. N. of Ajaccio by road. Pop. (1906) 1967. It is situated on the Bay of Calvi, in a malarial region, and is the port in Corsica nearest to France, being 109 m. from Antibes; the harbour, however, is exposed to the east and north-east winds. The modern town lies at the foot of a rock, on which stands the old town with its steep rock-paved streets and fortified walls, commanded by the Fort Muzello. Fishing is carried on, and timber, oil, wine, lemons and other sub-tropical fruits are exported to some extent. The most important buildings are the old palace of the Genoese governor, used as barracks, and the church (16th century), with the monument of the Baglioni family, which was intimately associated with the history of the town.

Calvi was founded in the 13th century and in 1278 passed into the hands of the Genoese. From that date it was remarkable for its adherence to their side, especially in 1553 when it repulsed two attacks of the united forces of the French and Turks. In recognition thereof the Genoese senate caused the words *Civitas Calvi semper fidelis* to be carved on the chief gate of the city, which still preserves the inscription. In 1794 Calvi was captured by the English, but it was retaken by the Corsicans in the following year.

CALVIN, JOHN (1500-1564), Swiss divine and reformer, was born at Noyon, in Picardy, on the 10th of July 1509. His father, Gérard Cauvin or Calvin,[1] was a notary-apostolic and procurator-fiscal for the lordship of Noyon, besides holding certain ecclesiastical offices in connexion with that diocese. The name of his mother was Jeanne le Franc; she was the daughter of an innkeeper at Cambrai, who afterwards came to reside at Noyon. Gérard Cauvin was esteemed as a man of considerable sagacity and prudence, and his wife was a godly and attractive lady. She bore him five sons, of whom John was the second. By a second wife there were two daughters.

Of Calvin's early years only a few notices remain. His father destined him from the first for an ecclesiastical career, and paid for his education in the household of the noble family of Hangest de Montmor. In May 1521 he was appointed to a chaplaincy attached to the altar of La Gésine in the cathedral of Noyon, and received the tonsure. The actual duties of the office were in such cases carried out by ordained and older men for a fraction of the stipend. The plague having visited Noyon, the young Hangests were sent to Paris in August 1523, and Calvin

accompanied them, being enabled to do so by the income received from his benefice. He lived with his uncle and attended as an out-student the Collège de la Marche, at that time under the regency of Mathurin Cordier, a man of character, learning and repute as a teacher, who in later days followed his pupil to Switzerland, taught at Neuchâtel, and died in Geneva in 1564. In dedicating to him his *Commentary on the First Epistle to the Thessalonians,* as "eximiae pietatis et doctrinae viro," he declares that so had he been aided by his instruction that whatever subsequent progress he had made he only regarded as received from him, and "this," he adds, "I wish to testify to posterity that if any utility accrue to any from my writings they may acknowledge it as having in part flowed from thee." From the Collège de la Marche he removed to the Collège de Montaigu,[2] where the atmosphere was more ecclesiastical and where he had for instructor a Spaniard who is described as a man of learning and to whom Calvin was indebted for some sound training in dialectics and the scholastic philosophy. He speedily outstripped all his competitors in grammatical studies, and by his skill and acumen as a student of philosophy, and in the college disputations gave fruitful promise of that consummate excellence as a reasoner in the department of speculative truth which he afterwards displayed. Among his friends were the Hangests (especially Claude), Nicolas and Michel Cop, sons of the king's Swiss physician, and his own kinsman Pierre Robert, better known as Olivétan. Such friendships testify both to the worth and the attractiveness of his character, and contradict the old legend that he was an unsociable misanthrope. Pleased with his success, the canons at Noyon gave him the curacy of St Martin de Marteville in September 1527. After holding this preferment for nearly two years, he exchanged it in July 1529 for the cure of Pont L'Évêque, a village near to Noyon, and the place to which his father originally belonged. He appears to have been not a little elated by his early promotion, and although not ordained, he preached several sermons to the people. But though the career of ecclesiastical preferment was thus early opened to him, Calvin was destined not to become a priest. A change came over the mind both of his father and himself respecting his future career. Gérard Cauvin began to suspect that he had not chosen the most lucrative profession for his son, and that the law offered to a youth of his talents and industry a more promising sphere.[3] He was also now out of favour with the cathedral chapter at Noyon. It is said also that John himself, on the advice of his relative, Pierre Robert Olivétan, the first translator of the Bible into French, had begun to study the Scriptures and to dissent from the Roman worship. At any rate he readily complied with his father's suggestion, and removed from Paris to Orleans (March 1528) in order to study law under Pierre Taisan de l'Etoile, the most distinguished jurisconsult of his day. The university atmosphere here was less ascetic than at Paris, but Calvin's ardour knew no slackening, and such was his progress in legal knowledge that he was frequently called upon to lecture, in the absence of one or other of the regular staff. Other studies, however, besides those of law occupied him while in this city, and moved by the humanistic spirit of the age he eagerly developed his classical knowledge. "By protracted vigils," says Beza, "he secured indeed a solid erudition and an excellent memory; but it is probable he at the same time sowed the seeds of that disease (dyspepsia) which occasioned him various illnesses in after life, and at last brought upon him premature death."[4] His friends here were Melchior Wolmar, a German schoolmaster and a man of exemplary scholarship and character, François Daniel, Francois de Connam and Nicolas Duchemin; to these his earliest letters were written.

From Orleans Calvin went to Bourges in the autumn of 1529 to continue his studies under the brilliant Italian, Andrea Alciati (1492-1550), whom Francis I. had invited into France and settled as a professor of law in that university. His friend Daniel went with him, and Wolmar followed a year later. By Wolmar Calvin was taught Greek, and introduced to the study of the New Testament in the original, a service which he gratefully acknowledges in one of his printed works.[5] The conversation of Wolmar may also have been of use to him in his consideration of the doctrines of the Reformation, which were now beginning to be widely diffused through France. Twelve years had elapsed since Luther had published his theses against indulgences—twelve years of intense excitement and anxious discussion, not in Germany only, but in almost all the adjacent countries. In France there had not been as yet any overt revolt against the Church of Rome, but multitudes were in sympathy with any attempt to improve the church by education, by purer morals, by better preaching and by a return to the primitive and uncorrupted faith. Though we cannot with Beza regard Calvin at this time as a centre of Protestant activity, he may well have preached at Lignières as a reformatory Catholic of the school of Erasmus. Calvin's own record of his "conversion" is so scanty and devoid of chronological data that it is extremely difficult to trace his religious development with any certainty. But it seems probable that at least up to 1532 he was far more concerned about classical scholarship than about religion.

His residence at Bourges was cut short by the death of his father in May 1531. Immediately after this event he went to Paris, where the "new learning" was now at length ousting the medieval scholasticism from the university. He lodged in the Collège Fortet, reading Greek with Pierre Danès and beginning Hebrew with François Vatable. It was at this time (April 1532) that Calvin issued his first publication, a commentary in Latin on Seneca's tract *De Clementia*. This book he published at his own cost, and dedicated to Claude Hangest, abbot of St Éloi, a member of the de Montmor family, with whom Calvin had been brought up. It was formerly thought that Calvin published this work with a view to influence the king to put a stop to the attacks on the Protestants, but there is nothing in the treatise itself or in the commentary to favour this opinion.

Soon after the publication of his first book Calvin returned to Orleans, where he stayed for a year, perhaps again reading law, and still undecided as to his life's work. He visited Noyon in August 1533, and by October of the same year was settled again in Paris. Here and now his destiny became certain. The conservative theology was becoming discredited, and humanists like Jacques Lefèvre of Étaples (Faber Stapulensis) and Gérard Roussel were favoured by the court under the influence of Margaret of Angoulême, queen of Navarre and sister of Francis I. Calvin's old friend, Nicolas Cop, had just been elected rector of the university and had to deliver an oration according to custom in the church of the Mathurins, on the feast of All Saints. The oration (certainly influenced but hardly composed by Calvin) was in effect a defence of the reformed opinions, especially of the doctrine of justification by faith alone. It is to the period between April 1532 and November 1533, and in particular to the time of his second sojourn at Orleans, that we may most fittingly assign the great change in Calvin which he describes (*Praef. ad Psalmos*; opera xxxi. 21-24) as his "sudden conversion" and attributes to direct divine agency. It must have been at least after his *Commentary on Seneca's De Clementia* that his heart was "so subdued and reduced to docility that in comparison with his zeal for true piety he regarded all other studies with indifference, though not entirely forsaking them. Though himself a beginner, many flocked to him to learn the pure doctrine, and he began to seek some hiding-place and means of withdrawal from people." This indeed was forced upon him, for Cop's address was more than the conservative party could bear, and Cop, being summoned to appear before the parlement of Paris, found it necessary, as he failed to secure the support either of the king, or of the university, to make his escape to Basel. An attempt was at the same time made to seize Calvin, but,

being forewarned of the design by his friends, he also made his escape. His room in the Collège Fortet, however, was searched, and his books and papers seized, to the imminent peril of some of his friends, whose letters were found in his repositories. He went to Noyon, but, proceedings against him being dropped, soon returned to Paris. But desiring both security and solitude for study he left the city again about New Year of 1534 and became the guest of Louis du Tillet, a canon of the cathedral, at Angoulême, where at the request of his host he prepared some short discourses, which were circulated in the surrounding parishes, and read in public to the people. Here, too in du Tillet's splendid library, he began the studies which resulted in his great work, the *Institutes*, and paid a visit to Nérac, where the venerable Lefèvre, whose revised translation of the Bible into French was published about this time, was spending his last years under the kindly care of Margaret of Navarre.

Calvin was now nearly twenty-five years of age, and in the ordinary way would have been ordained to the priesthood. Up till this time his work for the evangelical cause was not so much that of the public preacher or reformer as that of the retiring but influential scholar and adviser. Now, however, he had to decide whether, like Roussel and other of his friends, he should strive to combine the new doctrines with a position in the old church, or whether he should definitely break away from Rome. His mind was made up, and on the 4th of May he resigned his chaplaincy at Noyon and his rectorship at Pont l'Évêque. Towards the end of the same month he was arrested and suffered two short terms of imprisonment, the charges against him being not strong enough to be pressed. He seems to have gone next to Paris, staying perhaps with Étienne de la Forge, a Protestant merchant who suffered for his faith in February 1535. To this time belongs the story of the proposed meeting between Calvin and the Spanish reformer Servetus. Calvin's movements at this time are difficult to trace, but he visited both Orleans and Poitiers, and each visit marked a stage in his development.

The Anabaptists of Germany had spread into France, and were disseminating many wild and fanatical opinions among those who had seceded from the Church of Rome. Among other notions which they had imbibed was that of a sleep of the soul after death. To Calvin this notion appeared so pernicious that he composed a treatise in refutation of it, under the title of *Psychopannychia*. The preface to this treatise is dated Orleans 1534, but it was not printed till 1542. In it he chiefly dwells upon the evidence from Scripture in favour of the belief that the soul retains its intelligent consciousness after its separation from the body—passing by questions of philosophical speculation, as tending on such a subject only to minister to an idle curiosity. At Poitiers Calvin gathered round him a company of cultured and gentle men whom in private intercourse he influenced considerably. Here too in a grotto near the town he for the first time celebrated the communion in the Evangelical Church of France, using a piece of the rock as a table.

The year 1534 was thus decisive for Calvin. From this time forward his influence became supreme, and all who had accepted the reformed doctrines in France turned to him for counsel and instruction, attracted not only by his power as a teacher, but still more, perhaps because they saw in him so full a development of the Christian life according to the evangelical model. Renan, no prejudiced judge, pronounces him "the most Christian man of his time," and attributes to this his success as a reformer. Certain it is that already he had become conspicuous as a prophet of the new religion; his life was in danger, and he was obliged to seek safety in flight. In company with his friend Louis du Tillet, whom he had again gone to Angoulême to visit, he set out for Basel. On their way they were robbed by one of their servants, and it was only by borrowing ten crowns from their other servant that they were enabled to get to Strassburg, and thence to Basel. Here Calvin was welcomed by the band of scholars and theologians who had conspired to make that city the Athens of Switzerland, and especially by Oswald Myconius, the chief pastor, Pierre Viret and Heinrich Bullinger. Under the aupices and guidance of Sebastian Münster, Calvin now gave himself to the study of Hebrew.

Francis I., desirous to continue the suppression of the Protestants but anxious, because of his strife with Charles V., not to break with the Protestant princes of Germany, instructed his ambassador to assure these princes that it was only against Anabaptists, and other parties who called in question all civil magistracy, that his severities were exercised. Calvin, indignant at the calumny which was thus cast upon the reformed party in France, hastily prepared for the press his *Institutes of the Christian Religion*, which he published "first that I might vindicate from unjust affront my brethren whose death was precious in the sight of the Lord, and, next, that some sorrow and anxiety should move foreign peoples, since the same sufferings threatened many." The work was dedicated to the king, and Calvin says he wrote it in Latin that it might find access to the learned in all lands.[6] Soon after it appeared he set about translating it into French, as he himself attests in a letter dated October 1536. This sets at rest a question, at one time much agitated, whether the book appeared first in French or in Latin. The earliest French edition known is that of 1540, and this was after the work had been much enlarged, and several Latin editions had appeared. In its first form the work consisted of only six chapters, and was intended merely as a brief manual of Christian doctrine. The chapters follow a traditional scheme of religious teaching: (1) The Law, (as in the Ten Words), (2) Faith (as in the Apostles' Creed) (3) Prayer, (4) the Sacraments; to these were added (5) False Sacraments, (6) Christian liberty, ecclesiastical power and civil administration. The closing chapters of the work are more polemical than the earlier ones. His indebtedness to Luther is of course great, but his spiritual kinship with Martin Bucer of Strassburg is even more marked. Something also he owed to Scotus and other medieval schoolmen. The book appeared anonymously, the author having, as he himself says, nothing in view beyond furnishing a statement of the faith of the persecuted Protestants, whom he saw cruelly cut to pieces by impious and perfidious court parasites.[7] In this work, though produced when the author was only twenty-six years of age, we find a complete outline of the Calvinist theological system. In none of the later editions, nor in any of his later works do we find reason to believe that he ever changed his views on any essential point from what they were at the period of its first publication. Such an instance of maturity of mind and of opinion at so early an age would be remarkable under any circumstances; but in Calvin's case it is rendered peculiarly so by the shortness of the time which had elapsed since he gave himself to theological studies. It may be doubted also if the history of literature presents us with another instance of a book written at so early an age, which has exercised such a prodigious influence upon the opinions and practices both of contemporaries and of posterity.

After a short visit (April 1536) to the court of Renée, duchess of Ferrara (cousin to Margaret of Navarre), which at that time afforded an asylum to several learned and pious fugitives from persecution, Calvin returned through Basel to France to arrange his affairs before finally taking farewell of his native country. His intention was to settle at Strassburg or Basel, and to devote himself to study. But being unable, in consequence of the war between Francis I. and Charles V., to reach Strassburg by the ordinary route, he with his younger brother Antoine and his half-sister Marie journeyed to Lyons and so to Geneva, making for Basel. In Geneva his progress

was arrested, and his resolution to pursue the quiet path of studious research was dispelled by what he calls the "formidable obtestation" of Guillaume Farel.[8] After many struggles and no small suffering, this energetic spirit had succeeded in planting the evangelical standard at Geneva; and anxious to secure the aid of such a man as Calvin, he entreated him on his arrival to relinquish his design of going farther, and to devote himself to the work in that city. Calvin at first declined, alleging as an excuse his need of securing more time for personal improvement, but ultimately, believing that he was divinely called to this task and that "God had stretched forth His hand upon me from on high to arrest me," he consented to remain at Geneva. He hurried to Basel, transacted some business, and returned to Geneva in August 1536. He at once began to expound the epistles of St Paul in the church of St Pierre, and after about a year was also elected preacher by the magistrates with the consent of the people, an office which he would not accept until it had been repeatedly pressed upon him. His services seem to have been rendered for some time gratuitously, for in February 1537 there is an entry in the city registers to the effect that six crowns had been voted to him, "since he has as yet hardly received anything."

Calvin was in his twenty-eighth year when he was thus constrained to settle at Geneva; and in this city the rest of his life, with the exception of a brief interval, was spent. The post to which he was thus called was not an easy one. Though the people of Geneva had cast off the obedience of Rome, it was largely a political revolt against the duke of Savoy, and they were still (says Beza) "but very imperfectly enlightened in divine knowledge; they had as yet hardly emerged from the filth of the papacy."[9] This laid them open to the incursions of those fanatical teachers, whom the excitement attendant upon the Reformation had called forth, and who hung mischievously upon the rear of the reforming body. To obviate the evils thence resulting, Calvin, in union with Farel, drew up a condensed statement of Christian doctrine consisting of twenty-one articles. This the citizens were summoned, in parties of ten each, to profess and swear to as the confession of their faith—a process which, though not in accordance with modern notions of the best way of establishing men in the faith, was gone through, Calvin tells us, "with much satisfaction." As the people took this oath in the capacity of *citizens*, we may see here the basis laid for that theocratic system which subsequently became peculiarly characteristic of the Genevan polity. Deeply convinced of the importance of education for the young, Calvin and his coadjutors were solicitous to establish schools throughout the city, and to enforce on parents the sending of their children to them; and as he had no faith in education apart from religious training, he drew up a catechism of Christian doctrine which the children had to learn whilst they were receiving secular instruction. Of the troubles which arose from fanatical teachers, the chief proceeded from the efforts of the Anabaptists; a public disputation was held on the 16th and 17th of March 1537, and so excited the populace that the Council of Two Hundred stopped it, declared the Anabaptists vanquished and drove them from the city. About the same time also, the peace of Calvin and his friends was much disturbed and their work interrupted by Pierre Caroli, another native of northern France, who, though a man of loose principle and belief, had been appointed chief pastor at Lausanne and was discrediting the good work done by Pierre Viret in that city. Calvin went to Viret's aid and brought Caroli before the commissioners of Bern on a charge of advocating prayers for the dead as a means of their earlier resurrection. Caroli brought a counter-charge against the Geneva divines of Sabellianism and Arianism, because they would not enforce the Athanasian creed, and had not used the words "Trinity" and "Person" in the confession they had drawn up. It was a struggle between the thoroughgoing humanistic reformer who drew his creed solely from the "word of God" and the merely semi-Protestant reformer who looked on the old creed as a priceless heritage. In a synod held at Bern the matter was fully discussed, when a verdict was given in favour of the Geneva divines, and Caroli deposed from his office and banished. He returned to France, rejoined the Roman communion and spent the rest of his life in passing to and from the old faith and the new. Thus ended an affair which seems to have occasioned Calvin much more uneasiness than the character of his assailant, and the manifest falsehood of the charge brought against him, would seem to justify. Two brief anti-Romanist tracts, one entitled *De fugiendis impiorum sacris,* the other *De sacerdotio papali abjiciendo,* were also published early in this year.

Hardly was the affair of Caroli settled, when new and severer trials came upon the Genevan Reformers. The austere simplicity of the ritual which Farel had introduced, and to which Calvin had conformed; the strictness with which the ministers sought to enforce not only the laws of morality, but certain sumptuary regulations respecting the dress and mode of living of the citizens; and their determination in spiritual matters and ecclesiastical ceremonies not to submit to the least dictation from the civil power, led to violent dissensions. Amidst much party strife Calvin perhaps showed more youthful impetuosity than experienced skill. He and his colleagues refused to administer the sacrament in the Bernese form, *i.e.* with unleavened bread, and on Easter Sunday, 1538, declined to do so at all because of the popular tumult. For this they were banished from the city. They went first to Bern, and soon after to Zürich, where a synod of the Swiss pastors had been convened. Before this assembly they pleaded their cause, and stated what were the points on which they were prepared to insist as needful for the proper discipline of the church. They declared that they would yield in the matter of ceremonies so far as to employ unleavened bread in the eucharist, to use fonts in baptism, and to allow festival days, provided the people might pursue their ordinary avocations after public service. These Calvin regarded as matters of indifference, provided the magistrates did not make them of importance, by seeking to enforce them; and he was the more willing to concede them, because he hoped thereby to meet the wishes of the Bernese brethren whose ritual was less simple than that established by Farel at Geneva. But he and his colleagues insisted, on the other hand that for the proper maintenance of discipline, there should be a division of parishes—that excommunications should be permitted, and should be under the power of elders chosen by the council, in conjunction with the clergy—that order should be observed in the admission of preachers—and that only the clergy should officiate in ordination by the laying on of hands. It was proposed also, as conducive to the welfare of the church, that the sacrament of the Lord's Supper should be administered more frequently, at least once every month, and that congregational singing of psalms should be practised in the churches. On these terms the synod interceded with the Genevese to restore their pastors; but through the opposition of some of the Bernese (especially Peter Kuntz, the pastor of that city) this was frustrated, and a second edict of banishment was the only response.

Calvin and Farel betook themselves, under these circumstances, to Basel, where they soon after separated, Farel to go to Neuchâtel and Calvin to Strassburg. At the latter place Calvin resided till the autumn of 1541, occupying himself partly in literary exertions, partly as a preacher and especially an organizer in the French church, and partly as a lecturer on theology. These years were not the least valuable in his experience. In 1539 he attended Charles V.'s conference on Christian reunion at Frankfort as the companion of Bucer, and in the following year he appeared at Hagenau and Worms, as the delegate from the city of Strassburg. He was present also at the diet at Regensburg, where he deepened his acquaintance with Melanchthon, and formed with him a friendship which lasted through life. He also did something to relieve the persecuted Protestants of France. It is

to this period of his life that we owe a revised and enlarged form of his *Institutes*, his *Commentary on the Epistle to the Romans*, and his *Tract on the Lord's Supper*. Notwithstanding his manifold engagements, he found time to attend to the tenderer affections; for it was during his residence at Strassburg that he married, in August 1540, Idelette de Bure, the widow of one Jean Stordeur of Liége, whom he had converted from Anabaptism. In her Calvin found, to use his own words, "the excellent companion of his life," a "precious help" to him amid his manifold labours and frequent infirmities. She died in 1549, to the great grief of her husband, who never ceased to mourn her loss. Their only child Jacques, born on the 28th of July 1542, lived only a few days.

During Calvin's absence disorder and irreligion had prevailed in Geneva. An attempt was made by Cardinal Jacopo Sadoleto (1477-1547), bishop of Carpentras, to take advantage of this so as to restore the papal supremacy in that district; but this design Calvin, at the request of the Bernese authorities, who had been consulted by those of Geneva, completely frustrated, by writing such a reply to the letter which the bishop had addressed to the Genevese, as constrained him to desist from all further efforts. The letter had more than a local or temporary reference. It was a popular yet thoroughgoing defence of the whole Protestant position, perhaps the best apologia for the Reformation that was ever written. He seems also to have kept up his connexion with Geneva by addressing letters of counsel and comfort to the faithful there who continued to regard him with affection. It was whilst he was still at Strassburg that there appeared at Geneva a translation of the Bible into French, bearing Calvin's name, but in reality only revised and corrected by him from the version of Olivétan. Meanwhile the way was opening for his return. Those who had driven him from the city gradually lost power and office. Farel worked unceasingly for his recall. After much hesitation, for Strassburg had strong claims, he yielded and returned to Geneva, where he was received with the utmost enthusiasm (September 13, 1541). He entered upon his work with a firm determination to carry out those reforms which he had originally purposed, and to set up in all its integrity that form of church polity which he had carefully matured during his residence at Strassburg. He now became the sole directive spirit in the church at Geneva. Farel was retained by the Neuchâtelois, and Viret, soon after Calvin's return, removed to Lausanne. His duties were thus rendered exceedingly onerous, and his labour became excessive. Besides preaching every day in each alternate week, he taught theology three days in the week, attended weekly meetings of his consistory, read the Scriptures once a week in the congregation, carried on an extensive correspondence on a multiplicity of subjects, prepared commentaries on the books of Scripture, and was engaged repeatedly in controversy with the opponents of his opinions. "I have not time," he writes to a friend, "to look out of my house at the blessed sun, and if things continue thus I shall forget what sort of appearance it has. When I have settled my usual business, I have so many letters to write, so many questions to answer, that many a night is spent without any offering of sleep being brought to nature."

It is only necessary here to sketch the leading events of Calvin's life after his return to Geneva. He recodified the Genevan laws and constitution, and was the leading spirit in the negotiations with Bern that issued in the treaty of February 1544. Of the controversies in which he embarked, one of the most important was that in which he defended his doctrine concerning predestination and election. His first antagonist on this head was Albert Pighius, a Romanist, who, resuming the controversy between Erasmus and Luther on the freedom of the will, violently attacked Calvin for the views he had expressed on that subject. Calvin replied to him in a work published in 1543, in which he defends his own opinions at length, both by general reasonings and by an appeal to both Scripture and the Fathers, especially Augustine. So potent were his reasonings that Pighius, though owing nothing to the gentleness or courtesy of Calvin, was led to embrace his views. A still more vexatious and protracted controversy on the same subject arose in 1551. Jerome Hermes Bolsec, a Carmelite friar, having renounced Romanism, had fled from France to Veigy, a village near Geneva, where he practised as a physician. Being a zealous opponent of predestinarian views, he expressed his criticisms of Calvin's teaching on the subject in one of the public conferences held each Friday. Calvin replied with much vehemence, and brought the matter before the civil authorities. The council were at a loss which course to take; not that they doubted which of the disputants was right, for they all held by the views of Calvin, but they were unable to determine to what extent and in which way Bolsec should be punished for his heresy. The question was submitted to the churches at Basel, Bern, Zürich and Neuchâtel, but they also, to Calvin's disappointment, were divided in their judgment, some counselling severity, others gentle measures. In the end Bolsec was banished from Geneva; he ultimately rejoined the Roman communion and in 1577 avenged himself by a particularly slanderous biography of Calvin. Another painful controversy was that with Sébastien Castellio (1515-1563), a teacher in the Genevan school and a scholar of real distinction. He wished to enter the preaching ministry but was excluded by Calvin's influence because he had criticized the inspiration of the Song of Solomon and the Genevan interpretation of the clause "he descended into hell." The bitterness thus aroused developed into life-long enmity. During all this time also the less strict party in the city and in the council did not cease to harry the reformer.

But the most memorable of all the controversies in which Calvin was engaged was that into which he was brought in 1553 with Michael Servetus (*q.v.*). After many wanderings, and after having been condemned to death for heresy at Vienne, whence he was fortunate enough to make his escape, Servetus arrived in August 1553 at Geneva on his way to Naples. He was recognized in church and soon after, at Calvin's instigation, arrested. The charge of blasphemy was founded on certain statements in a book published by him in 1553, entitled *Christianismi Restitutio*, in which he animadverted on the Catholic doctrine of the Trinity, and advanced sentiments strongly savouring of Pantheism. The story of his trial is told elsewhere (see art. Servetus), but it must be noted here that the struggle was something more than a doctrinal one. The cause of Servetus was taken up by Calvin's Genevan foes headed by Philibert Berthelier, and became a test of the relative strength of the rival forces and of the permanence of Calvin's control. That Calvin was actuated by personal spite and animosity against Servetus himself may be open to discussion; we have his own express declaration that, after Servetus was convicted, he used no urgency that he should be put to death, and at their last interview he told Servetus that he never had avenged private injuries, and assured him that if he would repent it would not be his fault if all the pious did not give him their hands.[10] There is the fact also that Calvin used his endeavour to have the sentence which had been pronounced against Servetus mitigated, death by burning being regarded by him as an "atrocity," for which he sought to substitute death by the sword.[11] It can be justly charged against Calvin in this matter that he took the initiative in bringing on the trial of Servetus, that as his accuser he prosecuted the suit against him with undue severity, and that he approved the sentence which condemned Servetus to death. When, however, it is remembered that the unanimous decision of the Swiss churches and of the Swiss state governments was that Servetus deserved to die; that the general voice of Christendom was in favour of this; that even such a man as Melanchthon affirmed the justice of the sentence;[12] that an eminent English divine of the next age should declare

the process against him “just and honourable,”[13] and that only a few voices here and there were at the time raised against it, many will be ready to accept the judgment of Coleridge, that the death of Servetus was not “Calvin’s guilt especially, but the common opprobrium of all European Christendom.”[14]

Calvin was also involved in a protracted and somewhat vexing dispute with the Lutherans respecting the Lord’s Supper, which ended in the separation of the evangelical party into the two great sections of Lutherans and Reformed,—the former holding that in the eucharist the body and blood of Christ are objectively and consubstantially present, and so are actually partaken of by the communicants, and the latter that there is only a virtual presence of the body and blood of Christ, and consequently only a spiritual participation thereof through faith. In addition to these controversies on points of faith, he was for many years greatly disquieted, and sometimes even endangered, by the opposition offered by the libertine party in Geneva to the ecclesiastical discipline which he had established there. His system of church polity was essentially theocratic; it assumed that every member of the state was also under the discipline of the church; and he asserted that the right of exercising this discipline was vested exclusively in the consistory or body of preachers and elders. His attempts to carry out these views brought him into collision both with the authorities and with the populace,—the latter being not unnaturally restive under the restraints imposed upon their liberty by the vigorous system of church discipline, and the former being inclined to retain in their own hands a portion of that power in things spiritual which Calvin was bent on placing exclusively in the hands of the church rulers. His dauntless courage, his perseverance, and his earnestness at length prevailed, and he had the satisfaction, before he died, of seeing his favourite system of church polity firmly established, not only at Geneva, but in other parts of Switzerland, and of knowing that it had been adopted substantially by the Reformers in France and Scotland. The men whom he trained at Geneva carried his principles into almost every country in Europe, and in varying degree these principles did much for the cause of civil liberty.[15] Nor was it only in religious matters that Calvin busied himself; nothing was indifferent to him that concerned the welfare and good order of the state or the advantage of its citizens. His work embraced everything; he was consulted on every affair, great and small, that came before the council,—on questions of law, police, economy, trade, and manufactures, no less than on questions of doctrine and church polity. To him the city owed her trade in cloths and velvets, from which so much wealth accrued to her citizens; sanitary regulations were introduced by him which made Geneva the admiration of all visitors; and in him she reverences the founder of her university. This institution was in a sense Calvin’s crowning work. It added religious education to the evangelical preaching and the thorough discipline already established, and so completed the reformer’s ideal of a Christian commonwealth.

Amidst these multitudinous cares and occupations, Calvin found time to write a number of works besides those provoked by the various controversies in which he was engaged. The most numerous of these were of an exegetical character. Including discourses taken down from his lips by faithful auditors, we have from him expository comments or homilies on nearly all the books of Scripture, written partly in Latin and partly in French. Though naturally knowing nothing of the modern idea of a progressive revelation, his judiciousness, penetration, and tact in eliciting his author’s meaning, his precision, condensation, and concinnity as an expositor, the accuracy of his learning, the closeness of his reasoning, and the elegance of his style, all unite to confer a high value on his exegetical works. The series began with *Romans* in 1540 and ended with *Joshua* in 1564. In 1558-1559 also, though in very ill health, he finally perfected the Institutes.

The incessant and exhausting labours to which Calvin gave himself could not but tell on his fragile constitution. Amid many sufferings, however, and frequent attacks of sickness, he manfully pursued his course; nor was it till his frail body, torn by many and painful diseases—fever, asthma, stone, and gout, the fruits for the most part of his sedentary habits and unceasing activity—had, as it were, fallen to pieces around him, that his indomitable spirit relinquished the conflict. In the early part of the year 1564 his sufferings became so severe that it was manifest his earthly career was rapidly drawing to a close. On the 6th of February of that year he preached his last sermon, having with great difficulty found breath enough to carry him through it. He was several times after this carried to church, but never again was able to take any part in the service. With his usual disinterestedness he refused to receive his stipend, now that he was no longer able to discharge the duties of his office. In the midst of his sufferings, however, his zeal and energy kept him in continual occupation; when expostulated with for such unseasonable toil, he replied, “Would you that the Lord should find me idle when He comes?” After he had retired from public labours he lingered for some months, enduring the severest agony without a murmur, and cheerfully attending to all the duties of a private kind which his diseases left him strength to discharge. On the 25th of April he made his will, on the 27th he received the Little Council, and on the 28th the Genevan ministers, in his sick-room; on the 2nd of May he wrote his last letter—to his old comrade Farel, who hastened from Neuchâtel to see him once again. He spent much time in prayer and died quietly, in the arms of his faithful friend Theodore Beza, on the evening of the 27th of May, in the fifty-fifth year of his age. The next day he was buried without pomp “in the common cemetery called Plain-palais” in a spot not now to be identified.

Calvin was of middle stature; his complexion was somewhat pallid and dark; his eyes, to the latest clear and lustrous, bespoke the acumen of his genius. He was sparing in his food and simple in his dress; he took but little sleep, and was capable of extraordinary efforts of intellectual toil. He had a most retentive memory and a very keen power of observation. He spoke without rhetoric, simply, directly, but with great weight. He had many acquaintances but few close friends. His private character was in harmony with his public reputation and position. If somewhat severe and irritable, he was at the same time scrupulously just, truthful, and steadfast; he never deserted a friend or took an unfair advantage of an antagonist; and on befitting occasions he could be cheerful and even facetious among his intimates. “God gave him,” said the Little Council after his death, “a character of great majesty.” “I have been a witness of him for sixteen years,” says Beza, “and I think I am fully entitled to say that in this man there was exhibited to all an example of the life and death of the Christian, such as it will not be easy to depreciate, such as it will be difficult to emulate.”

Though Calvin built his theology on the foundations laid by earlier reformers, and especially by Luther and Bucer, his peculiar gifts of learning, of logic and of style made him pre-eminently the theologian of the new religion. The following may be regarded as his characteristic tenets, though not all are peculiar to him.

The dominant thought is the infinite and transcendent sovereignty of God, to know whom is the supreme end of human endeavour. God is made known to man especially by the Scriptures, whose writers were “sure and authentic amanuenses of the Holy Spirit.” To the Spirit speaking therein the Spirit-illumined soul of man makes response. While God is the source of all good, man as a sinner is guilty and corrupt. The first man was made in the image and likeness of God, which not only implies man’s superiority to all other creatures, but indicates his

original purity, integrity and sanctity. From this state Adam fell, and in his fall involved the whole human race descended from him. Hence depravity and corruption, diffused through all parts of the soul, attach to all men, and this first makes them obnoxious to the anger of God, and then comes forth in works which the Scripture calls works of the flesh (Gal. v. 19). Thus all are held vitiated and perverted in all parts of their nature, and on account of such corruption deservedly condemned before God, by whom nothing is accepted save righteousness innocence, and purity. Nor is that a being bound for another's offence; for when it is said that we through Adam's sin have become obnoxious to the divine judgment, it is not to be taken as if we, being ourselves innocent and blameless, bear the fault of his offence, but that, we having been brought under a curse through his transgression, he is said to have bound us. From him, however, not only has punishment overtaken us, but a pestilence instilled from him resides in us, to which punishment is justly due. Thus even infants, whilst they bring their own condemnation with them from their mother's womb, are bound not by another's but by their own fault. For though they have not yet brought forth the fruits of their iniquity, they have the seed shut up in them; nay, their whole nature is a sort of seed of sin, therefore it cannot but be hateful and abominable to God (*Instit.* bk. ii, ch. i. sect. 8).

To redeem man from this state of guilt, and to recover him from corruption, the Son of God became incarnate, assuming man's nature into union with His own, so that in Him were two natures in one person. Thus incarnate He took on Him the offices of prophet, priest and king, and by His humiliation, obedience and suffering unto death, followed by His resurrection and ascension to heaven, He has perfected His work and fulfilled all that was required in a redeemer of men, so that it is truly affirmed that He has merited for man the grace of salvation (bk. ii. ch. 13-17). But until a man is in some way really united to Christ so as to partake of Him, the benefits of Christ's work cannot be attained by him. Now it is by the secret and special operation of the Holy Spirit that men are united to Christ and made members of His body. Through faith, which is a firm and certain cognition of the divine benevolence towards us founded on the truth of the gracious promise in Christ, men are by the operation of the Spirit united to Christ and are made partakers of His death and resurrection, so that the old man is crucified with Him and they are raised to a new life, a life of righteousness and holiness. Thus joined to Christ the believer has life in Him and knows that he is saved, having the witness of the Spirit that he is a child of God, and having the promises, the certitude of which the Spirit had before impressed on the mind, sealed by the same Spirit on the heart (bk. iii. ch. 33-36). From faith proceeds repentance, which is the turning of our life to God, proceeding from a sincere and earnest fear of God, and consisting in the mortification of the flesh and the old man within us and a vivification of the Spirit. Through faith also the believer receives justification, his sins are forgiven, he is accepted of God, and is held by Him as righteous, the righteousness of Christ being imputed to him, and faith being the instrument by which the man lays hold on Christ, so that with His righteousness the man appears in God's sight as righteous. This imputed righteousness, however, is not disjoined from real personal righteousness, for regeneration and sanctification come to the believer from Christ no less than justification; the two blessings are not to be confounded, but neither are they to be disjoined. The assurance which the believer has of salvation he receives from the operation and witness of the Holy Spirit; but this again rests on the divine choice of the man to salvation; and this falls back on God's eternal sovereign purpose, whereby He has predestined some to eternal life while the rest of mankind are predestined to condemnation and eternal death. Those whom God has chosen to life He effectually calls to salvation, and they are kept by Him in progressive faith and holiness unto the end (bk. iii. *passim*). The external means or aids by which God unites men into the fellowship of Christ, and sustains and advances those who believe, are the church and its ordinances, especially the sacraments. The church universal is the multitude gathered from diverse nations, which though divided by distance of time and place, agree in one common faith, and it is bound by the tie of the same religion; and wherever the word of God is sincerely preached, and the sacraments are duly administered, according to Christ's institute, there beyond doubt is a church of the living God (bk. iv. ch. 1, sect. 7-11). The permanent officers in the church are pastors and teachers, to the former of whom it belongs to preside over the discipline of the church, to administer the sacraments, and to admonish and exhort the members; while the latter occupy themselves with the exposition of Scripture, so that pure and wholesome doctrine may be retained. With them are to be joined for the government of the church certain pious, grave and holy men as a senate in each church; and to others, as deacons, is to be entrusted the care of the poor. The election of the officers in a church is to be with the people, and those duly chosen and called are to be ordained by the laying on of the hands of the pastors (ch. 3, sect. 4-16). The sacraments are two—Baptism and the Lord's Supper. Baptism is the sign of initiation whereby men are admitted into the society of the church and, being grafted into Christ, are reckoned among the sons of God; it serves both for the confirmation of faith and as a confession before men. The Lord's Supper is a spiritual feast where Christ attests that He is the life-giving bread, by which our souls are fed unto true and blessed immortality. That sacred communication of His flesh and blood whereby Christ transfuses into us His life, even as if it penetrated into our bones and marrow, He in the Supper attests and seals; and that not by a vain or empty sign set before us but there He puts forth the efficacy of His Spirit whereby He fulfils what He promises. In the mystery of the Supper Christ is truly exhibited to us by the symbols of bread and wine; and so His body and blood, in which He fulfilled all obedience for the obtaining of righteousness for us, are presented. There is no such presence of Christ in the Supper as that He is affixed to the bread or included in it or in any way circumscribed; but whatever can express the true and substantial communication of the body and blood of the Lord, which is exhibited to believers under the said symbols of the Supper, is to be received, and that not as perceived by the imagination only or mental intelligence, but as enjoyed for the aliment of the eternal life (bk. iv. ch. 15, 17).

The course of time has substantially modified many of these positions. Even the churches which trace their descent from Calvin's work and faith no longer hold in their entirety his views on the magistrate as the preserver of church purity, the utter depravity of human nature, the non-human character of the Bible, the dealing of God with man. But his system had an immense value in the history of Christian thought. It appealed to and evoked a high order of intelligence, and its insistence on personal individual salvation has borne worthy fruit. So also its insistence on the chief end of man "to know and do the will of God" made for the strenuous morality that helped to build up the modern world. Its effects are most clearly seen in Scotland, in Puritan England and in the New England states, but its influence was and is felt among peoples that have little desire or claim to be called Calvinist.

Bibliography.—The standard edition of Calvin's works is that undertaken by the Strassburg scholars, J.W. Bauin, E. Cunitz, E. Reuss, P. Lobstein, A. Erichson (59 vols., 1863-1900). The last of these contains an elaborate bibliography which was also published separately at Berlin in 1900. The bulk of the writings was published in English by the Calvin Translation Society (48 vols., Edinburgh, 1843-1855); the *Institutes* have often been translated. The early lives by Beza and Collodon are given in the collected editions. Among modern biographies are those by P. Henry, *Das Leben J. Calvins* (3 vols., Hamburg, 1835-1844; Eng. trans, by H. Stebbing, London and New York, 1849); V. Audin, *Histoire de la vie, des ouvrages, et des doctrines de Calvin* (2 vols., Paris, 1841; Eng. trans, by J. McGill, London, 1843 and 1850) unfairly antagonistic; T.H. Dyer, *Life of John Calvin* (London,

1850); E. Stähelin, *Joh. Calvin, Leben und ausgewählte Schriften* (2 vols., Elberfeld, 1863); F.W. Kampschulte, *Joh. Calvin, seine Kirche und sein Staat in Genf* (2 vols., 1869, 1899, unfinished); Abel Lefranc, *La Jeunesse de Calvin* (Paris, 1888); E. Choisy, *La Théocratie à Genève au temps de Calvin* (Geneva, 1897); E. Doumergue, *Jean Calvin; les hommes et les choses de son temps* (5 vols., 1899-1908). See also A.M. Fairbairn, "Calvin and the Reformed Church" in the *Cambridge Modern History*, vol. ii. (1904); P. Schaff's, *History of the Christian Church*, vol. vii. (1892), and R. Stähelin's article in Hauck-Herzog's *Real-encyk. für prot. Theologie und Kirche.* Each of these contains a useful bibliography, as also does the excellent life by Professor Williston Walker, *John Calvin, the Organizer of Reformed Protestantism*, "Heroes of the Reformation" series (1906). See also C.S. Horne in *Mansfield Coll. Essays* (1909).

(W. L. A.; A. J. G.)

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1 The family name of Calvin seems to have been written indifferently Cauvin, Chauve, Chauvin, Calvus, Calvinus. In the contemporary notices of Gerard and his family, in the capitular registers of the cathedral at Noyon, the name is always spelt Cauuin. The anagram of Calvin is Alcuin, and this in its Latinized form Alcuinus appears in two editions of his *Instltutio* as that of the author (Audin, *Vie de Calvin,* i. 520). The syndics of Geneva address him in a letter written in 1540, and still preserved, as "Docteur Caulvin." In his letters written in French he usually signs himself "Jean Calvin." He affected the title of "Maitre," for what reason is not known.

2 Pierre de Montaigu refounded this institution in 1388. Erasmus and Ignatius Loyola also studied here.

3 Calv. *Praef. ad Comment. in Psalmos.*

4 *Jo. Calvini Vita, sub init.*

5 *Epist. Ded., Comment in Ep. II. ad Corinthios praefix.*

6 This edition forms a small 8vo of 514 pages, and 6 pages of index. It appeared at Basel from the press of Thomas Platter and Balthasar Lasius in March 1536, and was published by Johann Oporin. The dedicatory preface is dated 23rd August 1535. It is a masterpiece of apologetic literature. See W. Walker, *John Calvin,* 132 f., and for an outline of the contents of the treatise, ib. 137-149.

7 *Praef. ad Psalmos.*

8 *Ibid.*

9 Beza, *Vit. Calv. an. 1536.*

10 Fidelis Expositio Errorum Serveti, *sub init.* Calvini, *Opp.* t. ix.

11 Calvin to Farel, 20th Aug. 1553.

12 Tuo judicio prorsus assentior. Affirmo etiam vestros magistratus juste fecisse quod hominem blasphemum, re ordine judicata, interfecerunt.—Melanchthon to Calvin, 14th Oct. 1554.

13 Field *On the Church*, bk. iii. c. 27, vol. i. p. 288 (ed. Cambridge, 1847).

14 *Notes on English Divines*, vol. i. p. 49. See also *Table Talk*, vol. ii. p. 282 (ed. 1835).

15 W. Walker, *John Calvin,* pp. 403-8.

CALVINISTIC METHODISTS, a body of Christians forming a church of the Presbyterian order and claiming to be the only denomination in Wales which is of purely Welsh origin. Its beginnings may be traced to the labours of the Rev. Griffith Jones (1684-1761), of Llanddowror, Carmarthenshire, whose sympathy for the poor led him to set on foot a system of circulating charity schools for the education of children. In striking contrast to the general apathy of the clergy of the period, Griffith Jones's zeal appealed to the public imagination, and his powerful preaching exercised a widespread influence, many travelling long distances in order to attend his ministry. There 77
was thus a considerable number of earnest people dispersed throughout the country waiting for the rousing of the parish clergy. An impressive announcement of the Easter Communion Service, made by the Rev. Pryce Davies, vicar of Talgarth, on the 30th of March 1735, was the means of awakening Howell Harris (1714-1773) of Trevecca, and he immediately began to hold services in his own house. He was soon invited to do the same at the houses of others, and ended by becoming a fiery itinerant preacher, stirring to the depths every neighbourhood he visited. Griffith Jones, preaching at Llanddewi Brefi, Cardiganshire—the place at which the Welsh Patron Saint, David, first became famous—found Daniel Rowland (1713-1790), curate of Llangeitho, in his audience, and his patronizing attitude in listening drew from the preacher a personal supplication on his behalf, in the middle of the discourse. Rowland was deeply moved, and became an ardent apostle of the new movement. Naturally a fine orator, his new-born zeal gave an edge to his eloquence, and his fame spread abroad. Rowland and Harris had been at work fully eighteen months before they met, at a service in Devynock church, in the upper part of Breconshire. The acquaintance then formed lasted to the end of Harris's life—an interval of ten years excepted. Harris had been sent to Oxford in the autumn of 1735 to "cure him of his fanaticism," but he left in the following February. Rowland had never been to a university, but, like Harris, he had been well grounded in general knowledge. About 1739 another prominent figure appeared. This was Howell Davies of Pembrokeshire, whose ministry was modelled on that of his master, Griffith Jones, but with rather more clatter in his thunder.

In 1736, on returning home, Harris opened a school, Griffith Jones supplying him with books from his charity. He also set up societies, in accordance with the recommendations in Josiah Wedgwood's little book on the subject; and these exercised a great influence on the religious life of the people. By far the most notable of Harris's converts was William Williams (1717-1791), Pant y Celyn, the great hymn-writer of Wales, who while listening to the revivalist preaching on a tombstone in the graveyard of Talgarth, heard the "voice of heaven," and was "apprehended as by a warrant from on high." He was ordained deacon in the Church of England, 1740, but Whitefield recommended him to leave his curacies and go into the highways and hedges. On Wednesday and Thursday, January 5th and 6th, 1743, the friends of aggressive Christianity in Wales met at Wadford, near Caerphilly, Glam., in order to organize their societies. George Whitefield was in the chair. Rowland, Williams and John Powell—afterwards of Llanmartin—(clergymen), Harris, John Humphreys and John Cennick (laymen) were present. Seven lay exhorters were also at the meetings; they were questioned as to their spiritual experience and

allotted their several spheres; other matters pertaining to the new conditions created by the revival were arranged. This is known as the first Methodist Association—held eighteen months before Johm Wesley's first conference (June 25th, 1744). Monthly meetings covering smaller districts, were organized to consider local matters, the transactions of which were to be reported to the Quarterly Association, to be confirmed, modified, or rejected. Exhorters were divided into two classes—public, who were allowed to itinerate as preachers and superintend a number of societies; private, who were confined to the charge of one or two societies. The societies were distinctly understood to be part of the established church, as Wedgwood's were, and every attempt at estranging them therefrom was sharply reproved; but persecution made their position anomalous. They did not accept the discipline of the Church of England, so the plea of conformity was a feeble defence; nor had they taken out licenses, so as to claim the protection of the Toleration Act. Harris's ardent loyalty to the Church of England, after three refusals to ordain him, and his personal contempt for ill-treatment from persecutors, were the only things that prevented separation.

A controversy on a doctrinal point—"Did God die on Calvary?"—raged for some time, the principal disputants being Rowland and Harris; and in 1751 it ended in an open rupture, which threw the Connexion first into confusion and then into a state of coma. The societies split up into Harrisites and Rowlandites, and it was only with the revival of 1762 that the breach was fairly repaired. This revival is a landmark in the history of the Connexion. Williams of Pant y Celyn had just published a little volume of hymns, the singing of which inflamed the people. This led the bishop of St David's to suspend Rowland's license, and Rowland had to confine himself to a meeting-house at Llangeitho. Having been turned out of other churches, he had leased a plot of land in 1759, anticipating the final withdrawal of his license, in 1763, and a spacious building was erected to which the people crowded from all parts on Sacrament Sunday. Llangeitho became the Jerusalem of Wales; and Rowland's popularity never waned until his physical powers gave way. A notable event in the history of Welsh Methodism was the publication in 1770, of a 4to annotated Welsh Bible by the Rev. Peter Williams, a forceful preacher, and an indefatigable worker, who had joined the Methodists in 1746, after being driven from several curacies. It gave birth to a new interest in the Scriptures, being the first definite commentary in the language. A powerful revival broke out at Llangeitho in the spring of 1780, and spread to the south, but not to the north of Wales. The ignorance of the people of the north made it very difficult for Methodism to benefit from these manifestations, until the advent of the Rev. Thomas Charles (1755-1814), who, having spent five years in Somersetshire as curate of several parishes, returned to his native land to marry Sarah Jones of Bala. Failing to find employment in the established church, he joined the Methodists in 1784. His circulating charity schools and then his Sunday schools gradually made the North a new country. In 1791 a revival began at Bala; and this, strange to say, a few months after the Bala Association had been ruffled by the proceedings which led to the expulsion of Peter Williams from the Connexion, in order to prevent him from selling John Canne's Bible among the Methodists, because of some Sabellian marginal notes.

In 1790, the Bala Association passed "Rules regarding the proper mode of conducting the Quarterly Association," drawn up by Charles; in 1801, Charles and Thomas Jones of Mold, published (for the association) the "Rules and Objects of the Private Societies among the People called Methodists." About 1795, persecution led the Methodists to take the first step towards separation from the Church of England. Heavy fines made it impossible for preachers in poor circumstances to continue without claiming the protection of the Toleration Act, and the meeting-houses had to be registered as dissenting chapels. In a large number of cases this had only been delayed by so constructing the houses that they were used both as dwellings and as chapels at one and the same time. Until 1811 the Calvinistic Methodists had no ministers ordained by themselves; their enormous growth in numbers and the scarcity of ministers to administer the Sacrament—only three in North Wales, two of whom had joined only at the dawn of the century—made the question of ordination a matter of urgency. The South Wales clergy who regularly itinerated were dying out; the majority of those remaining itinerated but irregularly, and were most of them against the change. The lay element, with the help of Charles and a few other stalwarts, carried the matter through—ordaining nine at Bala in June, and thirteen at Llandilo in August. In 1823, the *Confession of Faith* was published; it is based on the *Westminster Confession* as "Calvinistically construed," and contains 44 articles. The Connexion's *Constitutional Deed* was formally completed in 1826.

Thomas Charles had tried to arrange for taking over Trevecca College when the trustees of the Countess of Huntingdon's Connexion removed their seminary to Cheshunt in 1791; but the Bala revival broke out just at the time, and, when things grew quieter, other matters pressed for attention. A college had been mooted in 1816, but the intended tutor died suddenly, and the matter was for the time dropped. Candidates for the Connexional ministry were compelled to shift for themselves until 1837, when Lewis Edwards (1809-1887) and David Charles (1812-1878) opened a school for young men at Bala. North and South alike adopted it as their college, the associations contributing a hundred guineas each towards the education of their students. In 1842, the South Wales Association opened a college at Trevecca, leaving Bala to the North; the Rev. David Charles became principal of the former, and the Rev. Lewis Edwards of the latter. After the death of Dr Lewis Edwards, Dr. T.C. Edwards resigned the principalship of the University College at Aberystwyth to become head of Bala (1891), now a purely theological college, the students of which were sent to the university colleges for their classical training. In 1905 Mr David Davies of Llandinam—one of the leading laymen in the Connexion—offered a large building at Aberystwyth as a gift to the denomination for the purpose of uniting North and South in one theological college; but in the event of either association declining the proposal, the other was permitted to take possession, giving the association that should decline the option of joining at a later time. The Association of the South accepted, and that of the North declined, the offer; Trevecca College was turned into a preparatory school on the lines of a similar institution set up at Bala in 1891.

The missionary collections of the denomination were given to the London Missionary Society from 1798 to 1840, when a Connexional Society was formed; and no better instances of missionary enterprise are known than those of the Khasia and Jaintia Hills, and the Plains of Sylhet in N. India. There has also been a mission in Brittany since 1842.

The constitution of the denomination (called in Welsh, "Hen Gorph," *i.e.* the Old Body) is a mixture of Presbyterianism and Congregationalism; each church manages its own affairs and reports (1) to the district meeting, (2) to the monthly meeting, the nature of each report determining its destination. The monthly meetings are made up of all the officers of the churches comprised in each, and are split up into districts for the purpose of a more local co-operation of the churches. The monthly meetings appoint delegates to the quarterly Associations, of which all officers are members. The Associations of North and South are distinct institutions, deliberating and

determining matters pertaining to them in their separate quarterly gatherings. For the purpose of a fuller co-operation in matters common to both, a general assembly (meeting once a year) was established in 1864. This is a purely deliberative conclave, worked by committees, and all its legislation has to be confirmed by the two Associations before it can have any force or be legal. The annual conference of the English churches of the denomination has no legislative standing, and is meant for social and spiritual intercourse and discussions.

In doctrine the church is Calvinistic, but its preachers are far from being rigid in this particular, being warmly evangelical, and, in general, distinctly cultured. The London degree largely figures on the Connexional Diary; and now the Welsh degrees, in arts and divinity, are being increasingly achieved. It is a remarkable fact that every Welsh revival, since 1735, has broken out among the Calvinistic Methodists. Those of 1735, 1762, 1780 and 1791 have been mentioned; those of 1817, 1832, 1859 and 1904-1905 were no less powerful, and their history is interwoven with Calvinistic Methodism, the system of which is so admirably adapted for the passing on of the torch. The ministerial system is quite anomalous. It started in pure itineracy; the pastorate came in very gradually, and is not yet in universal acceptance. The authority of the pulpit of any individual church is in the hands of the deacons; they ask the pastor to supply so many Sundays a year—from twelve to forty, as the case may be—and they then fill the remainder with any preacher they choose. The pastor is paid for his pastoral work, and receives his Sunday fee just as a stranger does; his Sundays from home he fills up at the request of deacons of other churches, and it is a breach of Connexional etiquette for a minister to apply for engagements, no matter how many unfilled Sundays he may have. Deacons and preachers make engagements seven or eight years in advance. The Connexion provides for English residents wherever required, and the English ministers are oftener in their own pulpits than their Welsh brethren.

The Calvinistic Methodists form in some respects the strongest church in Wales, and its forward movement, headed by Dr. John Pugh of Cardiff, has brought thousands into its fold since its establishment in 1891. Its Connexional Book Room, opened in 1891, yields an annual profit of from £1600 to £2000, the profits being devoted to help the colleges and to establish Sunday school libraries, etc. Its chapels in 1907 numbered 1641 (with accommodation for 488,080), manses 229; its churches[1] numbered 1428, ministers 921, unordained preachers 318, deacons 6179; its Sunday Schools 1731, teachers 27,895, scholars 193,460, communicants 189,164, total collections for religious purposes £300,912. The statistics of the Indian Mission are equally good: communicants 8027, adherents 26,787, missionaries 23, native ministers (ordained) 15, preachers (not ordained) 60.

The Calvinistic Methodists are intensely national in sentiment and aspirations, beyond all suspicion loyalists. They take a great interest in social, political and educational matters, and are prominent on public bodies. They support the Eisteddfod as the promoter and inspirer of arts, letters and music, and are conspicuous among the annual prize winners. They thus form a living, democratic body, flexible and progressive in its movements, yet with a sufficient proportion of conservatism both in religion and theology to keep it sane and safe.

(D. E. J.)

1 Adherents and members in scattered hamlets and attending different meeting-houses or chapels, often combine to form one society or church.

CALVISIUS, SETHUS (1556-1615), German chronologer, was born of a peasant family at Gorschleben in Thuringia on the 21st of February 1556. By the exercise of his musical talents he earned money enough for the start, at Helmstadt, of an university career, which the aid of a wealthy patron enabled him to continue at Leipzig. He became director of the music-school at Pforten in 1572, was transferred to Leipzig in the same capacity in 1594, and retained this post until his death on the 24th of November 1615, despite the offers successively made to him of mathematical professorships at Frankfort and Wittenberg. In his *Opus Chronologicum* (Leipzig, 1605, 7th ed. 1685) he expounded a system based on the records of nearly 300 eclipses. An ingenious, though ineffective, proposal for the reform of the calendar was put forward in his *Elenchus Calendarii Gregoriani* (Frankfort, 1612); and he published a book on music, *Melodiae condendae ratio* (Erfurt, 1592), still worth reading.

For details see V. Schmuck's *Leichenrede* (1615); J. Bertuch's *Chronicon Portense* (1739); F.W. E. Rost's *Oratio ad renovendam S. Calvisii memoriam* (1805); J G. Stallbaum's *Nachrichten über die Cantoren an der Thomasschule* (1842); *Allgemeine Deutsche Biographie*; Poggendorff's *Biog.-Litterarisches Handworterbuch.*

CALVO, CARLOS (1824-1906), Argentine publicist and historian, was born at Buenos Aires on the 26th of February 1824, and devoted himself to the study of the law. In 1860 he was sent by the Paraguayan government on a special mission to London and Paris. Remaining in France, he published in 1863 his *Derecho international teorico y practice de Europay America*, in two volumes, and at the same time brought out a French version. The book immediately took rank as one of the highest modern authorities on the subject, and by 1887 the first French edition had become enlarged to six volumes. Señor Calvo's next publications were of a semi-historical character. Between 1862 and 1869 he published in Spanish and French his great collection in fifteen volumes of the treaties and other diplomatic acts of the South American republics, and between 1864 and 1875 his *Annales historiques de la revolution de l'Amerique latine*, in five volumes. In 1884 he was one of the founders at the Ghent congress of the *Institut de Droit International.* In the following year he was Argentine minister at Berlin, and published his *Dictionnaire du droit international public et privé* in that city. Calvo died in May 1906 at Paris.

CALW or Kalw, a town of Germany, in the kingdom of Württemberg, on the Nagold, 34 m. S.W. of Stuttgart by rail. Pop. (1905), 4943. It contains a Protestant and a Roman Catholic Church, two schools, missionary institution, and a fine public library. The industries include spinning and weaving operations in wool and cotton. Carpets, cigars and leather are also manufactured. The timber trade, chiefly with the Netherlands, is important. The place is in favour as a health resort.

The name of Calw appears first in 1037. In the middle ages the town was under the dominion of a powerful family of counts, whose possessions finally passed to Württemberg in 1345. In 1634 the town was taken by the Bavarians, and in 1692 by the French.

CALYDON (Καλυδών), an ancient town of Aetolia, according to Pliny, 7½ Roman m. from the sea, on the river Euenus. It was said to have been founded by Calydon, son of Aetolus; to have been the scene of the hunting, by Meleager and other heroes, of the famous Calydonian boar, sent by Artemis to lay waste the fields; and to have taken part in the Trojan war. In historical times it is first mentioned (391 B.C.) as in the possession of the Achaeans, who retained it for twenty years, by the assistance of the Lacedaemonian king, Agesilaus, notwithstanding the attacks of the Arcarnanians. After the battle of Leuctra (371 B.C.) it was restored by Epaminondas to the Aetolians. In the time of Pompey it was a town of importance; but Augustus removed its inhabitants to Nicopolis, which he founded to commemorate his victory at Actium (31 B.C.). The walls of Calydon are almost certainly to be recognized in the Kastro of Kurtagá. These comprise a circuit of over 2 m., with one large gate and five smaller ones, and are situated on a hill on the right or west bank of the Euenus. Remains of large terrace walls outside the town probably indicate the position of the temple of Artemis Laphria, whose gold and ivory statue was transferred to Patras, together probably with her ritual. This included a sacrifice in which all kinds of beasts, wild and tame, were driven into a wooden pyre and consumed.

See W.M. Leake, *Travels in N. Greece*, i. p. 109, iii. pp. 533 sqq.; W.J. Woodhouse, *Aetolia*, pp. 95 ssq.

(E. Gr.)

CALYPSO, in Greek mythology, daughter of Atlas (or Oceanus, or Nereus), queen of the mythical island of Ogygia. When Odysseus was shipwrecked on her shores, Calypso entertained the hero with great hospitality, and prevailed on him to remain with her seven years. Odysseus was then seized with a longing to return to his wife and home; Calypso's promise of eternal youth failed to induce him to stay, and Hermes was sent by Zeus to bid her release him. When he set sail, Calypso died of grief. (Homer, *Odyssey*, i. 50, v. 28, vii. 254; Apollodorus i. 2, 7.)

CAM (CÃO), DIOGO (fl. 1480-1486), Portuguese discoverer, the first European known to sight and enter the Congo, and to explore the West African coast between Cape St Catherine (2°S.) and Cape Cross (21° 50′ S.) almost from the equator to Walfish Bay. When King John II. of Portugal revived the work of Henry the Navigator, he sent out Cam (about midsummer (?) 1482) to open up the African coast still further beyond the equator. The mouth of the Congo was now discovered (perhaps in August 1482), and marked by a stone pillar (still existing, but only in fragments) erected on Shark Point; the great river was also ascended for a short distance, and intercourse was opened with the natives. Cam then coasted down along the present Angola (Portuguese West Africa), and erected a second pillar, probably marking the termination of this voyage, at Cape Santa Maria (the Monte Negro of these first visitors) in 13° 26′ S. He certainly returned to Lisbon by the beginning of April 1484, when John II. ennobled him, made him a *cavalleiro* of his household (he was already an *escudeiro* or esquire in the same), and granted him an annuity and a coat of arms (8th and 14th of April 1484). That Cam, on his second voyage of 1483-1486, was accompanied by Martin Behaim (as alleged on the latter's Nuremberg globe of 1492) is very doubtful; but we know that the explorer revisited the Congo and erected two more pillars beyond the furthest of his previous voyage, the first at another "Monte Negro" in 15° 41′ S., the second at Cape Cross in 21° 50′, this last probably marking the end of his progress southward. According to one authority (a legend on the 1489 map of Henricus Martellus Germanus), Cam died off Cape Cross; but João de Barros and others make him return to the Congo, and take thence a native envoy to Portugal. The four pillars set up by Cam on his two voyages have all been discovered *in situ*, and the inscriptions on two of them from Cape Santa Maria and Cape Cross, dated 1482 and 1485 respectively, are still to be read and have been printed; the Cape Cross padrão is now at Kiel (replaced on the spot by a granite facsimile); those from the Congo estuary and the more southerly Monte Negro are in the Museum of the Lisbon Geographical Society.

See Barros, *Decadas da Asia*, Decade i. bk. iii., esp. ch. 3; Ruy de Pina, *Chronica d' el Rei D. João II.*; Garcia de Resende, *Chronica*; Luciano Cordeiro, "Diogo Cão" in *Boletim* of the *Lisbon Geog. Soc.*, 1892; E.G. Ravenstein, "Voyages of Diogo Cão," &c., in *Geog. Jnl.* vol. xvi. (1900); also *Geog. Jnl.* xxxi. (1908).

(C. R. B.)

CAMACHO, JUAN FRANCISCO (1824-1896), Spanish statesman and financier, was born in Cadiz in 1824. The first part of his life was devoted to mercantile and financial pursuits at Cadiz and then in Madrid, where he managed the affairs of and liquidated a mercantile and industrial society to the satisfaction and profit of the shareholders. In 1837 he became a captain in the national militia, in 1852 Conservative deputy in the Cortes for Alcoy, in 1853 secretary of congress, and was afterwards elected ten times deputy, twice senator and life senator in 1877. Camacho took a prominent part in all financial debates and committees, was offered a seat in the Mon cabinet of 1864, and was appointed under-secretary of state finances in 1866 under Canovas and O'Donnell. After the revolution of 1868 he declined the post of minister of finance offered by Marshal Serrano, but served in that capacity in 1872 and 1874 in Sagasta's cabinets. When the restoration took place, Camacho sat in the Cortes among the dynastic Liberals with Sagasta as leader, and became finance minister in 1881 at a critical moment when Spain had to convert, reduce, and consolidate her treasury and other debts with a view to resuming payment of coupons. Camacho drew up an excellent budget and collected taxation with a decidedly unpopular vigour. A few years later Sagasta again made him finance minister under the regency of Queen Christina, but had to sacrifice him when public opinion very clearly pronounced against his too radical financial reforms and his severity in collection of taxes. He was for the same reasons unsuccessful as a governor of the Tobacco Monopoly Company. He then seceded from the Liberals, and during the last years of his life he affected to vote with the Conservatives, who made him governor of the Bank of Spain. He died in Madrid on the 23rd of January 1896.

(A. E. H.)

CAMALDULIANS, or Camaldolese, a religious order founded by St Romuald. Born of a noble family at Ravenna *c.* 950, he retired at the age of twenty to the Benedictine monastery of S. Apollinare in Classe; but being strongly drawn to the eremitical life, he went to live with a hermit in the neighbourhood of Venice and then again near Ravenna. Here a colony of hermits grew up around him and he became the superior. As soon as they were established in their manner of life, Romuald moved to another district and there formed a second settlement of hermits, only to proceed in the same way to the establishment of other colonies of hermits or "deserts" as they were called. In this way during the course of his life Romuald formed a great number of "deserts" throughout central Italy. His chief foundation was at Camaldoli on the heights of the Tuscan Apennines not far from Arezzo, in a vale snow-covered during half the year. Romuald's idea was to reintroduce into the West the primitive eremitical form of monachism, as practised by the first Egyptian and Syrian monks. His monks dwelt in separate huts around the oratory, and came together only for divine service and on certain days for meals. The life was one of extreme rigour in regard to food, clothing, silence and general observance. Besides the hermits there were lay brothers to help in carrying out the field work and rougher occupations. St Romuald and the early Camaldolese exercised considerable influence on the religious movements of their time; the emperors Otto III. and Henry II. esteemed him highly and sought his advice on religious questions. Disciples of St Romuald went on missions to the still heathen parts of Russia, Poland and Prussia, where some of them suffered martyrdom. In his extreme old age St Romuald with twenty-five of his monks started on a missionary expedition to Hungary, but he was unable to accomplish the journey. He died in 1027. After his death mitigations were gradually introduced into the rule and manner of life; and in the monastery of St Michael in Murano, Venice, the life became cenobitical. From that time to the present day there have always been both eremitical and cenobitical Camaldolese, the latter approximating to ordinary Benedictine life. The Camaldolese spread all over Italy, and into Germany, Poland and France. Camaldoli itself exists as a "desert," the primitive observance of the institute being strictly maintained. There are a few other "deserts," all in Italy, except one in Poland; and there are about 90 hermits. The chief monastery of the cenobitical Camaldolese is S. Gregorio on the Caelian Hill in Rome; they number less than forty. Since the 11th century there have been Camaldolese nuns; at present there are five nunneries with 150 nuns, all belonging to the cenobitical branch of the order. The habit of the Camaldulians is white.

See Helyot, *Hist. des ordres religieux* (1792) v. cc. 21-25; Max Heimbucher, *Orden und Kongregationen* (1896) i. § 29; and the art. "Camaldulenser" in Wetzer and Welte, *Kirchenlexikon* (2nd ed.), and Herzog, *Realencyklopädie* (3rd ed.).

(E. C. B.)

CAMARGO, MARIE ANNE DE CUPIS DE (1710-1770), French dancer, of Spanish descent, was born in Brussels on the 15th of April 1710. Her father, Ferdinand Joseph de Cupis, earned a scanty living as violinist and dancing-master, and from childhood she was trained for the stage. At ten years of age she was given lessons by Mlle Françoise Prévost (1680-1741), then the first dancer at the Paris Opéra, and at once obtained an engagement as *première danseuse*, first at Brussels and then at Rouen. Under her grandmother's family name of Camargo she made her Paris *début* in 1726, and at once became the rage. Every new fashion bore her name; her manner of doing her hair was copied by all at court; her shoemaker—she had a tiny foot—made his fortune. She had many titled adorers whom she nearly ruined by her extravagances, among others Louis de Bourbon, comte de Clermont. At his wish she retired from the stage from 1736 to 1741. In her time she appeared in seventy-eight ballets or operas, always to the delight of the public. She was the first ballet-dancer to shorten the skirt to what afterwards became the regulation length. There is a charming portrait of her by Nicolas Lancret in the Wallace collection, London.

CAMARGUE (*Insula Camaria*), a thinly-populated region of southern France contained wholly in the

department of Bouches-du-Rhône, and comprising the delta of the Rhone. The Camargue is a marshy plain of alluvial formation enclosed between the two branches of the river, the Grand Rhône to the east and the Petit Rhône to the west. Its average elevation is from 6½ to 8 ft. The Camargue has a coast-line some 30 m. in length and an area of 290 sq. m., of which about a quarter consists of cultivated and fertile land. This is in the north and on the banks of the rivers. The rest consists of rough pasture grazed by the black bulls and white horses of the region and by large flocks of sheep, or of marsh, stagnant water and waste land impregnated with salt. The region is inhabited by flocks of flamingoes, bustards, partridge, and by sea-birds of various kinds. The Étang de Vaccarès, the largest of the numerous lagoons and pools, covers about 23 sq. m.; it receives three main canals constructed to drain off the minor lagoons. The Camargue is protected by dikes from the inundations both of the sea and of the rivers. Inlets in the sea-dike let in water for the purposes of the lagoon fisheries and the salt-pans; and the river-water is used for irrigation and for the submersion of vines. The climate is characterized by hard winters and scorching summers. Rain falls in torrents, but at considerable intervals. The mistral, blowing from the north and north-west, is the prevailing wind. The south-eastern portion of the Camargue is known as the Ile du Plan du Bourg. A secondary delta to the west of the Petit Rhône goes by the name of Petite Camargue.

CAMARINA, an ancient city of Sicily, situated on the south coast, about 17 m. S.E. of Gela (Terranova). It was founded by Syracuse in 599 B.C., but destroyed by the mother city in 552 for attempting to assert its independence. Hippocrates of Gela received its territory from Syracuse and restored the town in 492, but it was destroyed by Gelon in 484; the Geloans, however, founded it anew in 461. It seems to have been in general hostile to Syracuse, but, though an ally of Athens in 427, it gave some slight help to Syracuse in 415-413. It was destroyed by the Carthaginians in 405, restored by Timoleon in 339 after its abandonment by Dionysius's order, but in 258 fell into the hands of the Romans. Its complete destruction dates from A.D. 853. The site of the ancient city is among rapidly shifting sandhills, and the lack of stone in the neighbourhood has led to its buildings being used as a quarry even by the inhabitants of Terranova, so that nothing is now visible above ground but a small part of the wall of the temple of Athena and a few foundations of houses; portions of the city wall have been traced by excavation, and the necropolis has been carefully explored (see J. Schubring in *Philologus*, xxxii. 490; P. Orsi in *Monumenti dei Lincei*, ix. 201, 1899; xiv. 756, 1904). To the north lay the lake to which the answer of the Delphic oracle referred, μὴ κίνει Καμάριναν, when the citizens inquired as to the advisability of draining it.

CAMBACÉRÈS, JEAN JACQUES RÉGIS DE, duke of Parma (1753-1824), French statesman, was born at Montpellier on the 18th of October 1753. He was descended from a well-known family of the legal nobility (*noblesse de la robe*). He was designed for the magistracy of his province; and in 1771, when for a time the provincial parlement was suppressed, with the others, by the chancellor Maupeou, he refused to sit in the royal tribunal substituted for it. He continued, however, to study law with ardour, and in 1774 succeeded his father as councillor in the court of accounts and finances of his native town. Espousing the principles of the Revolution in 1789, he was commissioned by the *noblesse* of the province to draw up the *cahier* (statement of principles and grievances); and the *sénéchaussée* of Montpellier elected him deputy to the states-general of Versailles; but the election was annulled on a technical point. Nevertheless in 1792 the new department of Hérault, in which Montpellier is situated, sent him as one of its deputies to the Convention which assembled and proclaimed the Republic in September 1792. In the strife which soon broke out between the Girondins and the Jacobins he took no decided part, but occupied himself mainly with the legal and legislative work which went on almost without intermission even during the Terror. The action of Cambacérès at the time of the trial of Louis XVI. (December 25, 1792-January 20, 1793) was characteristic of his habits of thought. At first he protested against the erection of the Convention into a tribunal in these words: "The people has chosen you to be legislators; it has not appointed you as judges." He also demanded that the king should have due facilities for his defence. Nevertheless, when the trial proceeded, he voted with the majority which declared Louis to be guilty, but recommended that the penalty should be postponed until the cessation of hostilities, and that the sentence should then be ratified by the Convention or by some other legislative body. It is therefore inexact to count him among the regicides, as was done by the royalists after 1815. Early in 1793 he became a member of the Committee of General Defence, but he did not take part in the work of its more famous successor, the Committee of Public Safety, until the close of the year 1794. In the meantime he had done much useful work, especially that of laying down, conjointly with Merlin of Douai, the principles on which the legislation of the revolutionary epoch should be codified. At the close of 1794 he also used his tact and eloquence on behalf of the restoration of the surviving Girondins to the Convention, from which they had been driven by the *coup d'état* of the 31st of May 1793. In the course of the year 1795, as president of the Committee of Public Safety, and as responsible especially for foreign affairs, he was largely instrumental in bringing about peace with Spain. Nevertheless, not being a regicide, he was not appointed to be one of the five Directors to whom the control of public affairs was entrusted after the *coup d'état* of Vendémiaire 1795; but, as before, his powers of judgment and of tactful debating soon carried him to the front in the council of Five Hundred. The moderation of his views brought him into opposition to the Directors after the *coup d'état* of Fructidor (September 1797), and for a time he retired into private life. Owing, however, to the influence of Sieyès, he became minister of justice in July 1799. He gave a guarded support to Bonaparte and Sieyès in their enterprise of overthrowing the Directory (*coup d'état* of Brumaire 1799).

After a short interval Cambacérès was, by the constitution of December 1799, appointed second consul of France—a position which he owed largely to his vast legal knowledge and to the conviction which Sieyès entertained of his value as a manipulator of public assemblies. It is impossible here to describe in detail his relations to Napoleon, and the part which he played in the drawing up of the Civil Code, later on called the Code Napoleon. It must suffice to say that the skilful intervention of Cambacérès helped very materially to ensure to Napoleon the consulship for life (August 1, 1802); but the second consul is known to have disapproved of some of

the events which followed, notably the execution of the duc d'Enghien, the rupture with England, and the proclamation of the Empire (May 19, 1804). This last occurrence ended his title of second consul; it was replaced by that of arch-chancellor of the Empire. To him was decreed the presidence of the Senate in perpetuity. He also became a prince of the Empire and received in 1808 the title duke of Parma. Apart from the important part which he took in helping to co-ordinate and draft the Civil Code, Cambacérès did the state good service in many directions, notably by seeking to curb the impetuosity of the emperor, and to prevent enterprises so fatal as the intervention in Spanish affairs (1808) and the invasion of Russia (1812) proved to be. At the close of the campaign of 1814 he shared with Joseph Bonaparte the responsibility for some of the actions which zealous Bonapartists have deemed injurious to the fortunes of the emperor. In 1815, during the Hundred Days, he took up his duties reluctantly at the bidding of Napoleon; and after the second downfall of his master, he felt the brunt of royalist vengeance, being for a time exiled from France. A decree of 13th May 1818 restored him to his civil rights as a citizen of France; but the last six years of his life he spent in retirement. He was a member of the Academy till the 31st of March 1816, when a decree of exclusion was passed. In demeanour he was quiet, reserved and tactful, but when occasion called for it he proved himself a brilliant orator. He was a celebrated *gourmet*, and his dinners were utilized by Napoleon as a useful adjunct to the arts of statecraft.

See A. Aubriet, *Vie de Cambacérès* (2nd ed., Paris, 1825).

(J. Hl. R.)

CAMBALUC, the name by which, under sundry modifications, the royal city of the great khan in China became known to Europe during the middle ages, that city being in fact the same that we now know as Peking. The word itself represents the Mongol Khan-Balik, "the city of the khan," or emperor, the title by which Peking continues, more or less, to be known to the Mongols and other northern Asiatics.

A city occupying approximately the same site had been the capital of one of the principalities into which China was divided some centuries before the Christian era; and during the reigns of the two Tatar dynasties that immediately preceded the Mongols in northern China, viz. that of the Khitans, and of the Kin or "Golden" khans, it had been one of their royal residences. Under the names of Yenking, which it received from the Khitan, and of Chung-tu, which it had from the Kin, it holds a conspicuous place in the wars of Jenghiz Khan against the latter dynasty. He captured it in 1215, but it was not till 1284 that it was adopted as the imperial residence in lieu of Karakorum in the Mongol steppes by his grandson Kublai. The latter selected a position a few hundred yards to the north-east of the old city of Chung-tu or Yenking, where he founded the new city of Ta-tu ("great capital"), called by the Mongols Taidu or Daitu, but also Khan-Balik; and from this time dates the use of the latter name as applied to this site.

The new city formed a rectangle, enclosed by a colossal mud rampart, the longer sides of which ran north and south. These were each about 5⅓ English m. in length, the shorter sides 3¾ m., so that the circuit was upwards of 18 m. The palace of the khan, with its gardens and lake, itself formed an inner enclosure fronting the south. There were eleven city gates, viz. three on the south side, always the formal front with the Tatars, and two on each of the other sides; and the streets ran wide and straight from gate to gate (except, of course, where interrupted by the palace walls), forming an oblong chess-board plan.

Ta-tu continued to be the residence of the emperors till the fall of the Mongol power (1368). The native dynasty (Ming) which supplanted them established their residence at Nan-king ("South Court"), but this proved so inconvenient that Yunglo, the third sovereign of the dynasty, reoccupied Ta-tu, giving it then, for the first time, the name of Pe-king ("North Court"). This was the name in common use when the Jesuits entered China towards the end of the 16th century, and began to send home accurate information about China. But it is not so now; the names in ordinary use being King-cheng or King-tu, both signifying "capital." The restoration of Cambaluc was commenced in 1409. The size of the city was diminished by the retrenchment of nearly one-third at the northern end, which brought the enceinte more nearly to a square form. And this constitutes the modern (so-called) "Tatar city" of Peking, the south front of which is identical with the south front of the city of Kublai. The walls were completed in 1437. Population gathered about the southern front, probably using the material of the old city of Yenking, and the excrescence so formed was, in 1544, enclosed by a wall and called the "outer city." It is the same that is usually called by Europeans "the Chinese city." The ruins of the retrenched northern portion of Kublai's great rampart are still prominent along their whole extent, so that there is no room for question as to the position or true dimensions of the Cambaluc of the middle ages; and it is most probable, indeed it is almost a necessity, that the present palace stands on the lines of Kublai's palace.

The city, under the name of Cambaluc, was constituted into an archiepiscopal see by Pope Clement V. in 1307, in favour of the missionary Franciscan John of Montecorvino (d. 1330); but though some successors were nominated it seems probable that no second metropolitan ever actually occupied the seat.

Maps of the 16th and 17th centuries often show Cambaluc in an imaginary region to the north of China, a part of the misconception that has prevailed regarding Cathay. The name is often in popular literature written Cambalu, and is by Longfellow accented in verse *Cámbălú*. But this spelling originates in an accidental error in Ramusio's Italian version, which was the chief channel through which Marco Polo's book was popularly known. The original (French) MSS. all agree with the etymology in calling it Cambaluc, which should be accented *Cămbáluc*.

CAMBAY, a native state of India, within the Gujarat division of Bombay. It has an area of 350 sq. m. Pop. (1901) 75,225, showing a decrease of 16% in the decade, due to the famine of 1899-1900. The estimated gross revenue is £27,189; the tribute, £1460. In physical character Cambay is entirely an alluvial plain. As a separate

state it dates only from about 1730, the time of the dismemberment of the Mogul empire. The present chiefs are descended from Momin Khan II., the last of the governors of Gujarat, who in 1742 murdered his brother-in-law, Nizam Khan, governor of Cambay, and established himself there.

The town of Cambay had a population in 1901 of 31,780. It is supposed to be the *Camanes* of Ptolemy, and was formerly a very flourishing city, the seat of an extensive trade, and celebrated for its manufactures of silk, chintz and gold stuffs; but owing principally to the gradually increasing difficulty of access by water, owing to the silting up of the gulf, its commerce has long since fallen away, and the town has become poor and dilapidated. The spring tides rise upwards of 30 ft., and in a channel usually so shallow form a serious danger to shipping. The trade is chiefly confined to the export of cotton. The town is celebrated for its manufacture of agate and carnelian ornaments, of reputation principally in China. The houses in many instances are built of stone (a circumstance which indicates the former wealth of the city, as the material had to be brought from a very considerable distance); and remains of a brick wall, 3 m. in circumference, which formerly surrounded the town, enclose four large reservoirs of good water and three bazaars. To the south-east there are very extensive ruins of subterranean temples and other buildings half-buried in the sand by which the ancient town was overwhelmed. These temples belong to the Jains, and contain two massive statues of their deities, the one black, the other white. The principal one, as the inscription intimates, is Pariswanath, or Parswanath, carved in the reign of the emperor Akbar; the black one has the date of 1651 inscribed. In 1780 Cambay was taken by the army of General Goddard, was restored to the Mahrattas in 1783, and was afterwards ceded to the British by the peshwa under the treaty of 1803. It was provided with a railway in 1901 by the opening of the 11 m. required to connect with the gaekwar of Baroda's line through Petlad.

CAMBAY, GULF OF, an inlet in the coast of India, in the Gujarat division of Bombay. It is about 80 m. in length, but is shallow and abounds in shoals and sandbanks. It is supposed that the depth of water in this gulf has been decreasing for more than two centuries past. The tides, which are very high, run into it with amazing velocity, but at low water the bottom is left nearly dry for some distance below the latitude of the town of Cambay. It is, however, an important inlet, being the channel by which the valuable produce of central Gujarat and the British districts of Ahmedabad and Broach is exported; but the railway from Bombay to Baroda and Ahmedabad, near Cambay, has for some time past been attracting the trade to itself.

CAMBER (derived through the Fr. from Lat. *camera*, vault), in architecture, the upward curvature given to a beam and provided for the depression or sagging, which it is liable to, before it has settled down to its bearings. A "camber arch" is a slight rise given to the straight-arch to correct an apparent sinking in the centre (see Arch).

CAMBERT, ROBERT (1628-1677), French operatic composer, was born in Paris in 1628. He was a pupil of Chambonnières. In 1655, after he had obtained the post of organist at the church of St Honoré, he married Marie du Moustier. He was musical superintendent to Queen Anne of Austria, mother of Louis XIV., and for a time held a post with the marquis de Sourdeac. His earlier works, the words of which were furnished by Pierre Perrin, continued to be performed before the court at Vincennes till the death of his patron Cardinal Mazarin. In 1669 Perrin received a patent for the founding of the *Académie Nationale de musique*, the germ of the Grand Opéra, and Cambert had a share in the administration until both he and Perrin were discarded in the interests of Lulli. Displeased at his subsequent neglect, and jealous of the favour shown to Lulli, who was musical superintendent to the king, he went in 1673 to London, where soon after his arrival he was appointed master of the band to Charles II. One at least of his operas, *Pomone*, was performed in London under his direction, but it did not suit the popular taste, and he is supposed to have killed himself in London in 1677. His other principal operas were *Ariadne ou les amours de Bacchus* and *Les Peines et les plaisirs de l'amour*.

CAMBERWELL, a southern metropolitan borough of London, England, bounded N. by Southwark and Bermondsey, E. by Deptford and Lewisham, W. by Lambeth, and extending S. to the boundary of the county of London. Pop, (1901) 259,339. Area, 4480 acres. It appears in Domesday, but the derivation of the name is unknown. It includes the districts of Peckham and Nunhead, and Dulwich (*q.v.*) with its park, picture-gallery and schools. Camberwell is mainly residential, and there are many good houses, pleasantly situated in Dulwich and southward towards the high ground of Sydenham. Dulwich Park (72 acres) and Peckham Rye Common and Park (113 acres) are the largest of several public grounds, and Camberwell Green was once celebrated for its fairs. Immediately outside the southern boundary lies a well-known place of recreation, the Crystal Palace. Among institutions may be mentioned the Camberwell school of arts and crafts, Peckham Road. In Camberwell Road is Cambridge House, a university settlement, founded in 1897 and incorporating the earlier Trinity settlement. The parliamentary borough of Camberwell has three divisions, North, Peckham and Dulwich, each returning one member: but is not wholly coincident with the municipal borough, the Dulwich division extending to include

Penge, outside the county of London. The borough council consists of a mayor, ten aldermen, and sixty councillors.

CAMBIASI, LUCA (1527-1585), Genoese painter, familiarly known as Lucchetto da Genova (his surname is written also Cambiaso or Cangiagio), was born at Moneglia in the Genoese state, the son of a painter named Giovanni Cambiasi. He took to drawing at a very early age, imitating his father, and developed great aptitude for foreshortening. At the age of fifteen he painted, along with his father, some subjects from Ovid's *Metamorphoses* on the front of a house in Genoa, and afterwards, in conjunction with Marcantonio Calvi, a ceiling showing great daring of execution in the Palazzo Doria. He also formed an early friendship with Giambattista Castello; both artists painted together, with so much similarity of style that their works could hardly be told apart; from this friend Cambiasi learned much in the way of perspective and architecture. Luchetto's best artistic period lasted for twelve years after his first successes; from that time he declined in power, though not at once in reputation, owing to the agitations and vexations brought upon him by a passion which he conceived for his sister-in-law. His wife having died, and the sister-in-law having taken charge of his house and children, he endeavoured to procure a papal dispensation for marrying her; but in this he was disappointed. In 1583 he accepted an invitation from Philip II. to continue in the Escorial a series of frescoes which had been begun by Castello, now deceased; and it is said that one principal reason for his closing with this offer was that he hoped to bring the royal influence to bear upon the pope, but in this again he failed. Worn out with his disquietudes, he died in the Escorial in the second year of his sojourn. Cambiasi had an ardent fancy, and was a bold designer in a Raphaelesque mode. His extreme facility astonished the Spanish painters; and it is said that Philip II., watching one day with pleasure the offhand zest with which Luchetto was painting a head of a laughing child, was allowed the further surprise of seeing the laugh changed, by a touch or two upon the lips, into a weeping expression. The artist painted sometimes with a brush in each hand, and with a certainty equalling or transcending that even of Tintoret. He made a vast number of drawings, and was also something of a sculptor, executing in this branch of art a figure of Faith. Altogether he ranks as one of the ablest artists of his day. In personal character, notwithstanding his executive energy, he is reported to have been timid and diffident. His son Orazio became likewise a painter, studying under Luchetto.

> The best works of Cambiasi are to be seen in Genoa. In the church of S. Giorgio—the martyrdom of that saint; in the Palazzo Imperiali Terralba, a Genoese suburb—a fresco of the "Rape of the Sabines"; in S. Maria da Carignano—a "Pietà," containing his own portrait and (according to tradition) that of his beloved sister-in-law. In the Escorial he executed several pictures; one is a Paradise on the vaulting of the church, with a multitude of figures. For this picture he received 12,000 ducats, probably the largest sum that had, up to that time, ever been given for a single work.

CAMBODIA[1] (called by the inhabitants *Sroc Khmer* and by the French *Cambodge*), a country of south-eastern Asia and a protectorate of France, forming part of French Indo-China.

Geography.—It is bounded N. by Siam and Laos, E. by Annam, S.E. and S. by Cochin-China, S.W. by the Gulf of Siam, and W. by Siam. Its area is estimated at approximately 65,000 sq. m.; its population at 1,500,000, of whom some three-quarters are Cambodians, the rest Chinese, Annamese, Chams, Malays, and aboriginal natives. The whole of Cambodia lies in the basin of the lower Mekong, which, entering this territory on the north, flows south for some distance, then inclines south-west as far as Pnom-penh, where it spreads into a delta and resumes a southerly course. The salient feature of Cambodian geography is the large lake Tonlé-Sap, in a depression 68 m. long from south-east to north-west and 15 m. wide. It is fed by several rivers and innumerable torrents, and at flood-time serves as a reservoir for the Mekong, with which it is connected by a channel some 70 m. long, known as the Bras du Lac and joining the river at Pnom-Penh. In June the waters of the Mekong, swollen by the rains and the melting of the Tibetan snows, rise to a height of 40 to 45 ft. and flow through the Bras du Lac towards the lake, which then covers an area of 770 sq. m., and like the river inundates the marshes and forests on its borders. During the dry season the current reverses and the depression empties so that the lake shrinks to an area of 100 sq. m., and its depth falls from 45-48 ft. to a maximum of 5 ft. Tonlé-Sap probably represents the chief wealth of Cambodia. It supports a fishing population of over 30,000, most of whom are Annamese; the fish, which are taken by means of large nets at the end of the inundation, are either dried or fermented for the production of the sauce known as *nuoc-mam*. The northern and western provinces of Cambodia which fall outside the densely populated zone of inundation are thinly peopled; they consist of plateaus, in many places thickly wooded and intersected by mountains, the highest of which does not exceed 5000 ft. The region to the east of the Mekong is traversed by spurs of the mountains of Annam and by affluents of the Mekong, the most important of these being the Se-khong and the Tonle-srepok, which unite to flow into the Mekong at Stung-treng. Small islands, inhabited by a fishing population, fringe the west coast.

Climate, Fauna and Flora.—The climate of Cambodia, like that of Cochin China, which it closely resembles, varies with the monsoons. During the north-east monsoon, from the middle of October to the middle of April, dry weather prevails and the thermometer averages from 77° to 80° F. During the south-west monsoon, from the middle of April to the middle of October, rain falls daily and the temperature varies between 85° and 95°. The wild animals of Cambodia include the elephant, which is also domesticated, the rhinoceros, buffalo and some species of wild ox; also the tiger, panther, leopard and honey-bear. Wild boars, monkeys and rats abound and are the chief enemies of the cultivator. The crocodile is found in the Mekong, and there are many varieties of reptiles, some of them venomous. The horse of Cambodia is only from 11 to 12 hands in height, but is strong and capable of great endurance; the buffalo is the chief draught animal. Swine are reared in large numbers. Nux vomica, gamboge, caoutchouc, cardamoms, teak and other valuable woods and gums are among the natural products.

People.—The Cambodians have a far more marked affinity with their Siamese than with their Annamese neighbours. The race is probably the result of a fusion of the Malay aborigines of Indo-China with the Aryan and Mongolian invaders of the country. The men are taller and more muscular than the Siamese and Annamese, while the women are small and inclined to stoutness. The face is flat and wide, the nose short, the mouth large and the eyes only slightly oblique. The skin is dark brown, the hair black and, while in childhood the head is shaved with the exception of a small tuft at the top, in later life it is dressed so as to resemble a brush. Both sexes wear the langouti or loin-cloth, which the men supplement with a short jacket, the women with a long scarf draped round the figure or with a long clinging robe. Morose, superstitious, and given to drinking and gambling, the Cambodians are at the same time clean, fairly intelligent, proud and courageous. The wife enjoys a respected position and divorce may be demanded by either party. Polygamy is almost confined to the richer classes. Though disinclined to work, the Cambodians make good hunters and woodsmen. Many of them live on the borders of the Mekong and the great lake, in huts built upon piles or floating rafts. The religion of Cambodia is Buddhism, and involves great respect towards the dead; the worship of spirits or local genii is also wide-spread, and Brahmanism is still maintained at the court. Monks or *bonzes* are very numerous; they live by alms and in return they teach the young to read, and superintend coronations, marriages, funerals and the other ceremonials which play a large part in the lives of the Cambodians. As in the rest of Indo-China, there is no hereditary nobility, but there exist castes founded on blood-relationship—the members of the royal family within the fifth degree (the *Brah-Vansa*) those beyond the fifth degree (*Brah-Van*), and the *Bakou*, who, as descendants of the ancient Brahmans, exercise certain official functions at the court. These castes, as well as the mandarins, who form a class by themselves, are exempt from tax or forced service. The mandarins are nominated by the king and their children have a position at court, and are generally chosen to fill the vacant posts in the administration. Under the native régime the common people attached themselves to one or other of the mandarins, who in return granted them the protection of his influence. Under French rule, which has modified the old usages in many respects, local government of the Annamese type tends to supplant this feudal system. Slavery was abolished by a royal ordinance of 1897.

Cambodian idiom bears a likeness to some of the aboriginal dialects of south Indo-China; it is agglutinate in character and rich in vowel-sounds. The king’s language and the royal writing, and also religious words are, however, apparently of Aryan origin and akin to Pali. Cambodian writing is syllabic and complicated. The books (manuscripts) are generally formed of palm-leaves upon which the characters are traced by means of a style.

Industry and Commerce.—Iron, worked by the tribe of the Kouis, is found in the mountainous region. The Cambodians show skill in working gold and silver; earthenware, bricks, mats, fans and silk and cotton fabrics, are also produced to some small extent, but fishing and the cultivation of rice and in a minor degree of tobacco, coffee, cotton, pepper, indigo, maize, tea and sugar are the only industries worthy of the name. Factories exist near Pnom-Penh for the shelling of cotton-seeds. The Cambodian is his own artificer and self-sufficing so far as his own needs are concerned. Rice, dried fish, beans, pepper and oxen are the chief elements in the export trade of the country, which is in the hands of Chinese. The native plays little or no part in commerce.

Trade is carried on chiefly through Saigon in Cochin-China, Kampot, the only port of Cambodia, being accessible solely to coasting vessels. With the exception of the highway from Pnom-Penh (*q.v.*) the capital, to Kampot, the roads of Cambodia are not suited for vehicles. Pnom-Penh communicates regularly by the steamers of the “Messageries Fluviales” by way of the Mekong with Saigon.

Administration.—At the head of the government is the king (*rāj*). His successor is either nominated by himself, in which case he sometimes abdicates in his favour, or else elected by the five chief mandarins from among the Brah Vansa. The *upayuvrāj* (*obbaioureach*) or king who has abdicated, the heir-presumptive (*uparāj, obbareach*) and the first princess of the blood are high dignitaries with their own retinues. The king is advised by a council of five ministers, the superior members of the class of mandarins; and the kingdom is divided into about fifty provinces administered by members of that body. France is represented by a resident superior, who presides over the ministerial council and is the real ruler of the country, and by residents exercising supervision in the districts into which the country is split up for the purposes of the French administration. In each residential district there is a council, composed of natives and presided over by the resident, which deliberates on questions affecting the district. The resident superior is assisted by the protectorate council, consisting of heads of French administrative departments (chief of the judicial service, of public works. &c.) and one native “notable,” and the royal orders must receive its sanction before they can be executed. The control of foreign policy, public works, the customs and the exchequer are in French hands, while the management of police, the collection of the direct taxes and the administration of justice between natives remain with the native government. A French tribunal alone is competent to settle disputes where one of the parties is not a native.

The following is a summary of the local budget of Cambodia for 1899 and 1904:—

	Receipts.	Expenditure.
1899	£235,329	£188,654
1904	250,753	229,880

The chief sources of revenue are the direct taxes, including the poll-tax and the taxes on the products of the soil, which together amounted to £172,636 in 1904. The chief heads of expenditure are the civil list, comprising the personal allowance to the king and the royal family (£46,018 in 1904), public works (£39,593) and government house and residences (£29,977).

History.—The Khmers, the ancient inhabitants of Cambodia, are conjectured to have been the offspring of a fusion between the autochthonous dwellers in the Indo-Chinese peninsula, now represented by the Kouis and other savage tribes, and an invading race from the plateaus of central Asia. As early as the 12th century B.C., Chinese chronicles, which are almost the only source for the history of Cambodia till the 5th century A.D., mention a region called Fou-nan, in later times appearing under the name of Tchin-la; embracing the basin of the Menam, it extended eastwards to the Mekong and may be considered approximately coextensive with the Khmer kingdom. Some centuries before the Christian era, immigrants from the east coast of India began to exert a powerful influence over Cambodia, into which they introduced Brahmanism and the Sanskrit language. This Hinduizing process became more marked about the 5th century A.D., when, under S’rutavarman, the Khmers as a nation rose into prominence. The name *Kambuja*, whence the European form Cambodia, is derived from the Hindu *Kambu*, the name of the mythical founder of the Khmer race; it seems to have been officially adopted by the Khmers as the title of their country about this period. At the end of the 7th century the dynasty of S’rutavarman ceased to rule over the whole of Cambodia, which during the next century was divided into two portions ruled over by two

sovereigns. Unity appears to have been re-established about the beginning of the 9th century, when with Jayavarman III. there begins a dynasty which embraces the zenith of Khmer greatness and the era during which the great Brahman monuments were built. The royal city of Angkor-Thorn (see Angkor) was completed under Yasovarman about A.D. 900. In the 10th century Buddhism, which had existed for centuries in Cambodia, began to become powerful and to rival Brahmanism, the official religion. The construction of the temple of Angkor Vat dates probably from the first half of the 12th century, and appears to have been carried out under the direction of the Brahman Divakara, who enjoyed great influence under the monarchs of this period. The conquest of the rival kingdom of Champa, which embraced modern Cochin-China and southern Annam, and in the later 15th century was absorbed by Annam, may probably be placed at the end of the 12th century, in the reign of Jayavarman VIII., the last of the great kings. War was also carried on against the western neighbours of Cambodia, and the exhaustion consequent upon all these efforts seems to have been the immediate cause of the decadence which now set in. From the last decade of the 13th century there dates a valuable description of Tchin-la[2] written by a member of a Chinese embassy thereto. The same period probably also witnessed the liberation of the Thais or inhabitants of Siam from the yoke of the Khmers, to whom they had for long been subject, and the expulsion of the now declining race from the basin of the Menam. The royal chronicles of Cambodia, the historical veracity of which has often to be questioned, begin about the middle of the 14th century, at which period the Thais assumed the offensive and were able repeatedly to capture and pillage Angkor-Thorn. These aggressions were continued in the 15th century, in the course of which the capital was finally abandoned by the Khmer kings, the ruin of the country being hastened by internal revolts and by feuds between members of the royal family. At the end of the 16th century, Lovek, which had succeeded Angkor-Thorn as capital, was itself abandoned to the conquerors. During that century, the Portuguese had established some influence in the country, whither they were followed by the Dutch, but after the middle of the 17th century, Europeans counted for little in Cambodia till the arrival of the French. At the beginning of the 17th century the Nguyen, rulers of southern Annam, began to encroach on the territory of Cochin-China, and in the course of that and the 18th century, Cambodia, governed by two kings supported respectively by Siam and Annam, became a field for the conflicts of its two powerful neighbours. At the end of the 18th century the provinces of Battambang and Siem-reap were annexed by Siam. The rivalries of the two powers were concluded after a last and indecisive war by the treaty of 1846, as a result of which Ang-Duong, the protégé of Siam, was placed on the throne at the capital of Oudong, and the Annamese evacuated the country. In 1863, in order to counteract Siamese influence there, Doudart de Lagrée was sent by Admiral la Grandière to the court of King Norodom, the successor of Ang-Duong, and as a result of his efforts Cambodia placed itself under the protectorate of France. In 1866 Norodom transferred his capital to Pnom-Penh. In 1867 a treaty between France and Siam was signed, whereby Siam renounced its right to tribute and recognized the French protectorate over Cambodia in return for the provinces of Battambang and Angkor, and the Laos territory as far as the Mekong. In 1884 another treaty was signed by the king, confirming and extending French influence, and reducing the royal authority to a shadow, but in view of the discontent aroused by it, its provisions were not put in force till several years later. In 1904 the territory of Cambodia was increased by the addition to it of the Siamese provinces of Melupré and Bassac, and the maritime district of Krat, the latter of which, together with the province of Dansai, was in 1907 exchanged for the provinces of Battambang, Siem-reap and Sisophon. By the same treaty France renounced its sphere of influence on the right bank of the Mekong. In 1904 King Norodom was succeeded by his brother Sisowath.

See E. Aymonier, *Le Cambodge* (3 vols., Paris, 1900-1904); L. Moura, *Le royaume de Cambodge* (2 vols., Paris, 1883); A. Leclère, *Les codes cambodgiens* (2 vols., Paris, 1898), and other works on Cambodian law; Francis Gamier, *Voyage d'exploration en Indo-Chine* (Paris, 1873).

1 See also Indo-China, French

2 Translated by Abel Rémusat, *Noveaux Mélanges Asiatiques* (1829).

CAMBON, PIERRE JOSEPH (1756-1820), French statesman, was the son of a wealthy cotton merchant at Montpellier. In 1785 his father retired, leaving the direction of the business to Pierre and his two brothers, but in 1788 Pierre turned aside to politics, and was sent by his fellow-citizens as deputy *suppléant* to Versailles, where he was little more than a spectator. In January 1790 he returned to Montpellier, was elected a member of the municipality, was one of the founders of the Jacobin club in that city, and on the flight of Louis XVI. in 1791, he drew up a petition to invite the Constituent Assembly to proclaim a republic,—the first in date of such petitions. Elected to the Legislative Assembly, Cambon became noted for his independence, his honesty and his ability in finance. He was the most active member of the committee of finance and was often charged to verify the state of the treasury. Nothing could be more false than the common opinion that as a financier his sole expedient was to multiply the emissions of *assignats*. His remarkable speech of the 24th of November 1791 is a convincing proof of his sagacity. In politics, while he held aloof from the clubs, and even from parties, he was an ardent defender of the new institutions. On the 9th of February 1792, he succeeded in having a law passed sequestrating the possessions of the *emigrés*, and demanded, though in vain, the deportation of refractory priests to French Guiana. He was the last president of the Legislative Assembly. Re-elected to the Convention, he opposed the pretensions of the Commune and the proposed grant of money to the municipality of Paris by the state. He denounced Marat's placards as inciting to murder, summoned Danton to give an account of his ministry, watched carefully over the furnishing of military supplies, and was a strong opponent of Dumouriez, in spite of the general's great popularity. Cambon then incurred the hatred of Robespierre by proposing the suppression of the pay to the clergy, which would have meant the separation of church and state. His authority grew steadily. On the 15th of December 1792 he got the Convention to adopt a proclamation to all nations in favour of a universal republic. In the trial of Louis XVI. he voted for his death, without appeal or postponement. He attempted to prevent the creation of the Revolutionary Tribunal, but when called to the first Committee of Public Safety he worked on it energetically to organize the armies. On the 3rd of February 1793 he had decreed the emission of 800 millions of *assignats*, for the expenses of the war. His courageous intervention in favour of the Girondists on the and of June 1793 served Robespierre as a pretext to prevent his re-election to the Committee of Public Safety. But Cambon soon came to the conclusion that the security of France depended upon the triumph of the Mountain, and he did

not hesitate to accord his active co-operation to the second committee. He took an active share in the various expedients of the government for stopping the depreciation of the *assignats*. He was responsible, especially, for the great operation known as the opening of the *Grand Livre* (August 24), which was designed to consolidate the public debt by cancelling the stock issued under various conditions prior to the Revolution, and issuing new stock of a uniform character, so that all fund-holders should hold stock of the revolutionary government and thus be interested in its stability. Each fund-holder was to be entered in the Great Book, or register of the public debt, for the amount due to him every year. The result of this measure was a rise in the face value of the *assignats* from 27% to 48% by the end of the year. In matters of finance Cambon was now supreme; but his independence, his hatred of dictatorship, his protests against the excesses of the Revolutionary Tribunal, won him Robespierre's renewed suspicion, and on the 8th Thermidor Robespierre accused him of being anti-revolutionary and an aristocrat. Cambon's proud and vehement reply was the signal of the resistance to Robespierre's tyranny and the prelude to his fall. Cambon soon had reason to repent of that event, for he became one of those most violently attacked by the Thermidorian reaction. The royalist pamphlets and the journals of J.L. Tallien attacked him with fury as a former *Montagnard*. He was charged with being responsible for the discredit of the *assignats*, and even accused of malversations. On the 21st of February 1795 the project which he presented to withdraw four milliards of *assignats* from circulation, was rejected, and on the 3rd of April he was excluded from the committee of finance. On the 16th Germinal, Tallien procured a decree of accusation against him, but he was already in safety, taking refuge probably at Lausanne. In any case he does not seem to have remained in Paris, although in the riot of the 1st Prairial some of the insurgents proclaimed him mayor. The amnesty of the 4th Brumaire of the year IV. (the 5th of October 1795), permitted him to return to France, and he withdrew to his estate of Terral near Montpellier, where, during the White Terror, he had a narrow escape from an attempt upon his life. At first Cambon hoped to find in Bonaparte the saviour of the republic, but, deceived by the 18th Brumaire, he lived throughout the whole of the empire in peaceful seclusion. During the Hundred Days he was deputy for Hérault in the chamber of representatives, and pronounced himself strongly against the return of the Bourbons, and for religious freedom. Under the Restoration the "amnesty" law of 1816 condemned him as a regicide to exile, and he withdrew to Belgium, to St Jean-Ten-Noode, near Brussels, where he died on the 15th of February 1820.

(R. A.*)

See Bornarel, *Cambon* (Paris).

CAMBON, PIERRE PAUL (1843-), French diplomatist, was born on the 20th of January 1843. He was called to the Parisian bar, and became private secretary to Jules Ferry in the prefecture of the Seine. After ten years of administrative work in France as secretary of prefecture, and then as prefect successively of the departments of Aube (1872), Doubs (1876), Nord (1877-1882), he exchanged into the diplomatic service, being nominated French minister plenipotentiary at Tunis. In 1886 he became French ambassador to Madrid; was transferred to Constantinople in 1890, and in 1898 to London. He was decorated with the grand cross of the Legion of Honour, and became a member of the French Academy of Sciences.

His brother, JULES MARTIN CAMBON (1845-), was called to the bar in 1866, served in the Franco-Prussian War and entered the civil service in 1871. He was prefect of the department of Nord (1882) and of the Rhone (1887-1891), and in 1891 became governor-general of Algeria (see Guyot, *L'œuvre de M. Jules Cambon*, Paris, 1897), where he had served in a minor position in 1874. He was nominated French ambassador at Washington in 1897, and in that capacity negotiated the preliminaries of peace on behalf of the Spanish government after the war with the United States. He was transferred in 1902 to Madrid, and in 1907 to Berlin.

CAMBORNE, a market town in the Camborne parliamentary division of Cornwall, England, on the Great Western railway, 13 m. E.N.E. of Penzance. Pop. of urban district (1901), 14,726. It lies on the northward slope of the central elevation of the county, and is in the neighbourhood of some of the most productive tin and copper mines. These and the manufacture of mining machinery employ most of the inhabitants. The parish church of St Martin contains several monuments and an ancient stone altar bearing a Latin inscription. There are science and art and mining schools, and practical mining is taught in South Condurrow mine, the school attracting a large number of students. It was developed from classes initiated in 1859 by the Miners' Association, and a three years' course of instruction is provided.

Camborne (*Cambron, Camron*) formed a portion of the extensive manor of Tehidy, which at the time of the Domesday Survey was held by the earl of Mortain and subsequently by the Dunstanville and Basset families. Its interests were economically insignificant until the beginning of the 18th century when the rich deposits of copper and tin began to be vigorously worked at Dolcoath. It has been estimated that in 1788 this mine alone had produced ore worth £2,000,000 and in 1882 ore worth £5,500,000. As the result of the prosperity of this and other mines in the neighbourhood the population in 1860 was double that of 1830, six times that of 1770 and fifteen times that of 1660. Camborne was the scene of the scientific labours of Richard Trevithick (1771-1833), the engineer, born in the neighbouring parish of Illogan, and of William Bickford, the inventor of the safety-fuse, a native of Camborne. Three fairs on the feasts of St Martin and St Peter and on 25th of February were granted in 1708. The two former are still held, the last has been transferred to the 7th of March. A Tuesday market formed the subject of a judicial inquiry in 1768, but since the middle of the 19th century it has been held on Saturdays.

CAMBRAI, a town of northern France, capital of an arrondissement in the department of Nord, 37 m. S.S.E. of Lille on the main line of the Northern railway. Pop. (1906) 21,791. Cambrai is situated on the right and eastern bank of the Scheldt (arms of which traverse the west of the town) and at one extremity of the canal of St Quentin. The fortifications with which it was formerly surrounded have been for the most part demolished. The fosses have been filled up and the ramparts in part levelled to make way, as the suburbs extended, for avenues stretching out on all sides. The chief survivals from the demolition are the huge square citadel, which rises to the east of the town, the chateau de Selles, a good specimen of the military architecture of the 13th century, and, among other gates, the Porte Notre-Dame, a stone and brick structure of the early 17th century. Handsome boulevards now skirt the town, the streets of which are clean and well-ordered, and a large public garden extends at the foot of the citadel, with a statue of Enguerrand de Monstrelet the chronicler. The former cathedral of Cambrai was destroyed after the Revolution. The present cathedral of Notre-Dame is a church of the 19th century built on the site of the old abbey church of St Sépulchre. Among other monuments it contains that of Fénelon, archbishop from 1695 to 1715, by David d'Angers. The church of St Géry (18th century) contains, among other works of art, a marble rood-screen of Renaissance workmanship. The Place d'Armes, a large square in the centre of the town, is bordered on the north by a handsome hôtel de ville built in 1634 and rebuilt in the 19th century. The Tour St Martin is an old church-tower of the 15th and 18th centuries transformed into a belfry. The triple stone portal, which gave entrance to the former archiepiscopal palace, is a work of the Renaissance period. The present archbishop's palace, adjoining the cathedral, occupies the site of an old Benedictine convent.

Cambrai is the seat of an archbishop and a sub-prefect, and has tribunals of first instance and of commerce, a board of trade-arbitrators, a chamber of commerce and a branch of the Bank of France. Its educational institutions include communal colleges, ecclesiastical seminaries, and schools of drawing and music. The library has over 40,000 volumes and there is a museum of antiquities and objects of art. The chief industry of Cambrai is the weaving of muslin (*batiste*) and other fine fabrics (see Cambric); wool-spinning and weaving, bleaching and dyeing, are carried on, as well as the manufacture of chicory, oil, soap, sausages and metal boxes. There are also large beet-sugar works and breweries and distilleries. Trade is in cattle, grain, coal, hops, seed, &c.

Cambrai is the ancient Nervian town of *Camaracum*, which is mentioned in the Antonine Itinerary. In the 5th century it was the capital of the Frankish king Raguacharius. Fortified by Charlemagne, it was captured and pillaged by the Normans in 870, and unsuccessfully besieged by the Hungarians in 953. During the 10th, 11th and 12th centuries it was the scene of frequent hostilities between the bishop and his supporters on the one hand and the citizens on the other; but the latter ultimately effected their independence. In 1478 Louis XI., who had obtained possession of the town on the death of Charles the Bold, duke of Burgundy, handed it over to the emperor, and in the 16th century Charles V. caused it to be fortified with a strong citadel, for the erection of which the castles of Cavillers, Escaudoeuvres and many others were demolished. From that date to the peace of Nijmwegen, 1678, which assigned it to France, it frequently passed from hand to hand by capture or treaty. In 1793 it was besieged in vain by the Austrians. The League of Cambrai is the name given to the alliance of Pope Julius II., Louis XII., Maximilian I., and Ferdinand the Catholic against the Venetians in 1508; and the peace of Cambrai, or as it is also called, the Ladies' Peace, was concluded in the town in 1529 by Louise of Savoy, mother of Francis I., and Margaret of Austria, aunt of Charles V., in the name of these monarchs. The bishopric of Cambrai dates from the 5th century, and was raised in 1559 to the rank of an archbishopric, which continued till the Revolution, and has since been restored. The bishops received the title of count from the emperor Henry I. (919-936), and in 1510 were raised to the dignity of dukes, their territory including the town itself and its territory, called Cambrésis.

See E. Bouly, *Histoire de Cambrai et du Cambrésis* (Cambria, 1843).

CAMBRIA, the Med. Lat. name for Wales. After the end of the western Roman empire the Cymric Celts held for a while both Wales and the land round the Solway (now Cumberland and adjacent regions), and the former came to be called Cambria, the latter Cumbria, though the two names were sometimes interchanged by early medieval writers.

CAMBRIAN SYSTEM, in geology, the name now universally employed to designate the earliest group of Palaeozoic rocks which possesses a connected suite of fossils. The strata of this system rest upon the Pre-Cambrian, and are succeeded by the Ordovician system. Until the fourth decade of the 19th century all stratified rocks older than the Carboniferous had been grouped by geologists into a huge and indefinite "Transition Series." In 1831 Adam Sedgwick and Sir Roderick I. Murchison began the herculean task of studying and sub-dividing this series of rocks as it occurs in Wales and the bordering counties of England. Sedgwick attacked the problem in the Snowdon district, where the rocks are highly altered and displaced and where fossils are comparatively difficult to obtain; Murchison, on the other hand, began to work at the upper end of the series where the stratigraphy is simple and the fossils are abundant. Murchison naturally made the most of the fossils collected, and was soon able to show that the transition series could be recognized by them, just as younger formations had fossils peculiar to themselves; as he zealously worked on he followed the fossiliferous rocks further afield and continually lower in the series. This fossil-bearing set of strata he first styled the "fossiliferous greywacke series," changing it in 1835 to "Silurian system."

In the same year Sedgwick introduced the name "Cambrian series" for the older and lower members. Murchison published his Silurian system in 1839, wherein he recognized the Cambrian to include the barren slates and grits of Harlech, Llanberis and the Long Mynd. So far, the two workers had been in agreement; but in his presidential address to the Geological Society of London in 1842 Murchison stated his opinion that the Cambrian contained no fossils that differed from those of the Lower Silurian. Whereupon Sedgwick undertook a

re-examination of the Welsh rocks with the assistance of J.W. Salter, the palaeontologist; and in 1852 he included the Llandeilo and Bala beds (Silurian) in the Upper Cambrian. Two years later Murchison brought out his *Siluria*, in which he treated the Cambrian system as a mere local facies of the Silurian system, and he included in the latter, under J. Barrande's term "Primordial zone," all the lower rocks, although they had a distinctive fauna.

Meanwhile in Europe and America fossils were being collected from similar rocks which were classed as Silurian, and the use of "Cambrian" was almost discarded, because, following Murchison, it was taken to apply only to a group of rocks without a characteristic fauna and therefore impossible to recognize. Most of the Cambrian rocks were coloured as Silurian on the British official geological maps.

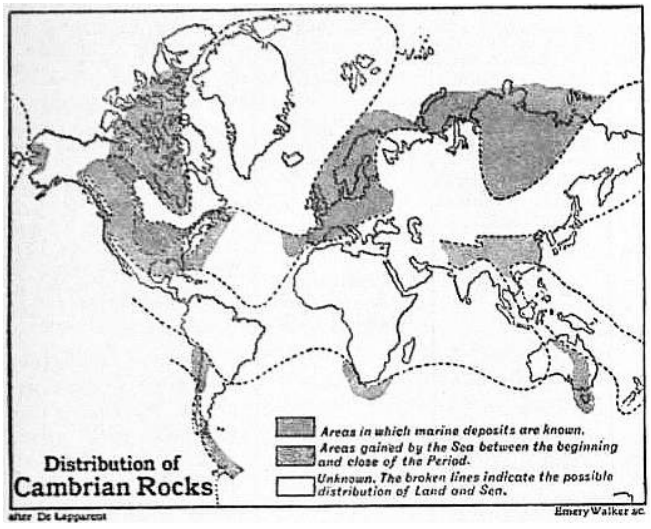
Nevertheless, from 1851 to 1855, Sedgwick, in his writings on the British palaeozoic deposits, insisted on the independence of the Cambrian system, and though Murchison had pushed his Silurian system downward in the series of rocks, Sedgwick adhered to the original grouping of his Cambrian system, and even proposed to limit the Silurian to the Ludlow and Wenlock beds with the May Hill Sandstone at the base. This attitude he maintained until the year of his death (1873), when there appeared his introduction to Salter's *Catalogue of Cambrian and Silurian Fossils.*

It is not to be supposed that one of these great geologists was necessarily in the wrong; each had right on his side. It was left for the subsequent labours of Salter and H. Hicks to prove that the rocks below the undoubted lower Silurian of Murchison did indeed possess a characteristic fauna, and their work was confirmed by researches going on in other countries. To-day the recognition of the earliest fossil-bearing recks, below the Llandeilo formation of Murchison, as belonging to the Cambrian system, and the threefold subdivision of the system according to palaeontological evidence, may be regarded as firmly established.

It should be noted that A. de Lapparent classifies the Cambrian as the lowest stage in the Silurian, the middle and upper stages being Ordovician and Gothlandian. E. Renevier proposed to use *Silurique* to cover the same period with the Cambrian as the lowest series, but these differences of treatment are merely nominal. Jules Marcou and others have used *Taconic* (Taconian) as the equivalent of Cambrian, and C. Lapworth proposed to apply the same term to the lowest sub-division only; he had also used "Annelidian" in the same sense. These names are of historical interest alone.

Cambrian Rocks.—The lithological characters of the Cambrian rocks possess a remarkable uniformity in all quarters of the globe. Muds, sands, grits and conglomerates are the predominant types. In Scotland, North America and Canada important deposits of limestone occur and subordinate limestones are found in the Cambrian of central Europe.

In some regions, notably in the Baltic province and in parts of the United States, the rocks still retain their original horizontality of deposition, the muds are scarcely indurated and the sands are still incoherent; but in most parts of the world they bear abundant evidence of the many movements and stresses to which they have been exposed through so enormous a period of time. Thus, we find them more frequently, folded, tilted and cleaved; the muds have become shales, slates, phyllites or schists, the grey and red sands and conglomerates have become quartzites and greywackes, while the limestones are very generally dolomitized. In the Cambrian limestones, as in their more recent analogues, layers and nodules of chert and phosphatized material are not wanting.



Igneous rocks are not extensively developed; in Wales they form an important feature and occur in considerable thickness; they are represented by lavas of olivine-diabase and by contemporaneous tuffs which are traversed by later granite and quartz felsite. In the Cambrian of Brittany there are acid lavas and tuffs. Quartz porphyry, diabase and diorite appear in the Ardennes. In Bohemia, North America and Canada igneous rocks have been observed.

In China, on the Yang-tse river, a thick deposit has been found full of boulders of diverse kinds of rock, striated in the manner that is typical of glacial action. A similar deposit occurs in the Gaisa beds near the Varanger Fjord in Norway. These formations lie at the base of the lowest Cambrian strata and may possibly be included in the pre-Cambrian, though in Norway they are clearly resting upon a striated floor of crystalline rocks.

Cambrian Life.—In a general survey of the life of this period, as it is revealed by the fossils, three outstanding facts are apparent: (1) the great divergence between the Cambrian fauna and that of the present day; (2) the Cambrian life assemblage differs in no marked manner from that of the succeeding Ordovician and Silurian periods; there is a certain family likeness which unites all of them; (3) the extraordinary complexity and diversity not only in the assemblage as a whole but within certain limited groups of organisms. Although in the Cambrian strata we have the oldest known fossiliferous rocks—if we leave out of account the very few and very obscure

organic remains hitherto recorded from the pre-Cambrian—yet we appear to enter suddenly into the presence of a world richly peopled with a suite of organisms already far advanced in differentiation; the Cambrian fauna seems to be as far removed from what must have been the first forms of life, as the living forms of this remote period are distant from the creatures of to-day.

With the exception of the vertebrates, every one of the great classes of animals is represented in Cambrian rocks. Simple protozoa appear in the form of Radiolaria; Lithistid sponges are represented by such forms as *Archaeoscyphia*, Hexactinellid sponges by *Protospongia*; Graptolites (*Dictyograptus* (*Dictyonema*)) come on in the higher parts of the system. Medusa-like casts have been found in the lower Cambrian of Scandinavia (*Medusina*) and in the mid-Cambrian of Alabama (*Brooksella*). Corals, *Archaeocyathus, Spirocyathus*, &c., lived in the Cambrian seas along with starfishes (*Palaeasterina*), Cystideans, *Protocystites, Trochocystites* and possibly Crinoids, *Dendrocrinus*. Annelids left their traces in burrows and casts on the sea-floor (*Arenicolites, Cruziana, Scolithus*, &c.). Crustacea occupied an extremely prominent place; there were Phyllocarids such as *Hymenocaris*, and Ostracods like *Entomidella*; but by far the most important in numbers and development were the Trilobites, now extinct, but in palaeozoic times so abundant. In the Cambrian period trilobites had already attained their maximum size; some species of *Paradoxides* were nearly 2 ft. long, but in company with these monsters were tiny forms like *Agnostus* and *Microdiscus*. Many of the Cambrian trilobites appear to have been blind, and they had not at this period developed that flexibility in the carapace that some forms acquired later.

Brachiopods were fairly abundant, particularly the non-articulated forms (*Obolus, Lingulella, Acrotreta, Discinopsis,* &c.); amongst the articulate genera are *Kutorgina, Orthis, Khynchonella.* It is a striking fact that certain of these non-articulate "lamp-shells" are familiar inhabitants of our present seas. Each of the principal groups of true mollusca was represented: Pelecypods (*Modioloides*); Gasteropods (*Scenella, Pleurotomaria, Trochonema*); Pteropods (*Hyohthellus, Hyolithes, Salleretta*); Cephalopods (*Orthoceras, Cystoceras*). Of land plants no traces have yet been discovered. Certain markings on slates and sandstones, such as the "fucoids" of Scandinavia and Scotland, the *Phycoides* of the Fichtelgebirge, *Eophyton* and other seaweed-like impressions, may indeed be the casts of fucoid plants; but it is by no means sure that many of them are not mere inorganic imitative markings or the tracks or casts of worms. *Oldhamia*, a delicate branching body, abundant in the Cambrian of the south-east of Ireland, is probably a calcareous alga, but its precise nature has not been satisfactorily determined.

Cambrian Stratigraphy.—Wherever the Cambrian strata have been carefully studied it has now been found possible and convenient to arrange them into three series, each of which is characterized by a distinctive genus of trilobite. Thus we have a Lower Cambrian with *Olenellus*, a middle series with *Paradoxides* and an Upper Cambrian with *Olenus*. It is true that these fossils are not invariably present in every occurrence of Cambrian strata, but this fact notwithstanding, the threefold division holds with sufficient constancy. An uppermost series lies above the *Olenus* fauna in some areas; it is represented by the Tremadoc beds in Britain or by the *Dictyonema* beds or *Euloma-Niobe* fauna elsewhere. Three regions deserve special attention: (1) Great Britain, the area in which the Cambrian was first differentiated from the old "Transition Series"; (2) North America, on account of the wide-spread occurrence of the rocks and the abundance and perfection of the fossils; and (3) Bohemia, made classic by the great labours of J. Barrande.

Great Britain and Ireland.—The table on p. 88 contains the names that have been applied to the subdivisions of the Cambrian strata in the areas of outcrop in Wales and England; at the same time it indicates approximately their relative position in the system.

In *Scotland* the upper and middle series are represented by a thick mass of limestone and dolomite, the Durness limestone (1500 ft.). In the lower series are, in descending order, the "Serpulite grits" or "Salterella beds," the "Fucoid beds" and the "Eriboll quartzite," which is divided into an upper "Pipe rock" and lower "Basal quartzite."

The Cambrian rocks of *Ireland*, a great series of purple and green shales, slates and grits with beds of quartzite, have not yet yielded sufficient fossil evidence to permit of a correlation with the Welsh rocks, and possibly some parts of the series may be transferred in the future to the overlying Ordovician.

North America.—On the North American continent, as in Europe, the Cambrian system is divisible into three series: (1) the lower or "Georgian," with *Olenellus* fauna; (2) the middle or "Acadian," with *Paradoxides or Dikelocephalus* fauna; (3) the upper or "Potsdam," with *Olenus* fauna (with Saratogan or St Croix as synonyms for Potsdam). The lower division appears on the Newfoundland and Labrador coasts, and is traceable thence, in a great belt south-west of those points, through Maine and the Hudson-Champlain valley into Alabama, a distance of some 2000 m.; and the rocks are brought up again on the western uplift, in Nevada, Idaho, Utah, western Montana and British Columbia. The middle division covers approximately the same region as the lower one, and in addition it is found in the states of Texas, Oklahoma, and Arizona, in western Montana, and possibly in western Wisconsin. The lower division, in addition to covering the areas already indicated, spreads over the interior of the United States.

Bohemia.—The Cambrian rocks of this country are now recognized by J.F. Pompesk; to comprise the Paradoxidian and Olenelledian groups. They were made famous through the researches of Barrande. The Cambrian system is covered by his stages "B" and "C"; the former a barren series of conglomerates and quartzites, the latter a series of grey and green fissile shales 1200 ft. thick with sandstones, greywackes and conglomerates.

	North Wales.	South Wales.	Midland and West of England.		
			Shropshire.	Malvern Hills.	Nuneaton.
Upper Cambrian, *Olenus* fauna	Tremadoc slates (*Euloma-Niobe* fauna) Lingula flags (1) Dolgelly beds (2) Ffestinieg beds (3) Maentwrog beds	Tremadoc beds Lingula flags	Shineton shales and shales with *Dictyonema*	Bronsil shales, gray (*Niobe* fauna) Malvern black shales (White-leaved-oak shales)	Upper Stockingford shale (Merivaleshal Middle Stockingford shales (Oldbury shales)
Middle Cambrian *Paradoxides* fauna	Menevian beds	Menevian beds			

		Solva group	Comley or Hollybush sandstone with upper Comley limestone	Hollybush sandstone	Lower Stockingford shales (Purley shales)
Lower Cambrian *Olenellus* fauna	Harlech grits and Llanberis slates	Caerfai group	Lower Comley limestone Wrekin quartzite	Hollybush sandstone with Malvern quarzite and conglomerate at the base	Upper Hartshill quarzite *Hyolithes* *Hyolithes* shales and limestone Middle and lower Hartshill quarzite and the quarzite of the Lickey Hills

Scandinavia.—Here the Cambrian system is only distinguished clearly on the eastern side, where the three subdivisions are found in a thin series of strata (400 ft.), in which black concretion-bearing shales play an important part. Limestones and shales with the *Euloma-Niobe* fauna come at the top. The upper series (*Olenus*) has been minutely zoned by W.C. Brögger, S.A. Tullberg and J.C. Moberg. In the middle series (*Paradoxides*) three thin limestone bands have been distinguished, the Fragmenten-Kalk, the Exulans-Kalk and the Andrarums-Kalk.

On the Norwegian side the Cambrian is perhaps represented by the Röros schists which lie at the base of a great series of crystalline schists, the probable equivalent of Ordovician and Silurian rocks.

Baltic Province.—The Cambrian rocks in this region are nearly all soft sediments, some 600 ft. thick; they reach from the Gulf of Finland towards Lake Ladoga. At the base is the so-called “blue clay” (really greenish) with ferruginous sandstones and with a fucoidal sandstone at its summit. This division is the equivalent of the Lower Cambrian. Above the fucoidal sandstone an important break appears in the system, for the *Paradoxides* and *Olenus* divisions are absent. The upper members are the “Ungulite grit” and about 20 ft. of Dictyonema shale. Cambrian rocks have been traced into Siberia (lat. 71°) and on the island of Vaigatch.

Central Europe.—Besides the Bohemian region previously mentioned, Cambrian rocks are present in Belgium and the north of France, in Spain and the Thüringer Wald. In the Ardennes the system is represented by grits and sandstones, shales, slates and quartz schists, and includes also whet slates and some igneous rocks. A. Dumont has arranged the whole series (*Terrain ardennais*) into three systems, an upper “Salmien,” a middle “Revinien” and a lower “Devillien,” but J. Gosselet has subsequently proposed to unite the two lower groups in one.

France.—-In northern France Cambrian rocks, mostly purple conglomerates and red shales, rest with apparent unconformability upon pre-Cambrian strata in Brittany, Normandy and northern Poitou. In the Rennes basin limestones—often dolomitic—are associated with quartzites and conglomerates; silicious limestones also occur in the Sarthe region. Farther south, around the old lands of Languedoc, equivalents of the two upper divisions of the Cambrian have been recorded; and the uppermost members of the system appear in Herault. Patches of Cambrian rocks are found in the Pyrenees.

In *Spain* slates and quartzites, the slates of Rivadeo, more than 9000 ft. thick, are followed by the middle Cambrian beds of La Vega, thick quartzites with limestone, slates and iron ores. Cambrian rocks occur also in the provinces of Seville and Ciudad-Real. Upper Cambrian strata have been found in upper Alemtejo in Portugal.

In *Russian Poland* is a series of conglomerates, quartzites and shales; Some of the beds yield a *Paradoxides* fauna.

In the *Thüringer Wald* are certain strata, presumably Cambrian since the uppermost beds contain the *Euloma-Niobe* fauna.

Sardinia contains both middle and upper Cambrian. The Cambrian system is represented in the Salt Range of India by the Neobolus or Khussack beds, which may possibly belong to the middle subdivision. The same group is probably represented in Corea and the Liao-tung by the thick “Sinisian” formation of F. von Richthofen.

In *South America* upper Cambrian rocks have been recorded from north Argentina.

The Lower Cambrian has been found at various places in *South Australia*; and in *Tasmania* a thick series of strata appears to be in part at least of Upper Cambrian age.

General Physical Conditions in the Cambrian Period.—The Cambrian rocks previously described are all such as would result from deposition, in comparatively shallow seas, of the products of degradation of land surfaces by the ordinary agents of denudation. Evidences of shallow water conditions are abundant; very frequently on the bedding surfaces of sandstones and other rocks we find cracks made by the sun’s heat and pittings caused by the showers that fell from the Cambrian sky, and these records of the weather of this remote period are preserved as sharply and clearly as those made only to-day on our tidal reaches. Ripple marks and current bedding further point, to the shallowness of the water at the places where the rocks were made.

No Cambrian rocks are such as would be formed in the abysses of the sea—although the absence of well-developed eyes in the trilobites has led some to assume that this condition was an indication that the creatures lived in abyssal depths.

At the close of the pre-Cambrian, many of the deposits of that period must have been elevated into regions of fairly high ground; this we may assume from the nature of the Cambrian deposits which are mainly the product of the denudation of such ground. Over the land areas thus formed, the seas in Cambrian time gradually spread, laying down first the series known as Lower Cambrian, then by further encroachment on the land the wider spread Upper Cambrian deposits—in Europe, the middle series is the most extensive. Consequently, Cambrian strata are usually unconformable on older rocks.

During the general advance of the sea, local warpings of the crust may have given rise to shallow lagoon or inland-lake conditions. The common occurrence of red strata has been cited in support of this view.

Compared with some other periods, the Cambrian was free from extensive volcanic disturbances, but in Wales and in Brittany the earlier portions of this period were marked by voluminous outpourings; a condition that was feebly reflected in central and southern Europe.

No definite conclusions can be drawn from the fossils as to the climatic peculiarities of the earth in Cambrian times. The red rocks may in some cases suggest desert conditions; and there is good reason to suppose that in

what are now Norway and China a glacial cold prevailed early in the period.

Considerable variations occur in the thickness of Cambrian deposits, which may generally be explained by the greater rapidity of deposition in some areas than in others. Nothing could be more striking than the difference between the thicknesses in western and eastern Europe; in Brittany the deposits are over 24,000 ft. thick, in Wales at least 12,000 ft., in western England they are only 3000 ft., and in northern Scotland 2000 ft., while no farther east than Scandinavia the complete Cambrian succession is only about 400 ft. thick. Again, in North America, the greatest thicknesses are found along the mountainous regions on the west and on the east—reaching 12,000 ft. in the latter and probably nearly 40,000 ft. in the former (in British Columbia)—while over the interior of the continent it is seldom more than 1000 ft. thick.

Any attempt to picture the geographical conditions of the Cambrian period must of necessity be very imperfect. It was pointed out by Barrande that early in Palaeozoic Europe there appeared two marine provinces—a northern one extending from Russia to the British Isles through Scandinavia and northern Germany, and a southern one comprising France, Bohemia, the Iberian peninsula and Sardinia. It is assumed that some kind of land barrier separated these two provinces. Further, there is a marked likeness between the Cambrian of western Europe and eastern America; many fossils of this period are common to Britain, Sweden and eastern Canada; therefore it is likely that a north Atlantic basin existed. Prof. Kayser suggests that there was also a Pacific basin more extensive than at present; this is borne out by the similarity between the Cambrian faunas of China, Siberia and Argentina. The same author postulates an Arctic continent, bordering upon northern Europe, Greenland and North America; an African-Brazilian continent across the present south Atlantic, and a marine communication between Australia and India, where the faunas have much in common.

References.—The literature devoted to the Cambrian period is very voluminous, important contributions having been made by A. Sedgwick, Sir R.I. Murchison, H. Hicks, C. Lapworth, T. Groom, J.W. Salter, J.E. Marr, C.D. Walcott, G.F. Matthew, E. Emmons, E. Billings, J. Barrande, F. Schmidt, W.C. Brögger, S.A. Tullberg, S.L. Torngrist, G. Linnarsson and many others. A good general account of the period will be found in Sir A. Geikie's *Text-Book of Geology*, vol. ii. 4th ed. 1903 (with references), and from an American point of view, in T.C. Chamberlin and R.D. Salisbury's *Geology*, vol. ii., 1906 (references to American sources). See also J.E. Marr, *The Classification of the Cambrian and Silurian Rocks*, 1883 (with bibliography up to the year of publication); A. Geikie *Q.J. Geol. Sac.,* 1891, xlvii., Ann. address, p. 90; F. Frech, "Die geographische Verbreitung und Entwickelung des Cambrium," *Compte Rendu. Congrès Géol. Internal. 1897, St-Pétersbourg* (1899); *Geological Literature added to the Geological Society's Library,* published annually since 1893.

(J. A. H.)

CAMBRIC, a word derived from *Kameryk* or *Kamerijk*, the Flemish name of Cambrai, a town in the department of Nord, France, where the cloth of this name is said to have been first made. It was originally made of fine linen. There is a record of a privy purse expenditure in 1530 for cambric for Henry VIII.'s shirts. Cambric has been used for many years in the manufacture of handkerchiefs, collars, cuffs, and for fine underclothing; also for the best shrouds, and for fine baby linen. The yarns for this cloth are of very fine quality, and the number of threads and picks often reaches and sometimes exceeds 120 per inch. Embroidery cambric is a fine linen used for embroidery. Batiste, said to be called after Baptiste, a linen-weaver of Cambrai, is a kind of cambric frequently dyed or printed. All these fabrics are largely copied in cheaper materials, mixtures of tow and cotton, and in many cases cotton alone, taking the place of the original flax line yarns.

CAMBRIDGE, EARLS AND DUKES OF. Under the Norman and early Plantagenet kings of England the earldom of Cambridge was united with that of Huntingdon, which was held among others by David I., king of Scotland, as the husband of earl Waltheof's daughter, Matilda. As a separate dignity the earldom dates from about 1340, when William V., count (afterwards duke) of Juliers, was created earl of Cambridge by King Edward III.; and in 1362 (the year after William's death) Edward created his own son, Edmund of Langley, earl of Cambridge, the title being afterwards merged in that of duke of York, which was bestowed upon Edmund in 1385. Edmund's elder son, Edward, earl of Rutland, who succeeded his father as duke of York and earl of Cambridge in 1402, appears to have resigned the latter dignity in or before 1414, as in this year his younger brother, Richard, was made earl of Cambridge. In the following year Richard was executed for plotting against King Henry V., and his title was forfeited, but it was restored to his son, Richard, who in 1415 became duke of York in succession to his uncle Edward. Subsidiary to the dukedom of York the title was held by Richard, and after his death in 1460 by his son Edward, afterwards King Edward IV., becoming extinct on the fall of the Yorkist dynasty.

In 1619 King James I., anxious to bestow an English title upon James Hamilton, 2nd marquess of Hamilton (d. 1625), created him earl of Cambridge, a title which came to his son and successor James, 3rd marquess and first duke of Hamilton (d. 1649). In 1651 when William, 2nd duke of Hamilton, died, his English title became extinct.

Again bestowed upon a member of the royal house, the title of earl of Cambridge was granted in 1659 by Charles II. to his brother Henry, duke of Gloucester, only to become extinct on Henry's death in the following year. In 1661 Charles, the infant son of James, duke of York, afterwards King James II., was designated as marquess and duke of Cambridge, but the child died before the necessary formalities were completed. However, two of James's sons, James (d. 1667) and Edgar (d. 1671), were actually created in succession dukes of Cambridge, but both died in childhood. After the passing of the Act of Settlement in 1701 it was proposed to grant an English title to George Augustus, electoral prince of Hanover, who, after his grandmother, the electress Sophia, and his father, the elector George Louis, was heir to the throne of England; and to give effect to this proposal George Augustus was created marquess and duke of Cambridge in November 1706. The title lapsed when he became king of Great Britain and Ireland in 1727, but it was revived in 1801 in favour of Adolphus

Frederick, the seventh son of George III. He and his son are dealt with below.

Adolphus Frederick, duke of Cambridge (1774-1850), was born in London on the 24th of February 1774. Having studied at the university of Göttingen, Adolphus Frederick served in the Hanoverian and British armies, and, in November 1801, was created earl of Tipperary and duke of Cambridge, becoming a member of the privy council in the following year. The duke is chiefly known for his connexion with Hanover. In 1815, on the conclusion of the war, the electorate of Hanover was raised to the rank of a kingdom, and in the following year the duke was appointed viceroy. He held this position until the separation of Great Britain and Hanover in 1837, and displaying tact and moderation, appears to have ruled the country with great success during a difficult period. Returning to England the duke became very popular, and was active in supporting many learned and benevolent societies. He died in London on the 8th of July 1850. In 1818 he married Augusta (1797-1889), daughter of Frederick, landgrave of Hesse-Cassel. He left three children: his successor, George; Augusta Caroline (b. 1822), who married Frederick William, grand duke of Mecklenburg-Strelitz; and Mary Adelaide (1833-1897), who married Francis, duke of Teck.

George William Frederick Charles, duke of Cambridge (1819-1904), was born at Hanover on the 26th of March 1819. He was thus about two months older than his cousin, Queen Victoria, and was for that period in the line of succession to the British throne. He was educated at Hanover by the Rev. J.R. Wood, a canon of Worcester. In November 1837, after he had served for a short time in the Hanoverian army, the rank of colonel in the British army was conferred upon him, and he was attached to the staff at Gibraltar from October 1838 to April 1839. After serving in Ireland with the 12th Royal Lancers, he was appointed in April 1842 colonel of the 17th Light Dragoons (now Lancers). From 1843 to 1845 he was colonel on the staff in the Ionian Islands, and was then promoted major-general. In October 1846 he took command of the Limerick district, and shortly afterwards of the Dublin district. In 1850 his father died, and he succeeded to the dukedom. Being appointed inspector of cavalry in 1852, he held that post until 1854, when, upon the outbreak of the Crimean War, he was placed in command of the 1st division (Guards and Highland brigades) of the British army in the East. In June of the same year he was promoted lieutenant-general. He was present at the battles of the Alma, Balaklava and Inkerman, and at the siege of Sevastopol. On the 15th of July 1856 he was appointed general commanding-in-chief, on the 9th of November 1862 field marshal, and by letters patent, 1887, commander-in-chief. The long period during which he held the command of the army was marked by many changes. The Crimean War brought to light great administrative defects, and led to a regrouping of the departments, which, with the whole personnel of the army, were brought under the authority of the secretary of state for war. The constitutional changes involved did not, however, affect seriously the organization of the military forces. Only in 1870, after the successes of Prussia had created a profound impression, were drastic changes introduced by Cardwell into the entire fabric of the army. The objects of the reformers of 1870 were undoubtedly wise; but some of the methods adopted were open to question, and were strongly resented by the duke of Cambridge, whose views were shared by the majority of officers. Further changes were inaugurated in 1880, and again the duke found much to criticize. His opinions stand recorded in the voluminous evidence taken by the numerous bodies appointed to inquire into the condition of the army. They show a sound military judgment, and, as against innovations as such, a strong attachment to the old regimental system. That this judgment and this attachment were not so rigid as was generally supposed is proved by his published correspondence. Throughout the period of change, while protesting, the duke invariably accepted and loyally endeavoured to carry out the measures on which the government decided. In a memorandum addressed to Mr Childers in 1880 he defined his attitude as follows:— “Should it appear, however, that for reasons of state policy it is necessary that the contemplated changes should be made, I am prepared to carry them out to the best of my ability.” This attitude he consistently maintained in all cases in which his training and associations led him, rightly or wrongly, to deprecate changes the need for which was not apparent to him. His judgment was especially vindicated in the case of an ill-advised reduction of the artillery carried out by Mr. Stanhope. Under the order in council of February 1888, the whole responsibility for military duties of every kind was for the first time centred upon the commander-in-chief. This, as pointed out by the Hartington commission in 1890, involved “an excessive centralization” which “must necessarily tend to weaken the sense of responsibility of the other heads of departments, and thus to diminish their efficiency.” The duke of Cambridge, whose position entailed many duties apart from those strictly appertaining to a commander-in-chief, could not give personal attention to the vast range of matters for which he was made nominally responsible. On the other hand, the adjutant-general could act in his name, and the secretary of state could obtain military advice from officials charged with no direct responsibility. The effect was to place the duke in a false position in the eyes of the army and of the country. If the administration of the army suffered after 1888, this was due to a system which violated principles. His active control of its training during the whole period of his command was less hampered, and more directly productive of good results.

Throughout his long term of office the duke of Cambridge evinced a warm interest in the welfare of the soldier, and great experience combined with a retentive memory made him a master of detail. He was famous for plain, and strong, language; but while quick to condemn deviations from the letter of regulations, and accustomed to insist upon great precision in drill, he was never a martinet, and his natural kindliness made him ready to bestow praise. Belonging to the older generation of soldiers, he could not easily adapt himself to the new conditions, and in dispensing patronage he was somewhat distrustful of originality, while his position as a member of the royal family tended to narrow his scope for selection. He was thus inclined to be influenced by considerations of pure seniority, and to underrate the claims of special ability. The army, however, always recognized that in the duke of Cambridge it had a commander-in-chief devoted to its interests, and keenly anxious amid many difficulties to promote its well-being. The duke resigned the commandership-in-chief on the 1st of November 1895, and was succeeded by Lord Wolseley, the duties of the office being considerably modified. He was at the same time gazetted honorary colonel-in-chief to the forces. He was made ranger of Hyde Park and St James’s Park in 1852, and of Richmond Park in 1857; governor of the Royal Military Academy in 1862, and its president in 1870, and personal aide-de-camp to Queen Victoria in 1882. He died on the 17th of March 1904 at Gloucester House, London. The chief honours conferred upon him were: G.C.H., 1825; K.G., 1835; G.C.M.G., 1845; G.C.B., 1855; K.P., 1861; K.T., 1881. From 1854 he was president of Christ’s hospital. The duke of Cambridge was married to Louisa Fairbrother, who took the name of FitzGeorge after her marriage. She died in 1890.

See Rev. E. Sheppard, *George, Duke of Cambridge; a Memoir of his Private Life* (London, 1906); and Willoughby Verner, *Military Life of the Duke of Cambridge* (1905).

CAMBRIDGE, RICHARD OWEN (1717-1802), English poet, was born in London on the 14th of February 1717. He was educated at Eton and at St John's College, Oxford. Leaving the university without taking a degree, he took up residence at Lincoln's Inn in 1737. Four years later he married, and went to live at his country seat of Whitminster, Gloucestershire. In 1751 he removed to Twickenham, where he enjoyed the society of many notable persons. Horace Walpole in his letters makes many jesting allusions to Cambridge in the character of newsmonger. He died at Twickenham on the 17th of September 1802. His chief work is the *Scribleriad* (1751), a mock epic poem, the hero of which is the Martinus Scriblerus of Pope, Arbuthnot and Swift. The poem is preceded by a dissertation on the mock heroic, in which he avows Cervantes as his master. The satire shows considerable learning, and was eagerly read by literary people; but it never became popular, and the allusions, always obscure, have little interest for the present-day reader. He made a valuable contribution to history in his *Account of the War in India...on the Coast of Coromandel from the year 1750 to 1760...* (1761). He had intended to write a history of the rise and progress of British power in India, but this enterprise went no further than the work just named, as he found that Robert Orme, who had promised him the use of his papers, contemplated the execution of a similar plan.

The Works of Richard Owen Cambridge, Esq., including several Pieces never before published, with an Account of his Life and Character by his Son, George Owen Cambridge (1803), includes, besides the *Scribleriad*, some narrative and satirical poems, and about twenty papers originally published in Edward Moore's paper called *The World*. His poems are included in A. Chalmers's *English Poets* (1816).

CAMBRIDGE, a municipal and parliamentary borough, the seat of a university, and the county town of Cambridgeshire, England, 56 m. N. by E. of London by the Great Eastern railway, served also by the Great Northern, London & North-Western and Midland lines. Pop. (1901) 38,379. It lies in a flat plain at the southern border of the low Fen country, at an elevation of only 30 to 50 ft. above sea-level. The greater part of the town is situated on the east (right) bank of the Cam, a tributary of the Ouse, but suburbs extend across the river. To the south and west the slight hills bordering the fenland rise gently. The parliamentary borough of Cambridge returns one member. The municipal borough is under a mayor, 12 aldermen, and 36 councillors. Area, 3233 acres.

Cambridge University[1] shares with that of Oxford the first place among such institutions in the British empire. It is the dominating factor in the modern importance of the town, and it is therefore necessary to outline the historical conditions which led to its establishment. The geographical situation of Cambridge, in its present appearance possessing little attraction or advantage, calls nevertheless for first consideration. Cambridge, in fact, owed its growth to its position on a natural line of communication between the east and the midlands of England, flanked on the one hand by the deep forests which covered the uplands, on the other by the unreclaimed fens, then desolate and in great part impenetrable. The importance of this highway may be judged from the number of early earthworks in the vicinity of Cambridge; and the Castle Hill, at the north side of the present town (near the west bank of the river), is perhaps a British work. Roman remains discovered in the same locality give evidence of the existence of a small town or village at the junction of roads; the name of *Camboritum* is usually attached to it, but without certainty. The modern name of Cambridge has no connexion with this. The present form of the name has usually been derived from a corruption of the original name Grantebrycge or Grantabridge (Skeat); but Mr Arthur Gray points out that there is no documentary evidence for this corruption in the shape of such probable intermediate forms as Grantebrig or Crantebrig. On the other hand, he brings evidence to show that the name Cantebrig, though not applied to the whole town, was very early given to that quarter of it near the Cante brig, *i.e.* the bridge over the Cante (the ward beyond the Great Bridge was called "Parcelle of Cambridge" as late as 1340); in this quarter, close to the bridge, Cambridge castle was built by the Conqueror, and from the castle and the castle-quarter the name spread within sixty years to the whole town, the similarity between the names Grantebrig and Cantebrig playing some part in this extension (*The Dual Origin of the Town of Cambridge*, p. 31). Granta is the earlier and still an alternative name of the river Cam, this more common modern form having been adopted in sympathy with the modern name of the town. Cambridge had a further importance from its position at the head of river navigation, and a charter of Henry I., in which the town is already referred to as a borough, grants it exclusive rights as a river-port, and regulates traffic and tolls. The wharves lay principally along that part of the river where are now the celebrated "backs" of some of the colleges, whose exquisite grounds slope down to the water. The great Sturbridge or Stourbridge Fair at Barnwell, formerly one of the most important in England, is a further illustration of the ancient commercial importance of Cambridge; the oldest known charter concerning it dates from the opening of the 13th century, though its initiation may perhaps be placed a century before.

History

Concerning the early municipal history of Cambridge little is known, but at the time of the Domesday survey its citizens felt themselves strong enough to protest against the exactions of the Norman sheriff, Roger Picot; and the town had attained a considerable degree of importance when, in 1068, William the Conqueror built a castle on the site known as Castle Hill, and used it as a base of operations against Hereward the Wake and the insurgents of the fenland. Cambridge, however, has practically no further military history. From the 14th century onward materials were taken from the castle by the builders of colleges, while the gatehouse, the last surviving portion, was removed in 1842.

The medieval spirit of emulation between the universities of Cambridge and Oxford resulted in a series of remarkable fables to account for the foundation of both. That of Cambridge was assigned to a Spanish prince, Cantaber, in the 4321st year after the Creation. A charter from King Arthur dated 531, and the transference of students from Cambridge to Oxford by King Alfred, were also claimed as historical facts. The true germ of the university is to be sought in the religious foundations in the town. The earliest to be noticed is the Augustinian house of St Giles, founded by Hugoline, wife of Roger Picot the sheriff, in 1092; this was removed in 1112 to Barnwell, where the chapel dedicated to St Andrew the Less is practically the sole remnant of its buildings. In 1224 the Franciscans came to Cambridge, and later in the same century a number of other religious orders settled here, such as the Dominicans, the Gilbertines and the Carmelites, who had before been established at Newnham. Students were gradually attracted to these several religious houses, and Cambridge was already

recognized as a centre of learning when, in 1231, Henry III. issued a writ for its governance as such, among other provisions conferring certain disciplinary powers on the bishop of Ely. It soon became evident that the influence of the religious orders on those who came to them for instruction was too narrow. This was recognized elsewhere, for it was in order to counteract that influence that Walter de Merton drew up the statute of governance for his foundation of Merton College, Oxford, a statute which was soon afterwards used as a model by Hugh de Balsham, bishop of Ely, when, in 1281-1284 he founded the first Cambridge college, Peterhouse.

The friction between town and university, due in the main to the conflict of their jurisdictions, the tradition of which, as in the sister university, died hard in the annual efforts of some undergraduates to revive the "town and gown" riots, culminated during the rebellion of Wat Tyler (1381) in an episode which is alone worthy of record and may serve to illustrate the whole. This was an attack by the rabble, instigated, it is said, by the more reputable townspeople, on the colleges, several of which were sacked. The attack was ultimately defeated by the courage and resource of Henry Spenser or Le Dispencer, bishop of Norwich. The relations of the university of Cambridge with the crown were never so intimate as those of Oxford. Henry III. fortified the town with two gates, but these were burnt by the rebellious barons; and in much later times the two first of the Stuart kings, and the two first of the Georges, cultivated friendly personal relations with the university. During the civil war the colleges even melted down their plate for the war chest of King Charles; but Cambridge showed little of the stubborn royalism of Oxford, and submitted to the Commonwealth without serious resistance.

Colleges.

The history of collegiate foundation in Cambridge after that of Peterhouse may be followed through the ensuing description of the colleges, but for ease of reference these are dealt with in alphabetical order. The main street which traverses the town from south to north, parallel to, and at a short distance from the river, is known successively as Trumpington Street, King's Parade, Trinity Street, St John's Street and Bridge Street. The majority of the colleges lie on either side of this street, and chiefly between it and the river. Those of St John's, Trinity, Trinity Hall, Clare, King's and Queens' present the famous "backs" towards the river, which is crossed by a series of picturesque bridges leading to the gardens and grounds on the opposite bank.

Christ's College is not among the group indicated above; it stands farther to the east, in St Andrew's Street. It was founded in 1505 by the Lady Margaret Beaufort, mother of Henry VII. It incorporated God's House, which had been founded by William Bingham, a cleric of London, in 1439, had been removed when the site was required for part of King's College, and had been refounded with the countenance of Henry VI. in 1448. This was a small house, but the Lady Margaret's endowment provided for a master, twelve fellows and forty-seven scholars. Edward VI. added another fellowship and three scholarships and the present number of fellows is fifteen. There are certain exhibitions in election to which preference is given to schools in the north of England—Giggleswick, Kirkby Lonsdale, Skipton and Sedbergh. The buildings of Lady Margaret's foundation were in great part faced in classical style in the 17th century; a building east of the old quadrangle is also of this period, and is ascribed to Inigo Jones. The rooms occupied by the foundress herself are preserved, though in an altered condition, as are those of the poet Milton, who was educated here, and with whom the college has many associations. In the fine gardens is an ancient mulberry tree believed to have been planted by him. Among illustrious names connected with this college are John Leland the antiquary, Archdeacon Paley, author of the *Evidences*, and Charles Darwin, while Henry More and others of the school of Cambridge Platonists in the 17th century were educated here.

Clare College lies close to the river, south of Trinity Hall. In 1326 the university erected a hall, known as University Hall, to accommodate a number of students, and in 1338 Elizabeth de Burgh, countess of Clare, re-endowed the hall, which took the name of Clare Hall, and only became known as college in 1856. There was a strong ecclesiastical tendency in this foundation; six out of the twenty fellows were to be priests when elected. The foundation now consists of a master and fifteen fellows, besides scholars, of whom three receive emoluments from the endowment of Lady Clare. The old college buildings were in great part destroyed by fire in 1521; the present buildings date from 1638 to 1715, and are admirable examples of their period. They surround a very beautiful quadrangle, and the back towards the river is also fine. Unconfirmed tradition indicates the poet Chaucer as an *alumnus* of this college; other famous men associated with it were Hugh Latimer the martyr, Ralph Cudworth, one of the "Platonists," and Archbishop Tillotson.

Corpus Christi College (commonly called Corpus) stands on the east side of Trumpington Street. The influence of medieval gilds in Cambridge, the character of which was primarily religious, was exceedingly strong. About the beginning of the 14th century there is first mentioned the gild of St Mary, which was connected with Great St Mary's church. The gild was at this time prosperous, but about 1350, when the idea of the foundation of a college by the gilds was matured, the fraternity of St Mary lacked the means to proceed save by amalgamating with another gild, that of Corpus Christi. The age of this institution, whose church was St Benedict's or St Bene't's, is not known. By the two gilds, therefore, the "House of Scholars of Corpus Christi and the Blessed Virgin Mary" was founded in 1352, the foundation being the only instance of its kind. In early times it was commonly known as St Bene't's from the church connected with the Corpus gild which stands over against the college, and served as its chapel for nearly three centuries. The foundation consists of a master and twelve fellows, with scholars of the old and later foundations. The ancient small quadrangle remains, and is of historical rather than architectural interest. The great quadrangle dates from 1823-1825. The library contains the famous collection of MSS. bequeathed by Archbishop Matthew Parker, *alumnus* of the college, in the 16th century.

Downing College is in the southern part of the town, to the east of Trumpington Street. Sir George Downing, baronet, of Gamlingay Park, who died in 1749, left estates to various relations, who died without issue. In this event, Downing's will provided for the foundation of a college, but the heirs contested the will with the university, and in spite of a decision against them in 1769, continued to hold the estates for many years, so that it was not until 1800 that the charter for the college was obtained. The foundation-stone was laid in 1807, and the two ranges of buildings, in classical style, represent all that was completed of an intended quadrangle. The foundation consists of a master, professors of English law and of medicine, six fellows and six scholars.

Emmanuel College overlooks St Andrew's Street. It was founded in 1584 by Sir Walter Mildmay (*c.* 1520-1589), chancellor of the exchequer and privy councillor under Queen Elizabeth. The foundation, considerably enlarged from the original, consists of a master, sixteen fellows and thirty scholars. There are further scholarships on other foundations which are awarded by preference to pupils of Uppingham and other schools in the midlands. Emmanuel was noted from the outset as a stronghold of Puritanism; it is indeed recorded that Elizabeth rallied the founder on his intention that this should be so. Mildmay assuredly had the welfare of the church primarily at

heart, and he attempted to provide against the life residence of fellows, which he considered an unhealthy feature in some colleges. The site of Emmanuel was previously occupied by a Dominican friary, and some of its buildings were adapted to collegiate uses. There is only a little of the earliest building remaining; the greater part of the present college dates from the second half of the 18th century. The chapel, however, is by Sir Christopher Wren (1677). Richard Holdsworth, Gresham professor, and William Sancroft, archbishop of Canterbury, were masters of this college; Bishops Joseph Hall and Thomas Percy were among its *alumni*, as was John Harvard, principal founder of the great American college which bears his name.

Gonville and Caius College (commonly called Caius, pronounced Kees), stands mainly on the west side of Trinity Street. It arose out of an earlier foundation. In 1348 Edmund Gonvile or Gonevill founded the hall of the Annunciation of the Blessed Virgin, which was commonly called Gonville Hall, for the education of twenty scholars in dialectic and other sciences, with endowment for a master and three fellows. This hall stood on part of the present site of Corpus, but on the death of its founder in 1351 it was moved to the north-west corner of the site of the present Caius, by William Bateman, bishop of Norwich and founder of Trinity Hall. The famous physician John Caius (*q.v.*), who was educated at this small institution, later conceived the idea of refounding and enlarging it, obtained a charter to do so in 1557, and became master of the new foundation of Gonville and Caius College. The foundation consists of a master and not less than twenty-two fellows, exclusive of the provision under the will of William Henry Drosier (d. 1889), doctor of medicine and fellow of the college, for the endowment of seven additional fellowships. Since its refoundation by Caius, the college has had a peculiar connexion with the study of medicine, while, besides many eminent physicians, Sir Thomas Gresham, Judge Jeffreys, Robert Hare, Jeremy Taylor, Henry Wharton and Lord Thurlow are among its noted names. Three sides of the main quadrangle, Tree Court, including the frontage towards Trinity Street, are modern (1870). The interior of this court is picturesque, and the design of the smaller Caius Court was inspired by Caius himself. He also designed the gates of Honour, Virtue and Humility, of which the two first stand *in situ*; the gate of Honour is a peculiarly good example of early Renaissance work. Caius is buried in the chapel.

Jesus College lies apart from and to the north-east of the majority of the colleges. It was founded in 1406 by John Alcock, bishop of Ely. The site was previously occupied by a Benedictine nunnery dedicated to St Radigund, which was already in existence in the first half of the 12th century and was claimed by Alcock to have been founded from Ely, to the bishops of which it certainly owed much. The name given to Alcock's college was that of "the most Blessed Virgin Mary, St John the Evangelist, and the glorious Virgin Saint Radigund," but it appears that the founder himself intended the name to be Jesus College. He provided for a master and six fellows, but the foundation now consists of a master and sixteen fellows, with twenty scholars or more. There are several further scholarships confined to the sons of clergymen of the Church of England. Architecturally Jesus is one of the most interesting colleges in Cambridge, for Alcock retained, and there still remains, a considerable part of the old buildings of the nunnery. The most important of these is the church, which Alcock, by removing most of the nave and other portions, converted into the usual form of a college chapel. The tower, however, is retained. The bulk of the building is an admirable example of Early English work, but there are traces of Norman; and Alcock added certain Perpendicular features. Of the rest of the college buildings, the hall is Alcock's work, the brick gatehouse is a fine structure of the close of the 15th century, while the cloister is a little later, and stands on the site of the nuns' cloister. Another court dates from the 17th and early 18th centuries, and there is a considerable amount of modern building. The most famous name connected with Jesus College is that of Cranmer. Among many others are Sir Thomas Elyot, John Bale, John Pearson, bishop of Chester, Hugh Peters, Gilbert Wakefield, Thomas Malthus, Laurence Sterne and Samuel Taylor Coleridge.

King's College has its fine frontage upon the western side of King's Parade. It was founded by King Henry VI. in 1441. The first site was small and circumscribed, and in 1443 the existing site was with difficulty cleared of dwellings. The king designed a close connexion between this college and his other foundation at Eton; he provided for a provost and for seventy scholars, all of whom should be Etonians. In 1861 open scholarships were instituted, and the foundation now consists of a provost, forty-six fellows and forty-eight scholars. Half the scholarships are still appropriated to Eton. An administrative arrangement peculiar to King's College is that by which the provost has absolute authority within its walls, to the exclusion of officers of the University. The chief architectural ornament of the college, and one of the most notable in the town, is the magnificent Perpendicular chapel, comparable with those of St George at Windsor and Henry VII. at Westminster Abbey. The building was begun in 1446, and extended (apart from the interior fittings) over nearly seventy years. Within, the most splendid features are the fan-vaulting which extends throughout the chapel, the noble range of stained-glass windows, which date for the most part from the early part of the 16th century, and the wooden organ screen, which, with part of the stalls, is of the time of Henry VIII. The college services are celebrated for the beauty of their music. The bulk of the other collegiate buildings are of the 18th century or modern. The old court of King's College is occupied by the modern university library, north of the chapel; the gateway, a good example (1444), is preserved. John Frith the Martyr, Richard Croke, Giles Fletcher, Richard Mulcaster, Sir William Temple, William Oughtred, the poet Waller, and Horace Walpole and others of his family are among many illustrious *alumni* of the college.

Magdalene College (pronounced Maudlin) stands on the west bank of the Cam, near the Great Bridge. In 1428 the Benedictines of Crowland Abbey founded a home for student monks on this site, and in 1519 Edward, duke of Buckingham, partly secularized this institution by founding Buckingham College in connexion with it. After the dissolution of the monastery, Thomas, Baron Audley of Walden, erected Magdalene in place of the former house in 1542. The foundation consists of a master and seven fellows, besides scholars. There are some valuable exhibitions appropriated to Wisbech school. The appointment of the master is peculiar, the office being in the gift of the occupant of Audley End, an estate near Saffron Walden, Essex. Some parts of the original building are preserved, but the most notable portion of the college is the Pepysian library, dating *c.* 1700. It contains the very valuable collection of books bequeathed by Samuel Pepys to the college, at which he was a student. Buckingham College had Archbishop Cranmer as a lecturer; Charles Kingsley and Charles Stewart Parnell were educated at Magdalene.

Pembroke College stands to the east of Trumpington Street. It was founded in 1347 by Mary de St Paul, widow of Aylmer de Valence, earl of Pembroke. Henry VI. made notable benefactions to it. The foundation consists of a master and thirteen fellows, and there are six scholarships on the original foundation, besides others of later institution. The older existing buildings are mainly of the 18th century, but much of the original fabric was removed and rebuilt in 1874. The chapel is of the middle of the 17th century, and is ascribed to Sir Christopher

Wren. The poets Spenser and Gray, Nicholas Ridley the martyr, Archbishop Whitgift and William Pitt were associated with this college; and from the number of bishops whose names are associated with it the college has obtained the style of *collegium episcopale*.

Peterhouse or St Peter's College is on the west side of Trumpington Street, almost opposite Pembroke. It has already been indicated as the oldest Cambridge college (1284). Hugh de Balsham, the founder, had settled some secular scholars in the ancient Augustinian Hospital of St John in 1280, but the experiment was not a success. Nor did he carry out his full intentions as regards Peterhouse, the foundation of which followed on the failure of the fusion of his scholars with the hospital; but Simon Montagu, his successor in the bishopric of Ely, carried on his work, and in 1344 gave the college a code of statutes in which the influence of the Merton code is plainly visible. A master and fourteen fellows formed the original foundation, but the present consists of a master, and not less than eleven fellows and twenty-three scholars. The hall retains some original work; it was first built out of a legacy from the founder. The library building (*c.* 1590) is due to a legacy from Dr Andrew Perne (master 1554-1580); and Dr Matthew Wren (master 1625-1634), uncle of the famous architect Sir Christopher Wren, directed the building of the chapel and cloisters. The most famous name connected with the college is that of Cardinal Beaufort.

Queens' College stands at the south of the riverside group, and one of its ranges of buildings rises immediately from the river. A college of St Bernard had been established in 1445 by Andrew Docket or Dokett, rector of St Botolph's church, who had also been principal of a hostel, or students' lodge, of St Bernard. He sought and obtained the patronage of Margaret of Anjou, wife of Henry VI., who undertook the foundation of a new house on another site in 1448, to bear the name of Queens'. Docket became the first master. In 1465 Elizabeth Woodville, wife of Edward IV., became the college's second foundress. The foundation consists of a president and eleven fellows. The buildings are exceedingly picturesque. The main quadrangle, of red brick, was completed very soon after the foundation. The smaller cloister court, towards the river, retains building of the same period, and the beautiful wooden gallery of the president's lodge deserves notice. Another court is called Erasmus's; the rooms which he is said to have occupied remain, and a walk in the college garden across the river bears his name.

St Catharine's College, on the west side of Trumpington Street, was founded by Dr Robert Woodlark or Wodelarke, chancellor of the university and (1452) provost of King's College. It was opened in 1473, but the charter of incorporation dates from 1475. The foundation provided for a master (Woodlark being the first) and three fellows; there are now six fellows, and twenty-six scholars. The principal buildings, surrounding a court on three sides, date mainly from a complete reconstruction of the college at the close of the 17th century.

St John's College, at the north of the riverside group of colleges, was founded in 1511 by the Lady Margaret Beaufort, also foundress of Christ's College. It replaced the Hospital of St John, which dated from the early years of the 13th century, and has been mentioned already in connexion with Peterhouse. The Lady Margaret died before the college was firmly established, and her designs were not carried out without many difficulties, which were overcome chiefly by the exertions of John Fisher, bishop of Rochester, one of her executors. Thirty-two fellowships were endowed, but subsequent endowments allowed extension, and the foundation now consists of a master, fifty-six fellows, sixty scholars and nine sizars. A large number of exhibitions are appropriated to special schools. Of the four courts of St John's, the easternmost is the original, and has a very fine Tudor gateway of brick. The chapel is modern (1863-1869), an ornate example of the work of Sir Gilbert Scott. The second court, practically unaltered, dates from 1508-1602. In this there is a beautiful Masters' gallery, panelled, with a richly-moulded ceiling; it is now used as a combination room or fellows' common-room. The third court, which contains the library (1624), backs on to the river, and the fourth, which is on the opposite bank, was built *c.* 1830. A covered bridge connects the two, and is commonly called the Bridge of Sighs from a certain resemblance to the bridge of that name at Venice. Among the notable names connected with this college are Cecil, Lord Burghley, Thomas Cartwright, Wentworth, earl of Strafford, Roger Ascham, Richard Bentley, John Cleveland, the satirist, Thomas Baker, the historian, Lord Palmerston, Professor Adams, Sir John Herschel, Bishop Colenso, Dr Benjamin Kennedy, Dean Merivale, Horne Tooke, Samuel Parr and William Wilberforce, and the poets Herrick (afterwards of Trinity Hall) and Wordsworth.

Selwyn College, standing west of the river (Sidgwick Avenue), was founded in 1882 by public subscription in memory of George Augustus Selwyn, bishop of New Zealand and afterwards of Lichfield, for the purpose of giving university education with economy "combined," according to the charter, "with Christian training, based upon the principles of the Church of England."

Sidney Sussex College faces Sidney Street. It was founded under the will (1588) of the Lady Frances Sidney, dowager countess of Sussex (d. 1589), and received its charter in 1596. The foundress provided for a master, ten fellows and twenty scholars, but thirty-six scholarships are now provided. The original buildings were of brick, but they were plastered over and greatly altered by Wyatville about 1830. The Grey Friars had occupied the site, and part of their buildings remained in the chapel until 1777. A beautiful block of new buildings, with a cloister, was erected in 1890. The most famous name associated with the college is that of Oliver Cromwell, who was a fellow commoner, as also was Thomas Fuller, author of the *Worthies of England*.

Trinity College, the front of which is on Trinity Street, is the largest collegiate foundation in Cambridge, and larger than any in Oxford. It was founded in 1546 by King Henry VIII. and absorbed several earlier institutions—King's Hall (founded by Edward III. in 1336), St Michael's or Michaelhouse (founded by Hervey de Stanton, chancellor of the exchequer under Edward II., in 1323), Fyswick or Physick's Hostel, belonging to Gonville Hall, and other hostels. Henry's original foundation was for a master and sixty fellows and scholars, but Queen Mary and other later benefactors enabled extensions to be made, and the foundation now consists of a master (appointed by the crown), at least sixty fellows, seventy-four scholars and sixteen sizars, with minor scholars, chaplains librarian and the regius professors of Divinity, Hebrew and Greek. Major scholarships are open to undergraduates, not being of standing to take the degree of bachelor of arts, as well as to non-members of the university under nineteen years of age, while minor scholarships and exhibitions are open only to the latter. There are valuable exhibitions appropriated to certain schools, of which the most important are those confined to Westminster school. Trinity College is entered from Trinity Street by the King's Gateway (1518-1535) preserved from King's Hall, but subsequently altered. The principal or Great Court is the largest in Cambridge and very fine. Its buildings are of different dates. In the centre is a picturesque fountain, erected by Thomas Neville, master (1593-1615), under whose direction much of the building was carried out. The chapel on the north side of the court was begun in the reign of Mary. The carved oak fittings within date from the mastership of Richard

Bentley (1700-1742). The organ is particularly fine. A statue of Sir Isaac Newton by Roubiliac stands in the antechapel, and Richard Porson and William Whewell are buried here. The hall on the west of the court is Neville's work (1605), and very beautiful. The second court is also his foundation and bears his name. The library on the west side is the work of Sir Christopher Wren. Its interior is excellent, and besides busts of some of the vast number of famous men connected with Trinity, it contains a statue of Lord Byron by the Danish sculptor Thorvaldsen. The New Court, Gothic in style, was begun in 1823. The beautiful grounds and walks of the college extend down to and beyond the river. The college has extended its buildings to the opposite side of Trinity Street, where the two courts known as Whewell's Hostel were built (c. 1860) at the charge of Dr William Whewell during his mastership. The eminent *alumni* of this great college are too numerous to admit of selection.

Trinity Hall, which lies near the river, south of Trinity, was founded by William Bateman, bishop of Norwich, in 1350. On the site there had been, for about twenty years before the foundation, a house of monastic students from Ely. The present college is alone in preserving the term Hall in its title. The foundation consists of a master and thirteen fellows, and the study of law, which the founder had especially in mind, is provided for by lectureships, and not less than three studentships tenable by graduates of the college. The buildings are for the most part modern or modernized, but the interior of the library well preserves its character of the early part of the 17th century.

University buildings.

Of the churches of Cambridge one has long been recognized as the church of the university, namely Great St Mary's, which stands in the centre of the town, between King's Parade and Market Hill. It is a fine Perpendicular structure, founded in 1478; but the tower was not completed until 1608. Some Decorated details are preserved from a former building. The university preachers deliver their sermons in this church, but it was formerly the meeting-place of the university for the transaction of business, for learned disputations and for secular festivals. The "Cambridge chimes" struck by the clock are famous, and a curfew is rung each evening on the great bell. The Senate House, standing opposite Great St Mary's, dates from 1730 and is classical in style. The buildings of the university library, in the immediate vicinity, enclose two quadrangles, and in part occupy the site of the old court of King's College. One of the quadrangles was formerly occupied by the schools or lecture rooms, but as the library grew it usurped their place. Important modern additions date from 1842, 1864 and 1888. The facade of the old schools is an excellent work of 1758. The library is one of those which is entitled to receive, under the Copyright Act, a copy of every book published in the United Kingdom. The Fitzwilliam Museum, a massive classical building, was begun in 1837 to contain the bibliographical and art collection bequeathed by Richard, Viscount Fitzwilliam, in 1816. The museum of archaeology (classical, general and local, 1884), is connected with the Fitzwilliam Museum. The Pitt Press (1833), housing the university printing establishment, was begun out of the residue of a fund for erecting the statues of William Pitt in Hanover Square, London, and Westminster Abbey. It stands near Pembroke, Pitt's college. The Selwyn Divinity School (1879), opposite St John's College, was built largely at the charge of Dr William Selwyn, Lady Margaret professor of divinity. The museums and lecture rooms (begun in 1863) are extensive buildings on each side of Downing Street. Included in these are the museum of zoology, which had its origin in collections made by Sir Busick Harwood, professor of anatomy in 1785-1814, and contains the collection of fishes made by Charles Darwin in the ship "Beagle"; the medical school, botanical museum and herbarium, mineralogical museum, engineering laboratory (1894), optical and astronomical lecture room, chemical laboratory (1887), and the Cavendish laboratory for physical research (1874), the gift of William Cavendish, 7th duke of Devonshire and chancellor of the university. The Sedgwick Geological Museum, opened by King Edward VII. in 1904, commemorates Adam Sedgwick, Woodwardian professor of geology, and originated in the collections of Dr John Woodward (d. 1728). Adjoining this building, in Downing Street is the law library, founded on a bequest from Miss Rebecca Flower Squire (d. 1898) with the law school. The observatory (1824) is on the outskirts of the town in Madingley Road, and the botanic garden (founded 1762, and removed to its present site in 1831) borders Trumpington Road. The club-rooms and debating hall of the Cambridge Union Society are adjacent to the Holy Sepulchre church.

The non-collegiate students of the university (*i.e.* those who receive the university education and possess the same status as collegiate students without belonging to any college) have lecture and other rooms and a library in Fitzwilliam Hall. This body was created in 1869. The students reside in lodgings. There are two women's colleges —Girton, established in 1873 on the north-western outskirts of the town, having been previously opened at Hitchin in 1869, and Newnham (1875), originally (1873) a hall of residence for students attending special lectures for women. Among other educational establishments mention must be made of the Leys school, founded in 1875 by prominent Wesleyans for non-sectarian education, and the Perse School, an ancient foundation remodelled in 1902.

Non-university buildings.

Out of a number of ancient churches in Cambridge, two, besides Great St Mary's, deserve special notice. In St Benedict's or Benet's, which has been already mentioned in connexion with Corpus College, the tower is of great interest, being the oldest surviving building in Cambridge, of pre-Norman workmanship, having rude ornamentation on the exterior and the tower arch within. The church of the Holy Sepulchre in Bridge Street is one of the four ancient round churches in England. Its supposed date is 1120-1140, but although it is doubtless to be associated with the Knights Templars, the circumstances of its foundation are not known. The chancel is practically a modern reconstruction, and an extensive restoration, which has been adversely criticized, was applied by the Cambridge Camden Society to the whole fabric in 1841. At several of the villages neighbouring or suburban to Cambridge there are churches of interest, as at Chesterton, Trumpington, Grantchester (where the name indicates a Roman station, borne out by the discovery of remains), Fen Ditton and Barnwell, near which is the Norman Sturbridge chapel. In Cambridge itself there is a Norman house, much altered, which by a tradition of unknown origin bears the name of the School of Pythagoras.

University constitution and administration.

The university is a corporate body, including all the colleges. These, however, are also corporations in themselves, and have their own statutes, but they are further subject to the paramount laws of the university. The university statutes of Queen Elizabeth were only replaced in 1858. The statutes as revised by a commission in that year were soon found to require emendation; in 1872 another commission was appointed, and in 1882 new statutes received the approval of the queen in council. The head of the university is the chancellor. He is a member of the university, of high rank and position, elected by the senate. Being generally non-resident, he delegates his administrative duties to the vice-chancellor, who is the head of a college, and is elected for one year by the senate. The

principal executive officers under the vice-chancellor are as follows. The two proctors have as their main duty that of disciplinary officers over the members of the university *in statu pupillari*. In each year two colleges nominate one proctor each, according to a fixed rotation which gives the larger colleges a more frequent choice than the smaller. The proctors are assisted by four pro-proctors. The public orator is the spokesman of the senate upon such public occasions as the conferring of honorary degrees. The librarian has charge of the university library. The registrary, with his assistant, records the proceedings of the senate, &c., and has charge of documents. The university returns two members to parliament, elected by the members of the senate. The chancellor and *sex viri* (elected by the senate) form a court for offences against the university statutes by members not *in statu pupillari*. The chancellor and six heads of colleges, appointed by the senate, form a court of discipline for members *in statu pupillari*.

Senate.

The senate in congregation is the legislative body. Those who have votes in it are the chancellor, vice-chancellor, doctors of divinity, law, medicine, science, letters and music, and masters of art, law, surgery and music. The council of the senate, consisting of the chancellor, vice-chancellor, four heads of colleges, four professors and eight other members of the senate chosen by the vice-chancellor, brings all proposals (called Graces) before the senate. The revenues of the university are derived chiefly from fees at matriculation, for certain examinations, and for degrees, from a tax upon all members of the university, and from contributions by the colleges, together with the profits of the University Press. A financial board, consisting of the vice-chancellor *ex officio* and certain elected members, administers the finances of the university. There are boards for each of the various faculties, and a General Board of Studies, with the vice-chancellor at the head. There are university professors, readers or lecturers in a large number of subjects. The oldest professorship is the Lady Margaret professorship of divinity, instituted by the founders of Christ's and St John's Colleges in 1502. In 1540 Henry VIII. founded the regius professorships of divinity, civil law, physic, Hebrew and Greek.

College organization — undergraduates.

The head of a college generally bears the title of master, as indicated above in the account of the several colleges. It has also seen that the foundation of each college includes a certain number of fellows and scholars. The affairs of the college are managed by the head and the fellows, or a committee of fellows. The scholars and other members *in statu pupillari* are generally termed collectively undergraduates. Those who receive no emoluments (and therefore pay the full fees) are technically called pensioners, and form the bulk of the undergraduates. Another group of students receiving emoluments are termed sizars; the primary object of sizarships is to open the university course to men of limited means. The title of fellow-commoners belongs to wealthy students who pay special fees and have the right of dining at the fellows' tables. This class has virtually ceased to exist. As regards his work, the undergraduate in college is under the intimate direction of his tutor; the disciplinary officer in college is the dean. Besides the foundation scholarships in each college there are generally certain scholarships and exhibitions founded by private or special benefactions; these are frequently awarded for the encouragement of specific branches of study, or are confined wholly, or by preference, to students from certain schools.

Residence and examinations.

The total number of students is about 3000. The colleges cannot accommodate this number, so that a student commonly spends some part of his residence in lodgings, which are licensed by, and under the control of, the university authorities. Such residence implies no sacrifice of membership of a college. There are three terms—Michaelmas (October), Lent and Easter (summer). They include together not less than 227 days, though the actual period of residence for undergraduates is about 24 weeks annually. Undergraduates usually begin residence in Michaelmas term. An elementary examination or other evidence of qualification is required for admission to a college. After nine terms' (three years') residence an undergraduate can take the first degree, that of bachelor of arts (B.A.). The examinations required for the ordinary B.A. degree are—(1) Previous examination or Little-go (usually taken in the first term of residence or at least in the first year), including classics, mathematics and a gospel in Greek and Paley's *Evidences of Christianity*, or an additional Greek or Latin classic and logic. (2) General examination in classics and mathematics, with a portion of English history, &c. (3) Special examination in a subject other than classical or mathematical. Candidates for honours are required to pass the Previous examination with certain additional subjects; they then have only a "tripos" examination in one of the following subjects—mathematics, classics, moral sciences, natural sciences, theology, law, history, oriental languages, medieval and modern languages, mechanical sciences, economics. The mathematical tripos is divided into two parts, in the first of which, down to 1909, the candidates were classed in the result as Wranglers, Senior Optimes and Junior Optimes. There was also an individual order of merit, the most proficient candidate being placed at the head of the list as Senior Wrangler. But in 1906 a number of important reforms of this tripos were proposed by the Mathematical Board, and among these the abolition of the individual order of merit was recommended and passed by the senate. It is not employed in any other tripos. The classical tripos is also in two parts, to the second of which certain kindred subjects are added (ancient philosophy, history, &c.). Individual order of merit is not observed in either part, the candidates being grouped in classes. There are a large number of university prizes and scholarships on special foundations. Such are the Smith's prizes for mathematics and natural philosophy, on the foundation (1768) of Robert Smith, master of Trinity, awarded up to 1883 after examination, but since then for an essay on some branch of each subject, and the Chancellor's medals, of which two have been awarded annually in classics since the foundation of the prizes in 1751 by Thomas Holles, duke of Newcastle.

Affiliated colleges.

The university may adopt as affiliated colleges institutions in the United Kingdom or in any part of the British empire which fulfil certain conditions as to the education of adult students. Attendance at these institutions is counted as equivalent to a certain period of residence at Cambridge University in the event of a student wishing to pursue his work here. There are over twenty such affiliated colleges. There are also, in England, certain "affiliated centres." These are towns in which there is no affiliated college, but students who have there attended a course of education managed in connexion with the university by a committee may enter the university with privileges similar to those enjoyed by students from affiliated colleges.

May week.

The principal social function of the university is the "May Week" at the close of the Easter term. It actually takes place in June and lasts longer than a week. There is a great influx of visitors into Cambridge for this occasion. The first four days are occupied by the college boat-races on the Cam, and on subsequent days there are college balls, concerts, theatrical performances and other

entertainments. On the Tuesday after the races there is a Congregation, at which prize exercises are recited, and usually, but not invariably, a number of honorary degrees are conferred on eminent men by invitation. This final period of the academic year is called Commencement, or in Latin *Comitia Maxim*.

AUTHORITIES.—For details of the administration of the university and colleges, regulations as to studies, prizes, scholarships, &c., see the annual *Cambridge University Calendar* and *The Students' Handbook to the University and Colleges of Cambridge*; see also R. Willis and J.W. Clark, *Architectural History of the University of Cambridge* (3 vols., Cambridge, 1886); J. Bass Mullinger, *History of the University of Cambridge from the Earliest Times to the Accession of Charles I.* (2 vols., 1873-1884; third vol., 1909); and smaller *History of Cambridge*, in Longman's "Epoch" Series (1888); J.W. Clark, *Cambridge, Historical and Picturesque* (London, 1890); T.D. Atkinson, *Cambridge Described and Illustrated*, with introduction by J.W. Clark (London, 1897); F.W. Maitland, *Township and Borough* (Cambridge, 1898); C.W. Stubbs, *Cambridge*, in "Mediaeval Towns" series (London, 1905); Arthur Gray, *The Dual Origin of the Town of Cambridge* (publications of the Cambridge Antiquarian Soc., new ser. No. I, Cambridge, 1908); J.W. Clark, *Liber memorandorum ecclesie de Bernewelle* (Cambridge, 1907), with an introduction by F.W. Maitland. For the individual colleges, see the series of *College Histories*, by various authors (London, 1899 et seq.).

1 See also UNIVERSITIES.

CAMBRIDGE, a city and the county-seat of Dorchester county, Maryland, U.S.A., on the Choptank river, near Chesapeake Bay, about 60 m. S.E. of Baltimore. Pop. (1890) 4192; (1900) 5747 (1958 being negroes); (1910) 6407. It is served by the Cambridge branch of the Philadelphia, Baltimore & Washington railway (Pennsylvania railway), which connects with the main line at Seaford, 30 m. distant, and with the Baltimore, Chesapeake & Atlantic at Hurlock, 16 m. distant; and by steamers of the Baltimore, Chesapeake & Atlantic railway company. It is a business centre for the prosperous farming region by which it is surrounded, and is a shipping point for oysters and fish; among its manufactures are canned fruits and vegetables, flour, hominy, phosphates, underwear and lumber. Cambridge was founded in 1684, received its present name in 1686, and was chartered as a city in 1900.

CAMBRIDGE, a city and one of the county-seats of Middlesex county, Massachusetts, U.S.A., situated on the Charles river, in the outskirts of Boston, of which it is in effect a part, although under separate government. Pop. (1880) 52,669; (1890) 70,028; (1900) 91,886; (1910 census) 104,839. Of the total population in 1900, 30,446 were foreign-born, including 11,235 Irish, 9613 English Canadians, 1944 English, 1483 French Canadians and 1584 Swedish; and 54,200 were of foreign parentage (both parents foreign-born), including 24,961 of Irish parentage, 9829 of English-Canadian parentage, 2587 of English parentage, and 2288 of French-Canadian parentage. Cambridge is entered directly by only one railway, the Boston & Maine. The township, now practically built over by the city, contained originally several separate villages, the names of which are still used as a convenience in designating corresponding sections of the municipality: Old Cambridge, North Cambridge, Cambridgeport and East Cambridge, the last two being manufacturing and commercial districts.

Old Cambridge is noted as the seat of Harvard University (*q.v.*) and as a literary and scientific centre. Radcliffe College (1879), for women, practically a part of Harvard; an Episcopal Theological School (1867), and the New Church (Swedenborgian or New Jerusalem) Theological School (1866) are other educational institutions of importance. To Cambridge also, in 1908, was removed Andover Theological Seminary, a Congregational institution chartered in 1807, opened in Andover, Massachusetts, in 1808 (re-incorporated under separate trustees in 1907). This seminary is one of the oldest and most famous theological institutions in the United States; it grew out of the theological teaching previously given in Phillips Academy, and was founded by the widow of Lt.-Governor Samuel Phillips, her son John Phillips and Samuel Abbot (1732-1812). The instruction was strongly Calvinistic in the earlier period, but the seminary has always been "equally open to Protestants of every denomination." Very liberal aid is given to students, and there is no charge for tuition. The *Bibliotheca Sacra*, founded in 1843 by Edward Robinson and in 1844 taken over by Professors Bela B. Edwards and Edwards A. Park, and the *Andover Review* (1884-1893), have been the organs of the seminary. In 1886 some of its professors published *Progressive Orthodoxy*, a book which made a great stir by its liberal tone, its opposition to supernaturalism and its evident trend toward the methods of German "higher criticism." Legal proceedings for the removal of five professors, after the publication of this book, failed; and their successful defence helped to secure greater freedom in thought and in instruction in American Presbyterian and Congregational theological seminaries. The seminary is now affiliated with Harvard University, though it remains independent and autonomous.

Cambridge is a typical New England city, built up in detached residences, with irregular streets pleasantly shaded, and a considerable wealth of historic and literary associations. There are many reminders of the long history of Harvard, and of the War of Independence. Cambridge was the site of the camp of the first American army, at the outbreak of the war, and from it went the detachment which intrenched on Bunker's Hill. Here are the Apthorp House (built in 1760), in which General Burgoyne and his officers were lodged as prisoners of war in 1777; the elm under which, according to tradition, Washington took command of the Continental Army on the 3rd of July 1775; the old Vassall or Craigie House (1759), where Washington lived in 1775-1776, and which was later the home of Edward Everett, Joseph E. Worcester, Jared Sparks and (1837-1882) Henry W. Longfellow. Elbridge Gerry lived and James Russell Lowell was born, lived and died in "Elmwood" (built in 1767); Oliver Wendell Holmes was born in Cambridge also; John Fiske, the historian, lived here; and there are many other literary associations, attractive and important for those interested in American letters. In Mt Auburn Cemetery are buried many artists, poets, scholars and other men and women of fame. Cambridge is one of the few American cities

possessing a crematorium (1900). The municipal water-works are excellent. A handsome bridge joining Cambridgeport to Boston (cost about $2,250,000) was opened late in 1906. Four other bridges span the Charles river between the two cities. A dam between East Cambridge and Boston, traversed by a roadway 150 ft. wide, was in the process of construction in 1907; and an extension of the Boston subway into Cambridge to the grounds of Harvard University, a distance of about 3 m., was projected. The city government is administered almost entirely under the state civil-service laws, Cambridge having been a leader in the adoption of its provisions. A non-partisan association for political reform did excellent work from 1890 to 1900, when it was superseded by a non-partisan party. Since 1887 the city has declared yearly by increasing majorities for prohibition of the liquor traffic. The high schools enjoy a notable reputation. A handsome city hall (cost $235,000) and public library (as well as a manual training school) were given to the city by Frederick H. Rindge, a one-time resident, whose benefactions to Cambridge aggregated in value $650,000. Cambridge has many manufacturing establishments, and in 1905 the city's factory products were valued at $42,407,064, an increase of 45.8% over their value in 1900. The principal manufactures are slaughtering and meat-packing products, foundry and machine-shop products, rubber boots and shoes, rubber belting and hose, printing and publishing products, carpentering, pianos and organs, confectionery and furniture. Cambridge is one of the chief publishing centres of the country. The tax valuation of property in 1906 ($105,153,235) was more than $1000 per inhabitant.

Cambridge is "one of the few American towns that may be said to have owed their very name and existence to the pursuit of letters" (T.W. Higginson). Its site was selected in 1630 by Governor Winthrop and others as suitable for fortifications and defence, and it was intended to make it the capital of the Massachusetts Bay Colony; but as Boston's peninsular position gave it the advantage in commerce and in defence against the Indians, the plan fell through, although up to 1638 various sessions of the general court and particular courts were held here. The township records (published) are continuous since 1632. A direct tax for the wooden "pallysadoe" about Cambridge led the township of Watertown in 1632 to make the first protest in America against taxation without representation. The settlement was first known as the "New Towne," but in 1638 was named Cambridge in honour of the English Cambridge, where several score of the first immigrants to the colony were educated. The oldest college in America (Harvard) was founded here in 1636. In 1639 there was set up in Cambridge the first printing press of British North America (Boston having none until 1676). Other notable dates in history are 1637 and 1647, when general synods of New England churches met at Cambridge to settle disputed doctrine and define orthodoxy; the departure for Connecticut of Thomas Hooker's congregation in 1636; the meeting of the convention that framed the present constitution of the commonwealth, 1779-1780; the separation of the Congregationalists and Unitarians of the first parish church, in 1829; and the grant of a city charter in 1846. The original township of Cambridge was very large, and there have been successively detached from it, Newton (1691), Lexington (1713), Brighton (1837) and Arlington (1867).

See Lucius R. Paige, *History of Cambridge, Massachusetts, 1630-1877* (Boston, Mass., 1877); T.W. Higginson, *Old Cambridge* (New York, 1899); Arthur Gilman (ed.), *The Cambridge of Eighteen Hundred and Ninety-Six* (Cambridge, 1896); and *Historic Guide to Cambridge* (Cambridge, 1907.)

CAMBRIDGE, a city and the county-seat of Guernsey county, Ohio, U.S.A., on Wills Creek, about 75 m. E. by N. of Columbus. Pop. (1890) 4361; (1900) 8241, of whom 407 were foreign-born; (1910 census) 11,327. It is served by the Baltimore & Ohio and the Pennsylvania railways, and is connected by an electric line with Byesville (pop. in 1910, 3156), about 7 m. S. Cambridge is built on a hill about 800 ft. above sea-level. There is a public library. Coal, oil, natural gas, clay and iron are found in the vicinity, and among the city's manufactures are iron, steel, glass, furniture and pottery. The value of its factory products in 1905 was $2,440,917. The municipality owns and operates the water-works. Cambridge was first settled in 1798 by emigrants from the island of Guernsey (whence the name of the county); was laid out as a town in 1806; was incorporated as a village in 1837; and was chartered as a city in 1893.

CAMBRIDGE PLATONISTS, a school of philosophico-religious thinkers which flourished mainly at Cambridge University in the second half of the 17th century. The founder was Benjamin Whichcote and the chief members were Ralph Cudworth, Richard Cumberland, Joseph Glanvill, Henry More and John Norris (see separate articles). Other less important members were Nathanael Culverwel (d. 1651?), Theophilus Gale (1628-1678), John Pordage (1607-1681), George Rust (d. 1670), John Smith (1618-1652) and John Worthington (1618-1671). They represented liberal thought at the time and were generally known as Latitudinarians. Their views were due to a reaction against three main tendencies in contemporary English thought: the sacerdotalism of Laud and his followers, the obscurantist sectaries and, most important of all, the doctrines of Hobbes. They consist chiefly of a reconciliation between reason and religion, resulting in a generally tolerant spirit. They tend always to mysticism and the contemplation of things transcendental. In spite of inaccuracy and the lack of critical capacity in dealing with their authorities both ancient and modern, the Cambridge Platonists exercised a valuable influence on English theology and thought in general. Their chief contributions to thought were Cudworth's theory of the "plastic nature" of God, More's elaborate mysticism, Norris's appreciation of Malebranche, Glanvill's conception of scepticism as an aid to Faith, and, in a less degree, the harmony of Faith and Reason elaborated by Culverwel. The one doctrine on which they all combined to lay especial emphasis was the absolute existence of right and wrong quite apart from the theory of divine authority. Their chief authorities were Plato and the Neo-platonists (between whom they made no adequate distinction), and among modern philosophers, Descartes, Malebranche and Boehme. From these sources they attempted to evolve a philosophy of religion, which would not only refute the views of Hobbes, but would also free theology finally from the errors of scholasticism, without plunging it in the newer dangers of unfettered rationalism (see Ethics).

See Tulloch, *Rational Theology in England in the 17th Century*; Hallam, *Literature of Europe* (chap, on Philosophy from 1650 to 1700); Hunt, *Religious Thought in England*; von Stein, *Sieben Bucher zur Geschichte des Platonismus* (1862), and works on individual philosophers appended to biographies.

CAMBRIDGESHIRE, an eastern county of England, bounded N. by Lincolnshire, E. by Norfolk and Suffolk, S. by Essex and Hertfordshire, and W. by Bedfordshire, Huntingdonshire and Northamptonshire. The area is 858.9 sq. m. The greater part of the county falls within the district of the Fens, and is flat, elevated only a few feet above sea-level, and intersected with innumerable drainage channels. The physical characteristics of this district, and the history of its reclamation from a marshy and in great part uninhabitable condition, fall for consideration under the heading FENS. Except in the south of the county the scenery of the flat land is hardly ever varied by rising ground or wood, and owes the attraction it possesses rather to individuality than to beauty. At the south-eastern and southern boundaries, and to the west of Cambridge, bordering the valley of the Cam on the north, the land rises in gentle undulations; but for the rest, such elevations as the Gog Magog Hills, S.E. of Cambridge, and the gentle hillock on which the city of Ely stands, are isolated and conspicuous from afar. The principal rivers are the Ouse and its tributaries in the south and centre, and the Nene in the north; the greater part of the waters of both these rivers within Cambridgeshire flow in artificial channels, of which those for the Ouse, two great parallel cuts between Earith and Denver Sluice, in Norfolk, called the Bedford Rivers, form the most remarkable feature in the drainage of the county. The old main channel of the Ouse, from Ely downward to Denver (below which are tidal waters), is filled chiefly by the waters of the Cam or Granta, which joins the Ouse 3 m. above Ely, the Lark (which with its feeder, the Kennett, forms the boundary of the county with Suffolk for a considerable distance) and the Little Ouse, forming part of the boundary with Norfolk.

Geology.—By its geological features, Cambridgeshire is divisible into three well-marked regions; in the south and south-east are the low uplands formed by the Chalk; north of this, but best developed in the south-west, is a clay and greensand area; all the remaining portion is alluvial Fenland. The general strike of the rocks is along a south-west and north-east line, the dip is south-easterly. The oldest rock is the Jurassic Oxford Clay, which appears as an irregular strip of elevated flat ground reaching from Croxton by Conington and Fenny Drayton to Willingham and Rampton. Eastward and northward it no doubt forms the floor of the Fen country, and at Thorney and Whittlesea small patches rise like islands, through the level fen alluvium. The Coralline Oolite, with the Els worth or St Ives rock at the base, occurs as a small patch, covered by Greensand, at Upware, whence many fossils have been obtained; elsewhere its place is taken by the Ampthill Clays, which are passage beds between the Oxford and Kimmeridge Clays. The latter clay lies in a narrow strip by Papworth St Agnes, Oakington and Cottenham; a large irregular outcrop surrounds Haddenham and Ely, and similar occurrences are at March, Chatteris and Manea. Above the Kimmeridge Clay comes the Lower Greensand, sandy for the greater part, but here and there hardened into the condition known as “Carstone,” which has been used as an inferior building-stone. This formation is thickest in the south-west; it extends from the border by Gamlingay, Cuxton and Cottenham, and appears again in outliers at Upware, Ely and Haddenham. The Gault forms a strip of flat ground, 4 to 6 m. wide, running roughly parallel with the course of the river Cam, from Guilden Morden through Cambridge to Soham; it is a stiff blue clay 200 ft. thick in the south-west, but is thinner eastward. At the bottom of the chalk is the Chalk Marl, 10 to 20 ft. thick, with a glauconitic and phosphatic nodule-bearing layer at its base, known as the Cambridge Greensand. This bed has been largely worked for the nodules and for cement; it contains many fossils derived from the Gault below. Several outliers of Chalk Marl lie upon the Gault west of the Cam. The Chalk comprises all the main divisions of the formation, including the Totternhoe stone, Melbourn rock and Chalk rock. Much glacial boulder clay covers all the higher ground of the county; it is a stiff brownish clay with many chalk fragments of travelled rocks. Near Ely there is a remarkable mass of chalk, evidently transported by ice, resting on and surrounded by boulder clay. Plateau gravel caps some of the chalk hills, and old river gravels occur at lower levels with the bones of mammoth, rhinoceros and other extinct mammals. The low-lying Fen beds are marly silt with abundant peat beds and buried forests; at the bottom is a gravel layer of marine origin.

Industries.—The climate is as a whole healthy, the fens being so carefully drained that diseases to which dwellers in marshy districts are commonly liable are practically eliminated. The land is very fertile, and although some decrease is generally apparent in the acreage under grain crops, Cambridgeshire is one of the principal grain-producing counties in England. Nearly nine-tenths of the total area is under cultivation, and an unusually small proportion is under permanent pasture. Wheat is the chief grain crop, but large quantities of barley and oats are also grown. Among green crops potatoes occupy a large and increasing area. Dairy-farming is especially practised in the south-west, where the district of the Cam valley has long been known as the Dairies; and much butter and cheese are sent to the London markets. Sheep are pastured extensively on the higher ground, but the number of these and of cattle for the county as a whole is not large. Beans occupy a considerable acreage, and fruit-growing and market-gardening are important in many parts. There is no large manufacturing industry common to the county in general; among minor trades brewing is carried on at several places, and brick-making and lime-burning may also be mentioned.

Communications.—The principal railway serving the county is the Great Eastern, of which system numerous branch lines centre chiefly upon Cambridge, Ely and March. Cambridge is also served by branches of the Great Northern line from Hitchin, of the London & North-Western from Bletchley and Bedford, and of the Midland from Kettering. A trunk line connecting the eastern counties with the north and north-west of England runs northward from March under the joint working of the Great Northern and Great Eastern companies. The artificial waterways provide the county with an extensive system of inland navigation; and a considerable proportion of the industrial population is employed on these. In this connexion the building of boats and barges is carried on at several towns.

Population and Administration.—The area of the ancient county is 549,723 acres, with a population in 1891 of 188,961, and in 1901 of 190,682. The ancient county includes the two administrative counties of Cambridge in the south and the Isle of Ely in the north. The liberty of the Isle of Ely was formerly of the independent nature of a county palatine, but ceased to be so under acts of 1836 and 1837. Its area is 238,048 acres, and that of the administrative county of Cambridge 315,171 acres. Cambridgeshire contains seventeen hundreds. The municipal

boroughs are Cambridge, the county town (pop. 38,379), in the administrative county of Cambridge, and Wisbech (9381) in the Isle of Ely. The other urban districts are—in the administrative county of Cambridge, Chesterton (9591), and in the Isle of Ely, Chatteris (4711), Ely (7713), March (7565) and Whittlesey (3909). Among other considerable towns Soham (4230) and Littleport (4181), both in the neighbourhood of Ely, may be mentioned. The town of Newmarket, which, although wholly within the administrative county of West Suffolk, is mainly in the ancient county of Cambridgeshire, is famous for its race-meetings. The county is in the south-eastern circuit, and assizes are held at Cambridge. Each administrative county has a court of quarter sessions, and the two are divided into ten petty sessional divisions. The borough of Cambridge has a separate court of quarter sessions, and this borough and Wisbech have separate commissions of the peace. The university of Cambridge exercises disciplinary jurisdiction over its members. There are 168 entire civil parishes in the two administrative counties. Cambridgeshire is almost wholly in the diocese of Ely and the archdeaconries of Ely and Sudbury, but small portions are within the dioceses of St Albans and Norwich. There are 194 ecclesiastical parishes or districts wholly or in part within the county. The parliamentary divisions are three, namely, Northern or Wisbech, Western or Chesterton, and Eastern or Newmarket, each returning one member. The county also contains the parliamentary borough of Cambridge, returning one member; and the university of Cambridge returns two members.

History.—The earliest English settlements in what is now Cambridgeshire were made about the 6th century by bands of Engles, who pushed their way up the Ouse and the Cam, and established themselves in the fen-district, where they became known as the Gyrwas, the districts corresponding to the modern counties of Huntingdonshire and Cambridgeshire being distinguished as the lands of the North Gyrwas and the South Gyrwas respectively. At this period the fen-district stretched southward as far as Cambridge, and the essential unity which it preserved is illustrated later by its inclusion under one sheriff, chosen in successive years from Cambridgeshire proper, the Isle of Ely and Huntingdonshire. In 656 numerous lands in the neighbourhood of Wisbech were included in the endowment of the abbey of Peterborough, and in the same century religious houses were established at Ely and Thorney, both of which, however, were destroyed during the Danish invasions of the 9th century. After the treaty of Wedmore the district became part of the Danelaw. On the expulsion of the Danes by Edward in the 10th century it was included in East Anglia, but in the 11th century was again overrun by the Danes, who in the course of their devastations burnt Cambridge. The first mention of the shire in the Saxon Chronicle records the valiant resistance which it opposed to the invaders in 1010 when the rest of East Anglia had taken ignominious flight. The shire-system of East Anglia was in all probability not definitely settled before the Conquest, but during the Danish occupation of the 9th century the district possessed a certain military and political organization round Cambridge, its chief town, whence probably originated the constitution and demarcation of the later shire. At the time of the Domesday Survey the county was divided as now, except that the Isle of Ely, which then formed two hundreds having their meeting-place at Witchford, is now divided into the four hundreds of Ely, Wisbech, North Witchford and South Witchford, while Cambridge formed a hundred by itself. The hundred of Flendish was then known as Flamingdike. Cambridgeshire was formerly included in the diocese of Lincoln, until, on the erection of Ely to a bishop’s see in 1109, almost the whole county was placed in that diocese. In 1291 the whole county, with the exception of parishes in the deanery of Fordham and diocese of Norwich, constituted the archdeaconry of Ely, comprising the deaneries of Ely, Wisbech, Chesterton, Cambridge, Shingay, Bourn, Barton and Camps. The Isle of Ely formerly constituted an independent franchise in which the bishops exercised quasi-palatinate rights, and offences were held to be committed against the bishop’s peace. These privileges were considerably abridged in the reign of Henry VIII., but the Isle still had separate civil officers, appointed by the bishop, chief among whom were the chief justice, chief bailiff, deputy bailiff and two coroners. The bishop is still *custos rotulorum* of the Isle. Cambridgeshire has always been remarkable for its lack of county families, and for the frequent changes in the ownership of estates. No Englishmen retained lands of any importance after the Conquest, and at the time of the Domesday Survey the chief lay proprietors were Alan, earl of Brittany, whose descendants the Zouches retained estates in the county until the 15th century; Picot the sheriff, whose estates passed to the families of Peverell and Peche; Aubrey de Vere, whose descendants retained their estates till the 16th century; and Hardwinus de Scalariis, ancestor of the Scales of Whaddon.

From the time of Hereward’s famous resistance to the Conqueror in the fen-district, the Isle of Ely was intimately concerned with the great political struggles of the country. It was defended against Stephen by Bishop Nigellus of Ely, who fortified Ely and Aldreth, and the latter in 1144 was held for the empress Maud by Geoffrey de Mandeville. During the struggles between John and his barons, Faukes de Breauté was made governor of Cambridge Castle, which, however, surrendered to the barons in the same year. The Isle of Ely was seized by the followers of Simon de Montfort in 1266, but in 1267 was taken by Prince Edward. At the Reformation period the county showed much sympathy with the Reformers, and in 1642 the knights, gentry and commoners of Cambridgeshire petitioned for the removal of all unwarrantable orders and dignities, and the banishment of popish clergy. In the civil war of the 17th century Cambridgeshire was one of the associated counties in which the king had no visible party, though the university assisted him with contributions of plate and money.

Cambridgeshire has always been mainly an agricultural county. The Domesday Survey mentions over ninety mills and numerous valuable fisheries, especially eel-fisheries, and contains frequent references to wheat, malt and honey. The county had a flourishing wool-industry in the 14th century, and became noted for its worsted cloths. The Black Death of 1349 and the ravages committed during the Wars of the Roses were followed by periods of severe depression, and in 1439 several Cambridgeshire towns obtained a remission of taxation on the plea of poverty. In the 16th century barley for malt was grown in large quantities in the south, and the manufacture of willow-baskets was carried on in the fen-districts. Saffron was extensively cultivated in the 18th century, and paper was manufactured near Sturbridge. Sturbridge fair was at this period reckoned the largest in Europe, the chief articles of merchandise being wool, hops and leather; and the Newmarket races and horse-trade were already famous. Large waste areas were brought under cultivation in the 17th century through the drainage of the fen-district, which was brought to completion about 1652 through the labours of Cornelius Vermuyden, a Dutchman. The coprolite industry was very profitable for a short period from 1850 to 1880, and its decline was accompanied by a general industrial and agricultural depression. Cambridgeshire returned three members to parliament in 1290, and in 1295 the county returned two members, the borough of Cambridge two members, and the city of Ely two members, this being the sole return for Ely. The university was summoned to return members in 1300 and again in 1603, but no returns are recorded before 1614, after which it continued to return two members. Under the Reform Act of 1832 the county returned three members.

Antiquities.—In ecclesiastical architecture Cambridgeshire would be rich only in the possession of the

magnificent cathedral at Ely and the round church of the Holy Sepulchre, Jesus College and King's College chapels, and many other examples in Cambridge. But there are many fine churches elsewhere. At Thorney, a small town in the north of the county, which owes much in appearance to the 8th duke of Bedford (d. 1872), the parish church is actually a portion of the church of an abbey said to date originally from the 7th century, and refounded in 972 by Ethelwold, bishop of Winchester, as a Benedictine monastery. The church is partly fine Norman. Another Norman building of special interest is Sturbridge chapel near Cambridge, which belonged to a lepers' hospital. To this foundation King John granted a fair, which became, and continued until the 18th century, one of the most important in England. It is still held in September. At Swaffham Prior there are remains of two churches in one churchyard, the tower of one being good Transitional Norman, while that of the other is Perpendicular, the upper part octagonal. Among many Early English examples the church of Cherry Hinton near Cambridge may be mentioned. The churches of Trumpington and Bottisham are fine specimens of the Decorated style; in the first is a famous brass to Sir Roger de Trumpington (1289). As Perpendicular examples the tower and spire of St Mary's, Whittlesey, and the rich wooden roof of Outwell church, may be selected. Monastic remains are scanty. Excluding the town of Cambridge there are no domestic buildings, either ancient or modern, of special note, with the exception of Sawston Hall, in the south of the county, a quadrangular mansion dated 1557-1584.

AUTHORITIES.—See D. and S. Lysons, *Magna Britannia*, vol. ii. part i. (London, 1808); C.C. Babington, *Ancient Cambridgeshire* (Cambridge, 1883); R. Bowes, *Catalogue of Books printed at or relating to Cambridge* (Cambridge, 1891 et seq.); E. Conybeare, *History of Cambridgeshire* (London, 1897); *Victoria County History, Cambridgeshire*.

CAMBUSLANG, a town of Lanarkshire, Scotland. It is situated near the Clyde, 4½ m. S.E. of Glasgow (of which it is a residential suburb) by the Caledonian railway. Pop. (1891) 8323; (1901) 12,252. Its leading industries include coal-mining, turkey-red dyeing and brick-making. It contains one of the largest steel works in the United Kingdom. Among the chief edifices are a public hall, institute and library. It was the birthplace of John Claudius London (1783-1843), the landscape gardener and writer on horticulture, whose *Arboretum et Fruticetum Britannicum* still ranks as an authority.

CAMBYSES (Pers. *Kambujiya*), the name borne by the father and the son of Cyrus the Great. When Cyrus conquered Babylon in 539 he was employed in leading religious ceremonies (*Chronicle of Nabonidus*), and in the cylinder which contains Cyrus's proclamation to the Babylonians his name is joined to that of his father in the prayers to Marduk. On a tablet dated from the first year of Cyrus, Cambyses is called king of Babel. But his authority seems to have been quite ephemeral; it was only in 530, when Cyrus set out on his last expedition into the East, that he associated Cambyses on the throne, and numerous Babylonian tablets of this time are dated from the accession and the first year of Cambyses, when Cyrus was "king of the countries" (*i.e.* of the world). After the death of his father in the spring of 528 Cambyses became sole king. The tablets dated from his reign in Babylonia go down to the end of his eighth year, *i.e.* March 521 B.C.[1] Herodotus (iii. 66), who dates his reign from the death of Cyrus, gives him seven years five months, *i.e.* from 528 to the summer of 521. For these dates cf. Ed. Meyer, *Forschungen zur alien Geschichte*, ii. 470 ff.

The traditions about Cambyses, preserved by the Greek authors, come from two different sources. The first, which forms the main part of the account of Herodotus (iii. 2; 4; 10-37), is of Egyptian origin. Here Cambyses is made the legitimate son of Cyrus and a daughter of Apries (Herod, iii. 2, Dinon fr. 11, Polyaen. viii. 29), whose death he avenges on the successor of the usurper Amasis. (In Herod, iii. 1 and Ctesias *ap*. Athen. xiii. 560 D, this tradition is corrected by the Persians: Cambyses wants to marry a daughter of Amasis, who sends him a daughter of Apries instead of his own daughter, and by her Cambyses is induced to begin the war.) His great crime is the killing of the Apis, for which he is punished by madness, in which he commits many other crimes, kills his brother and his sister, and at last loses his empire and dies from a wound in the hip, at the same place where he had wounded the sacred animal. Intermingled are some stories derived from the Greek mercenaries, especially about their leader Phanes of Halicarnassus, who betrayed Egypt to the Persians. In the Persian tradition the crime of Cambyses is the murder of his brother; he is further accused of drunkenness, in which he commits many crimes, and thus accelerates his ruin. These traditions are found in different passages of Herodotus, and in a later form, but with some trustworthy detail about his household, in the fragments of Ctesias. With the exception of Babylonian dated tablets and some Egyptian inscriptions, we possess no contemporary evidence about the reign of Cambyses but the short account of Darius in the Behistun inscription. It is impossible from these sources to form a correct picture of Cambyses' character; but it seems certain that he was a wild despot and that he was led by drunkenness to many atrocious deeds.

It was quite natural that, after Cyrus had conquered Asia, Cambyses should undertake the conquest of Egypt, the only remaining independent state of the Eastern world. Before he set out on his expedition he killed his brother Bardiya (Smerdis), whom Cyrus had appointed governor of the eastern provinces. The date is given by Darius, whereas the Greek authors narrate the murder after the conquest of Egypt. The war took place in 525, when Amasis had just been succeeded by his son Psammetichus III. Cambyses had prepared for the march through the desert by an alliance with Arabian chieftains, who brought a large supply of water to the stations. King Amasis had hoped that Egypt would be able to withstand the threatened Persian attack by an alliance with the Greeks. But this hope failed; the Cyprian towns and the tyrant Polycrates of Samos, who possessed a large fleet, now preferred to join the Persians, and the commander of the Greek troops, Phanes of Halicarnassus, went over to them. In the decisive battle at Pelusium the Egyptians were beaten, and shortly afterwards Memphis was taken. The captive king Psammetichus was executed, having attempted a rebellion. The Egyptian inscriptions

show that Cambyses officially adopted the titles and the costume of the Pharaohs, although we may very well believe that he did not conceal his contempt for the customs and the religion of the Egyptians. From Egypt Cambyses attempted the conquest of Ethiopia (Cush), *i.e.* the kingdom of Napata and Meroe, the modern Nubia. But his army was not able to cross the deserts; after heavy losses he was forced to return. In an inscription from Napata (in the Berlin museum) the Ethiopian king Nastesen relates that he had beaten the troops of Kembasuden, *i.e.* Cambyses, and taken all his ships (H. Schäfer, *Die Aethiopische Königsinschrift des Berliner Museums*, 1901). Another expedition against the great oasis failed likewise, and the plan of attacking Carthage was frustrated by the refusal of the Phoenicians to operate against their kindred. Meanwhile in Persia a usurper, the Magian Gaumata, arose in the spring of 522, who pretended to be the murdered Bardiya (Smerdis). He was acknowledged throughout Asia. Cambyses attempted to march against him, but, seeing probably that success was impossible, died by his own hand (March 521). This is the account of Darius, which certainly must be preferred to the traditions of Herodotus and Ctesias, which ascribe his death to an accident. According to Herodotus (iii. 64) he died in the Syrian Ecbatana, *i.e.* Hamath; Josephus (*Ant.* xi. 2. 2) names Damascus; Ctesias, Babylon, which is absolutely impossible.

See A. Lincke, *Kambyses in der Sage, Litteratur und Kunst des Mittelalters*, in *Aegyptiaca: Festschrift für Georg Ebers* (Leipzig 1897), pp. 41-61; also PERSIA: *Ancient History*. (Ed. M.)

1 On the much discussed tablet, which is said to date from his 11th year, the writer had at first written "10th year of Cyrus," and then corrected this date into "1st year of Cambyses"; see Strassmaier, *Inschriften von Cambyses*, No. 97.

CAMDEN, CHARLES PRATT, 1ST EARL (1714-1794), lord chancellor of England, was born in Kensington in 1714. He was a descendant of an old Devonshire family of high standing, the third son of Sir John Pratt, chief-justice of the king's bench in the reign of George I. He received his early education at Eton and King's College, Cambridge. In 1734 he became a fellow of his college, and in the following year obtained his degree of B.A. Having adopted his father's profession, he had entered the Middle Temple in 1728, and ten years later he was called to the bar. He practised at first in the courts of common law, travelling also the western circuit. For some years his practice was so limited, and he became so much discouraged, that he seriously thought of turning his back on the law and entering the church. He listened, however, to the advice of his friend Sir Robert Henley, a brother barrister, afterwards known as Lord Chancellor Northington, and persevered, working on and waiting for success. The first case which brought him prominently into notice and gave him assurance of ultimate success was the government prosecution, in 1752, of a bookseller, William Owen, for a libel on the House of Commons.

His speech for the defence contributed much to the verdict for the defendant. In 1757, through the influence of William Pitt (afterwards earl of Chatham), with whom he had formed an intimate friendship while at Eton, he received the appointment of attorney-general. The same year he entered the House of Commons as member for the borough of Downton in Wiltshire. He sat in parliament four years, but did not distinguish himself as a debater. His professional practice now largely increased. One of the most noticeable incidents of his tenure of office as attorney-general was the prosecution of Dr. J. Shebbeare (1709-1788), a violent party writer of the day, for a libel against the government contained in his notorious *Letters to the People of England*, which were published in the years 1756-1758. As a proof of Pratt's moderation in a period of passionate party warfare and frequent state trials, it is noted that this was the only official prosecution for libel which he set on foot. In January 1762 Pratt was raised to the bench as chief-justice of the common pleas. He was at the same time knighted. Soon after his elevation the nation was thrown into great excitement about the prosecution of John Wilkes, and the question involved in it of the legality of "general warrants." Chief-Justice Pratt pronounced, with decisive and almost passionate energy, against their legality, thus giving voice to the strong feeling of the nation and winning for himself an extraordinary degree of popularity as one of the "maintainers of English constitutional liberty." Honours fell thick upon him in the form of addresses from the city of London and many large towns, and of presentations of freedom from various corporate bodies. In July 1765 he was raised to the peerage as Baron Camden, of Camden Place, in the county of Kent; and in the following year he was removed from the court of common pleas to take his seat as lord chancellor (July 30, 1766). This seat he retained less than four years; for although he discharged its duties in so efficient a manner that, with one exception, his decisions were never reversed on appeal, he took up a position of such uncompromising hostility to the governments of the day, the Grafton and North administrations, on the greatest and most exciting matters, the treatment of the American colonies and the proceedings against John Wilkes, that the government had no choice but to require of him the surrender of the great seal. He retired from the court of chancery in January 1770, but he continued to take a warm interest in the political affairs and discussions of the time. He continued steadfastly to oppose the taxation of the American colonists, and signed, in 1778, the protest of the Lords in favour of an address to the king on the subject of the manifesto of the commissioners to America. In 1782 he was appointed president of the council under the Rockingham administration, but retired in the following year. Within a few months he was reinstated in this office under the Pitt administration, and held it till his death. Lord Camden was a strenuous opponent of Fox's India Bill, took an animated part in the debates on important public matters till within two years of his death, introduced in 1786 the scheme of a regency on occasion of the king's insanity, and to the last zealously defended his early views on the functions of juries, especially of their right to decide on all questions of libel. He was raised to the dignity of an earl in May 1786, and was at the same time created Viscount Bayham. Earl Camden died in London on the 18th of April 1794. His remains were interred in Seale church in Kent.

CAMDEN, JOHN JEFFREYS PRATT, 2ND EARL and 1ST MARQUESS (1759-1840), only son of the 1st earl, was born on the 11th of February 1750, and was educated at Trinity College, Cambridge. In 1780 he was chosen member of parliament for Bath, and he obtained the lucrative position of teller of the exchequer, an office which

he kept until his death, although after 1812 he refused to receive the large income arising from it. In the ministry of William Pitt, Pratt was successively a lord of the admiralty and a lord of the treasury; then, having succeeded his father in the earldom in 1794, he was appointed lord-lieutenant of Ireland in 1795. Disliked in Ireland as an opponent of Roman Catholic emancipation and as the exponent of an unpopular policy, Camden's term of office was one of commotion and alarm, culminating in the rebellion of 1798. Immediately after the suppression of the rising he resigned, and in 1804 became secretary for war and the colonies under Pitt, and in 1805 lord president of the council. He was again lord president from 1807 to 1812, after which date he remained for some time in the cabinet without office. In 1812 he was created earl of Brecknock and Marquess Camden. He died on the 8th of October 1840, and was succeeded by his only son, George Charles, 2nd marquess (1799-1866). The present marquess is his descendant. Camden was chancellor of the university of Cambridge and a knight of the Garter.

CAMDEN, WILLIAM (1551-1623), English antiquary and historian, was born in London on the 2nd of May 1551. His father, Sampson Camden, a native of Lichfield, had settled in London, and, as a painter, had become a member of the company of painter-stainers. His mother, Elizabeth, belonged to the old Cumberland family of Curwen. Young Camden received his early education at Christ's Hospital and St Paul's school, and in 1566 went to Magdalen College, Oxford, probably as a servitor or chorister. Failing to obtain a demyship at Magdalen he removed to Broadgates Hall, afterwards Pembroke College, and later to Christ Church, where he was supported by his friend, Dr Thomas Thornton, canon of Christ Church. As a defender of the established religion he was soon engaged in controversy, and his failure to secure a fellowship at All Souls' College is attributed to the hostility of the Roman Catholics. In 1570 he supplicated in vain for the degree of B.A., and although a renewed application was granted in 1573 it is doubtful if he ever took a degree; and in 1571 he went to London and devoted himself to antiquarian studies, for which he had already acquired a taste.

Camden spent some time in travelling in various parts of England collecting materials for his *Britannia*, a work which was first published in 1586. Owing to his friendship with Dr Gabriel Goodman, dean of Westminster, Camden was made second master of Westminster school in 1575; and when Dr Edward Grant resigned the headmastership in 1593 he was appointed as his successor. The vacations which he enjoyed as a schoolmaster left him time for study and travel, and during these years he supervised the publication of three further editions of the *Britannia*. Although a layman he was granted the prebend of Ilfracombe in 1589, and in 1597 he resigned his position at Westminster on being made Clarencieux king-at-arms, an appointment which caused some ill-feeling, and the York herald, Ralph Brooke, led an attack on the genealogical accuracy of the *Britannia*, and accused its author of plagiarism. Camden replied to Brooke in an appendix to the fifth edition of the *Britannia*, published in 1600, and his reputation came through the ordeal untarnished. Having brought out an enlarged and improved edition of the *Britannia* in 1607, he began to work on a history of the reign of Queen Elizabeth, to which he had been urged by Lord Burghley in 1597. The first part of this history dealing with the reign down to 1588 was published in 1615 under the title *Annales rerum Anglicarum et Hibernicarum regnante Elizabetha*. With regard to this work some controversy at once arose over the author's treatment of Mary, queen of Scots. It was asserted that Camden altered his original narrative in order to please James I., and, moreover, that the account which he is said to have given to his friend, the French historian, Jacques de Thou, differed substantially from his own. It seems doubtful if there is any truth in either of these charges. The second part of this work, finished in 1617, was published, after the author's death, at Leiden in 1625 and in London in 1627. In 1622 Camden carried out a plan to found a history lectureship at Oxford. He provided an endowment from some lands at Bexley, and appointed as the first lecturer, his friend, Degory Wheare. The present occupant of the position is known as the Camden professor of ancient history. His concluding years were mainly spent at Chislehurst, where he had taken up his residence in 1609, and in spite of recurring illnesses he continued to work at material for the improvement of the *Britannia* and kindred subjects. He died at Chislehurst on the 9th of November 1623, and was buried in Westminster Abbey, where a monument now stands to his memory.

The *Britannia*, the first edition of which is dedicated to Burghley, is a survey of the British islands written in elegant Latin. It was first translated into English in 1610, probably under the author's direction, and other translations have subsequently appeared, the best of which is an edition edited by Richard Gough and published in three volumes in 1789, and in four volumes in 1806. The *Annales* has been translated into French, and English translations appeared in 1635, 1675 and 1688. The Latin version was published at Leiden in 1639 and 1677, and under the editorship of T. Hearne at Oxford in 1717. In addition to these works Camden compiled a Greek grammar, *Institutio Graecae Grammatices Compendiaria*, which became very popular, and he published an edition of the writings of Asser, Giraldus Cambrensis, Thomas Walsingham and others, under the title, *Anglica, Hibernica, Normannica, Cambrica, a veteribus scripta*, published at Frankfort in 1602, and again in 1603. He also drew up a list of the epitaphs in Westminster Abbey, which was issued as *Reges, Reginae, Nobiles et alii in ecclesia collegiata Beati Petri Westmonasterii sepulti*. This was enlarged and published again in 1603 and 1606. In 1605 he published his *Remains concerning Britain*, a book of collections from the *Britannia*, which quickly passed through seven editions; and he wrote an official account of the trial of the Gunpowder Plot conspirators as *Actio in Henricum Garnetum, Societatis Jesuiticae in Anglia superiorem et caeteros*.

Camden, who refused a knighthood, was a man of enormous industry, and possessed a modest and friendly disposition. He had a large number of influential friends, among whom were Archbishop Ussher, Sir Robert Cotton, John Selden, the French jurist Brisson, and Isaac Casaubon. His correspondence was published in London in 1691 by Dr Thomas Smith under the title, *Vita Gulielmi Camdeni et Illustrium virorum ad G. Camdenum Epistolae*. This-volume also contains his *Memorabilia de seipso*; his notes of the reign of James I.; and other interesting matter. In 1838 the Camden Society was founded in his honour, and much valuable work has been done under its auspices.

CAMDEN, a city and the county-seat of Camden county, New Jersey, U.S.A., on the Delaware river, directly opposite Philadelphia, Pa. Pop. (1880) 41,659; (1890) 58,313; (1900) 75,935, of whom 10,097 were foreign-born and 5576 were negroes; (1910) 94,538. It is a terminus of the Atlantic City, the West Jersey & Sea Shore, and the Pennsylvania (Amboy division) railways, and is also served by river and coasting steamboat lines. Camden is practically a suburb of Philadelphia, with which it is connected by ferries. It has several pleasant residential sections, and among its public buildings are the city hall, the Camden county court house, the post office, the free public library, the Cooper hospital and the West Jersey homeopathic hospital. The high school has a thoroughly equipped manual training department. The city owns and operates its water-works system, and is an important manufacturing and ship-building centre, among its manufactories being chemical works; asbestos, wall-paper, oil-cloth and morocco-leather factories; woollen, worsted and yarn mills; preserving factories; iron and steel mills; boot and shoe factories; and ship-yards. In 1900 the total value of the city's manufactured products was $20,451,874 (of which $17,969,954 was the value of factory products, which in 1905 had increased 86.5% to $33,587,273), several of the largest items being worsted goods ($2,090,991 in 1900, and $2,528,040 in 1905); leather, tanned, curried and finished ($1,515,935 in 1900, and $6,364,928 in 1905); oil-cloth ($1,638,556 in 1900); pickles, preserves and sauces ($685,358 in 1900), and wooden ships and boats ($409,500 in 1900, and $361,089 in 1905, when the value of the iron and steel ship-building industry was $4,673,504). The first settlers on the site of Camden came in 1679, but for a century the settlement consisted of isolated farms and a small group of houses about the ferry by which travellers from the east crossed to Philadelphia. The early settlers were largely Quakers. About 1773 Jacob Cooper laid out a town near the ferry, and gave it the name Camden in honour of Lord Chancellor Camden, who had been one of the strongest opponents of the Stamp Act. The settlement, however, was known variously as "Pluckemin," "The Ferry" and "Cooper's Ferry" until about the time of the War of 1812. Until 1828 it was administratively a part of the town of Newton, Gloucester county, but in that year, with more than a thousand inhabitants, it was chartered as a city under its present name. During the British occupation of Philadelphia in the War of Independence, a British force was stationed here, and Camden was the scene of several skirmishes between the British troops and the New Jersey irregular militia. Camden was the home of Walt Whitman from 1873 until his death.

CAMDEN, a town and the county-seat of Kershaw county, South Carolina, U.S.A., near the Wateree river, 33 m. N.E. of Columbia. Pop. (1890) 3533; (1900) 2441; this decrease was due to the separation from Camden during the decade of its suburb "Kirkwood," re-annexed in 1905; (1910) 3569. It is served by the Atlantic Coast Line, the Seaboard Air Line and the Southern railways. Camden is situated about 100 ft. above the river, which is navigable to this point. The town is a winter resort, chiefly for Northerners. Cotton, grain and rice are produced in the vicinity, and there are some manufactories, including cotton mills, a cotton-seed oil mill and planing mills. Camden, first known as Pine Tree Hill, is one of the oldest interior towns of the state, having been settled in 1758; in 1768 the present name was adopted in honour of Lord Chancellor Camden. The town was first incorporated in 1791; its present charter dates from 1890. For a year following the capture of Charleston by the British in May 1780, during the War of Independence, Camden was the centre of important military operations. It was occupied by the British under Cornwallis in June 1780, was well fortified and was garrisoned by a force under Lord Rawdon. On the 16th of August Gen. Horatio Gates, with an American force of about 3600, including some Virginia militia under Charles Porterfield (1750-1780) and Gen. Edward Stevens (1745-1820), and North Carolina militia under Gen. Richard Caswell (1729-1789), was defeated here by the British, about 2000 strong, under Lord Cornwallis, who had joined Rawdon in anticipation of an attack by Gates. Soon after the engagement began a large part of the Americans, mostly North Carolina and Virginia militia, fled precipitately, carrying Gates with them; but Baron De Kalb and the Maryland troops fought bravely until overwhelmed by numbers, De Kalb himself being mortally wounded. A monument was erected to his memory in 1825, Lafayette laying the corner-stone. The British loss in killed, wounded and missing was 324; the American loss was about 800 or 900 killed and 1000 prisoners, besides arms and baggage. On the 3rd of December Gates was superseded by Gen. Nathanael Greene, who after Cornwallis had left the Carolinas, advanced on Camden and arrived in the neighbourhood on the 19th of April 1781. Considering his force (about 1450) insufficient for an attack on the fortifications, he withdrew a short distance north of Camden to an advantageous position on Hobkirk's Hill, where on the 25th of April Rawdon, with a force of only 950, took him somewhat by surprise and drove him from the field. The casualties on each side were nearly equal: American 271; British 258. On the 8th of May Rawdon evacuated the town, after burning most of it. On the 24th of February 1865, during the Civil War, a part of Gen. W.T. Sherman's army entered Camden and burned stores of tobacco and cotton, and several buildings. (See American War of Independence.)

See also T.J. Kirkland and R.M. Kennedy, *Historic Camden* (Columbia, S.C., 1905).

CAMEL (from the Arabic *Djemal* or the Heb. *Gamal*), the name of the single-humped Arabian *Camelus dromedarius*, but also applied to the two-humped central Asian *C. bactrianus* and to the extinct relatives of both. The characteristics of camels and their systematic position are discussed under the headings Tylopoda and Artiodactyla. The two living species are distinguishable at a glance. It may be mentioned that the Bactrian camel, which is a shorter-legged and more ponderous animal than the Arabian species, grows an enormously long and thick winter coat, which is shed in blanket-like masses in spring. The Arabian camel, which is used not only in the country from which it takes its name, but also in North Africa and India, and has been introduced into Australia and North America, is known only as a domesticated animal. On the other hand, the Bactrian species, which is employed throughout a large tract of central Asia in the domesticated condition, appears, according to recent researches, to exist in the wild state in some of the central Asian deserts. From the examination of specimens collected by Dr Sven Hedin, Professor W. Leche shows that the wild Bactrian camel differs from the domesticated

breed of central Asia in the following external characters: the humps are smaller; the long hair does not occupy nearly so much of the body; the colour is much more rufous; and the ears and muzzle are shorter. Many important differences are also recorded between the skulls of the two animals, and it is especially noteworthy that the last lower molar is smaller in the wild than in the tame race. In connexion with this point it should be noticed that, unlike what occurs in the yak, the wild animal is not larger than the tame one, although it is incorrect to say that the former is decidedly the inferior of the latter in point of stature. Dr Leche also institutes a comparison between the skeletons of the wild and the tame Bactrian camel with the remains of certain fossil Asiatic camels, namely, *Camelus knoblochi* from Sarepta, Russia, and *C. alutensis* from the Aluta valley, Rumania. This comparison leads to the important conclusion that the wild Bactrian *Camelus bactrianus ferus* comes much nearer to the fossil species than it does to the domesticated breed, the resemblance being specially noticeable in the absolutely and relatively small size of the last molar. In view of these differences from the domesticated breed, and the resemblance of the skull or lower jaw to that of the extinct European species, it becomes practically impossible to regard the wild camels as the offspring of animals that have escaped from captivity.

On the latter hypothesis it has been generally assumed that the wild camels are the descendants of droves of the domesticated breed which escaped when certain central Asian cities were overwhelmed by sand-storms. This theory, according to Professor Leche, is rendered improbable by Dr Sven Hedin's observations on the habits and mode of life of the wild camel. The habitat of the latter extends from the lower course of the Keria river to the desert at the termination of that river, and thence to the neighbourhood of the Achik, the ancient bed of the Tarim river. These animals also occur in the desert district south of the Tarim; but are most abundant in the deserts and mountains to the southward of Kuruktagh, where there are a few brackish-water pools, and are also common in the barren mountains between Kuruktagh and Choetagh. Large herds have also been observed in the deserts near Altyntagh. The capacity of camels for travelling long distances without water—owing to special structural modifications in the stomach—is familiar to all. That the Arabian species was one of the earliest animals to be domesticated is evident from the record of Scripture, where six thousand camels are said to have formed part of the wealth of the patriarch Job. Camels also formed part of the present which Pharaoh gave to Abraham, and it was to a company of Ishmaelites travelling from Gilead to Egypt on camels, laden with spices, much as their Arabian descendants do at the present day, that Joseph was sold by his brothers.

The hump (or humps) varies in size according to the condition of the animal, becoming small and flaccid after hard work and poor diet.

During the rutting-season male camels become exceedingly savage and dangerous, uttering a loud bubbling roar and engaging in fierce contests with their fellows. The female carries her young for fully eleven months, and produces only one calf at a time, which she suckles for a year. Eight days after birth the young Arabian camel stands 3 ft. high, but does not reach its full growth till its sixteenth or seventeenth year; it lives from forty to fifty years. The flesh of the young camel resembles veal, and is a favourite food of the Arabs, while camel's milk forms an excellent and highly nutritious beverage, although it does not furnish butter. The long hair is shorn every summer, and woven into a variety of stuffs used by the Arab for clothing himself and his family, and covering his tent. It was in raiment of camel's hair that John the Baptist appeared as a preacher. The hair imported into Europe is chiefly used in the manufacture of small brushes used by painters, while the thick hide is formed into a very durable leather. The droppings are used as fuel, and from the incinerated remains of these sal-ammoniac is extracted, which was at one time largely exported from Egypt.

The Bactrian camel is, if possible, of still more importance to many of the central Asian Mongol races, supplying them alike with food and raiment. It is, however, as "the ship of the desert," without which vast tracts of the earth's surface could scarcely be explored, that the camel is specially valuable. In its fourth year its training as a beast of burden begins, when it is taught to kneel and to rise at a given signal, and is gradually accustomed to bear increasing loads. These vary in weight from 500 to 1000 lb., according to the variety of camel employed, for of the Arabian camel there are almost as many breeds as there are of the horse. When crossing a desert camels are expected to carry their loads 25 m. a day for three days without drink, getting a supply of water, however, on the fourth; but the fleeter breeds will carry their rider and a bag of water 50 m. a day for five days without drinking. When too heavily laden the camel refuses to rise, but on the march it is exceedingly patient under its burden, only yielding beneath it to die. Relieved from its load it does not, like other animals, seek the shade, even when that is to be found, but prefers to kneel beside its burden in the broad glare of the sun, seeming to luxuriate in the burning sand. When overtaken by a dust-storm it falls on its knees, and stretching its neck along the sand, closes its nostrils and remains thus motionless till the atmosphere clears; and in this position it affords some shelter to its driver, who, wrapping his face in his mantle, crouches behind his beast.

The food of the camel consists chiefly of the leaves of trees, shrubs and dry hard vegetables, which it is enabled to tear down and masticate by means of its powerful front teeth. As regards temperament, if, writes Sir F. Palgrave, "docile means stupid, well and good; in such a case the camel is the very model of docility. But if the epithet is intended to designate an animal that takes an interest in its rider so far as a beast can, that in some way understands his intentions, or shares them in a subordinate fashion, that obeys from a sort of submissive or half-fellow-feeling with his master, like the horse or elephant, then I say that the camel is by no means docile—very much the contrary. He takes no heed of his rider, pays no attention whether he be on his back or not, walks straight on when once set agoing, merely because he is too stupid to turn aside, and then should some tempting thorn or green branch allure him out of the path, continues to walk on in the new direction simply because he is too dull to turn back into the right road. In a word, he is from first to last an undomesticated and savage animal rendered serviceable by stupidity alone, without much skill on his master's part, or any co-operation on his own, save that of an extreme passiveness. Neither attachment nor even habit impresses him; never tame, though not wide-awake enough to be exactly wild."

For extinct camels see Tylopoda.

(R. L.*)

The Biblical expression (Matt. xix. 24, &c.), "it is easier for a camel to go through a needle's eye," &c., is sometimes explained by saying that the "needle's eye" means the small gate which is opened in the great gate of a city, when the latter is closed for the night; but recent criticism (*e.g.* Post in *Hastings' Dict.*, under "Camel") throws doubt on this explanation, and assumes that the more violent hyperbole is intended. There is a various reading κάμιλος (cable) for κάμηλος (camel), but Cheyne, in the *Ency. Biblica*, rejects this (see Cable).

CAMELFORD, THOMAS PITT, 1st Baron (1737-1793), English politician and art patron, was a nephew of the 1st earl of Chatham. He sat in parliament from 1761 till 1784, siding against his uncle and following George Grenville, who was also a relative; and in 1784 he was raised to the peerage. He dabbled in architecture and the arts generally, and was a prominent figure in the artistic circles of his day. His son Thomas Pitt, 2nd Baron Camelford (1775-1804), who succeeded him in 1793, had an adventurous and misspent career in the navy, but is principally remembered for his death in a duel with Mr Best on the 10th of March 1804, the title becoming extinct.

CAMELLIA, a genus or subgenus of evergreen trees or shrubs belonging to the natural order Ternstroemiaceae, with thick dark shining leaves and handsome white or rose-coloured flowers. The name *Camellia* was given by Linnaeus in honour of George Joseph Camellus or Kamel, a Moravian Jesuit who travelled in Asia and wrote an account of the plants of the Philippine Island, Luzon, which is included in the third volume of John Ray's *Historia Plantarum* (1704). Modern botanists are agreed that the tea-plant, placed by Linnaeus in a separate genus, *Thea*, is too nearly allied to *Camellia* to admit of the two being regarded as distinct genera. *Thea* and *Camellia* are therefore now considered to represent one genus, which has been generally called *Camellia*, but more correctly *Thea*, as this name was the earlier of the two. Under the latter view *Camellia* is regarded as a subgenus or section of *Thea*. It contains about eight species, natives of India, China and Japan. Most of the numerous cultivated forms are horticultural products of *C. japonica*, a native of China and Japan, which was introduced into Europe by Lord Petre in 1739. The wild plant has red flowers, recalling those of the wild rose, but most of the cultivated forms are double. In the variety *anemonaeflora* nearly all the stamens have become transformed into small petaloid structures which give the flower the appearance of a double anemone.

Another species, *C. reticulata*, a native of Hongkong, is also prized for its handsome flowers, larger than those of *C. japonica*, which are of a bright rose colour and as known in cultivation semi-double or double.

Both *C. sasanqua* and *C. drupifera*, the former inhabiting Japan and China, the latter Cochin-China and the mountains of India, are oil-yielding plants. The oil of *C. sasanqua* (of which sasankwa is the native Japanese name) has an agreeable odour and is used for many domestic purposes. It is obtained from the seeds by subjecting them to pressure sufficient to reduce them to a coarse powder, and then boiling and again pressing the crushed material. The leaves are also used in the form of a decoction by the Japanese women for washing their hair; and in a dried state they are mixed with tea on account of their pleasant flavour. The oil of *C. drupifera*, which is closely allied to *C. sasanqua*, is used medicinally in Cochin-China. The flowers of these two species, unlike those of *C. japonica* and *C. reticulata*, are odoriferous.

Camellias, though generally grown in the cool greenhouse, are hardy in the south of England and the south-west of Scotland and Ireland. They grow best in a rich compost of sandy peat and loam, and should not be allowed to get too dry at the roots; a liberal supply of water is especially necessary during the flowering period. The best position—when grown out of doors—is one facing north or north-west, with a wall or hedge behind for protection from cold winds. July is the best time for planting; care must be taken that the roots are evenly spread, not matted into a ball.

The plants are propagated by layers or cuttings, and the single-flowered ones also by seeds. Cuttings are taken in August and placed in sandy peat or loam in a cold shaded frame. In the following spring those which have struck are placed in a gentle heat, and in September or October the rooted plants are potted off. Camellias are also propagated by grafting or inarching in early spring on stocks of the common variety of *C. japonica.*

The scale insect sometimes attacks the camellia. To remove the white scale, the plants are washed with a sponge and solution of soft soap as soon as their growth is completed, and again before the buds begin to swell. The brown scale may be got rid of by repeated washings with one of the many insecticides, but it should be applied at a temperature of 90°.

CAMEO, a term of doubtful origin, applied in the first instance to engraved work executed in relief on hard or precious stones. It is also applied to imitations of such stones in glass, called "pastes," or on the shells of molluscous animals. A cameo is therefore the converse of an intaglio, which consists of an incised or sunk engraving in the same class of materials. For the history of this branch of art, and for an account of some of its most remarkable examples, see Gem.

The origin of the word is doubtful and has been a matter of copious controversy. The *New English Dictionary* quotes its use in a Sarum inventory of 1222, *"lapis unus cameu"* and *"magnus camehu."* The word is in current use in the 13th century. Thus Matthew Paris, in his Life of Abbot Leofric of St Albans, in the *Abbatum S. Albani Vitae,* says: *"retentis quibusdam nobilibus lapidibus insculptis, quos camaeos vulgariter appellamus."* In variant forms the word has found its way into most languages, *e.g.* Latin, *camahutus, camahelus, camaynus*; Italian, *chammeo, chameo*; French, *camahieu, chemahou, camaut, camaieu*. The following may be mentioned among the derivations that have been proposed:—von Hammer: *camaut*, the hump of a camel; Littré and others: *camateum*, an assumed Low Latin form from καματεύειν and κάματον; Chabouillet and Babelon: κειμήλια, treasures, connecting the word in particular with the dispersion of treasures from Constantinople, in 1204; King: Arabic *camea*, an amulet.

For a bibliography of the question, see Babelon, *Cat. des Camées ... de la Bibliothèque Nationale*, p. iv.

CAMERA (a Latin adaptation of Gr. καμάρα, an arched chamber), in law, a word applied at one time to the English judges' chambers in Serjeants' Inn, as distinct from their bench in Westminster Hall. It was afterwards applied to the judges' private room behind the court, and, hence, in the phrase *in camera*, to cases heard in private, *i.e.* in chambers. So far as criminal cases are concerned, the courts have no power to hear them in private, nor have they any power to order adults (men or women) out of court during the hearing. In civil proceedings at common law, it may also be laid down that the public cannot be excluded from the court; in *Malan* v. *Young*, 1889, 6 T.L.R. 68, Mr Justice Denman held that he had power to hear the case *in camera*, but he afterwards stated that there was considerable doubt among the judges as to the power to hear cases *in camera*, even by consent, and the case was, by consent of the parties, finally proceeded with before the judge *as arbitrator*. In the court of chancery it is the practice to hear in private cases affecting wards of the court and lunatics, family disputes (by consent), and cases where a public trial would defeat the object of the action (*Andrew* v. *Raeburn*, 1874, L.R. 9 Ch. 522). In an action for infringement of a patent for a chemical process the defendant was allowed to state a secret process *in camera (Badische Anilin und Soda Fabrik* v. *Gillman*, 1883, 24 Ch. D. 156). The Court of Appeal has decided that it has power to sit in private; in *Mellor* v. *Thompson*, 1885, 31 Ch. D. 55, it was stated that a public hearing would defeat the object of the action, and render the respondent's success in the appeal useless. In matrimonial causes, the divorce court, following the practice of the ecclesiastical courts under the provisions of the Matrimonial Causes Act 1857, s. 22, hears suits for nullity of marriage on physical grounds *in camera*, but not petitions for dissolution of marriage, which must be heard in open court. It was also decided in *Druce* v. *Druce*, 1903, 19 T.L.R. 387, that, in cases for judicial separation the court has jurisdiction to hear the case *in camera*, where it is satisfied that justice cannot be done by hearing the case in public.

CAMERA LUCIDA, an optical instrument invented by Dr William Hyde Wollaston for drawing in perspective. Closing one eye and looking vertically downwards with the other through a slip of plain glass, *e.g.* a microscope cover-glass, held close to the eye and inclined at an angle of 45° to the horizon, one can see the images of objects in front, formed by reflection from the surface of the glass, and at the same time one can also see through the transparent glass. The virtual images of the objects appear projected on the surface of a sheet of paper placed beneath the slip of glass, and their outline can be accurately traced with a pencil. This is the simplest form of the camera lucida. The image (see fig. 1) is, however, inverted and perverted, and it is not very bright owing to the poor reflecting power of unsilvered glass. The brightness of the image is sometimes increased by silvering the glass; and on removing a small portion of the silver the observer can see the image with part of the pupil while he sees the paper through the unsilvered aperture with the remaining part. This form of the instrument is often used in conjunction with the microscope, the mirror being attached to the eye-piece and the tube of the microscope being placed horizontally.

About the beginning of the 19th century Dr Wollaston invented a simple form of the camera lucida which gives bright and erect images. A four-sided prism of glass is constructed having one angle of 90°, the opposite angle of 135°, and the two remaining angles each of 67½°. This is represented in cross-section and in position in fig. 2. When the pupil of the eye is held half over the edge of the prism a, one sees the image of the object with one half of the pupil and the paper with the other half. The image is formed by successive total reflection at the surfaces b c and a b. In the first place an inverted image (first image) is formed in the face b c, and then an image of this image is formed in a b, and it is the outline of this second image seen projected on the paper that is traced by the pencil. It is desirable for two reasons that the image should lie in the plane of the paper, and this can be secured by placing a suitable lens between the object and the prism. If the image does not lie in the plane of the paper, it is impossible to see it and the pencil-point clearly at the same time. Moreover, any slight movement of the head will cause the image to appear to move relatively to the paper, and will render it difficult to obtain an accurate drawing.

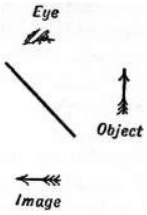


FIG. 1.

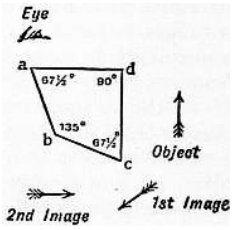


FIG. 2.

Before the application of photography, the camera lucida was of considerable importance to draughtsmen. The advantages claimed for it were its cheapness, smallness and portability; that there was no appreciable distortion, and that its field was much larger than that of the camera obscura. It was used largely for copying, for reducing or for enlarging existing drawings. It will readily be understood, for example, that a copy will be half-size if the distance of the object from the instrument is double the distance of the instrument from the copy.

(C. J. J.)

CAMERA OBSCURA, an optical apparatus consisting of a darkened chamber (for which its name is the Latin rendering) at the top of which is placed a box or lantern containing a convex lens and sloping mirror, or a prism combining the lens and mirror. If we hold a common reading lens (a magnifying lens) in front of a lamp or some other bright object and at some distance from it, and if we hold a sheet of paper vertically at a suitable distance behind the lens, we see depicted on the paper an image of the lamp. This image is inverted and perverted. If now we place a plane mirror (*e.g.* a lady's hand glass) behind the lens and inclined at an angle of 45° to the horizon so as to reflect the rays of light vertically downwards, we can produce on a horizontal sheet of paper an unperverted image of the bright object (fig. 1), *i.e.* the image has the same appearance as the object and is not perverted as when the reflection of a printed page is viewed in a mirror. This is the principle of the camera obscura, which was extensively used in sketching from nature before the introduction of photography, although it is now scarcely to

be seen except as an interesting side-show at places of popular resort. The image formed on the paper may be traced out by a pencil, and it will be noticed that in this case the image is real—not virtual as in the case of the camera lucida. Generally the mirror and lens are combined into a single piece of worked glass represented in section in fig. 2. Rays from external objects are first refracted at the convex surface *a b,* then totally reflected at the plane surface *a c,* and finally refracted at the concave surface *b c* (fig. 2) so as to form an image on the sheet of paper *d e.* The curved surfaces take the place of the lens in fig. 1, and the plane surface performs the function of the mirror. The prism *a b c* is fixed at the top of a small tent furnished with opaque curtains so as to prevent the diffused daylight from overpowering the image on the paper, and in the darkened tent the images of external objects are seen very distinctly.

Quite recently, the camera obscura has come into use with submarine vessels, the *periscope* being simply a camera obscura under a new name.

(C. J. J.)

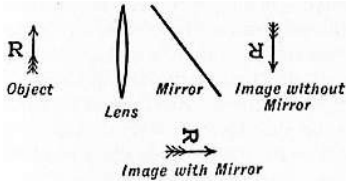


FIG. 1.

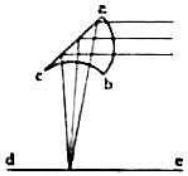


FIG. 2.

History.—The invention of this instrument has generally been ascribed, as in the ninth edition of this work, to the famous Neapolitan savant of the 16th century, Giovanni Battista della Porta, but as a matter of fact the principle of the simple camera obscura, or darkened chamber with a small aperture in a window or shutter, was well known and in practical use for observing eclipses long before his time. He was anticipated in the improvements he claimed to have made in it, and all he seems really to have done was to popularize it. The increasing importance of the camera obscura as a photographic instrument makes it desirable to bring together what is known of its early history, which is far more extensive than is usually recognized. In southern climes, where during the summer heat it is usual to close the rooms from the glare of the sunshine outside, we may often see depicted on the walls vivid inverted images of outside objects formed by the light reflected from them passing through chinks or small apertures in doors or window-shutters. From the opening passage of Euclid's *Optics* (*c.* 300 B.C.), which formed the foundation for some of the earlier middle age treatises on geometrical perspective, it would appear that the above phenomena of the simple darkened room were used by him to demonstrate the rectilinear propagation of light by the passage of sunbeams or the projection of the images of objects through small openings in windows, &c. In the book known as Aristotle's *Problems* (sect. xv. cap. 5) we find the correlated problem of the image of the sun passing through a quadrilateral aperture always appearing round, and he further notes the lunated image of the eclipsed sun projected in the same way through the interstices of foliage or lattice-work.

There are, however, very few allusions to these phenomena in the later classical Greek and Roman writers, and we find the first scientific investigation of them in the great optical treatise of the Arabian philosopher Alhazen (*q.v.*), who died at Cairo in A.D. 1038. He seems to have been well acquainted with the projection of images of objects through small apertures, and to have been the first to show that the arrival of the image of an object at the concave surface of the common nerve—or the retina—corresponds with the passage of light from an object through an aperture in a darkened place, from which it falls upon a surface facing the aperture. He also had some knowledge of the properties of concave and convex lenses and mirrors in forming images. Some two hundred years later, between A.D. 1266 and 1279, these problems were taken up by three almost contemporaneous writers on optics, two of whom, Roger Bacon and John Peckham, were Englishmen, and Vitello or Witelo, a Pole.

That Roger Bacon was acquainted with the principle of the camera obscura is shown by his attempt at solving Aristotle's problem stated above, in the treatise *De Speculis,* and also from his references to Alhazen's experiments of the same kind, but although Dr John Freind, in his *History of Physick,* has given him the credit of the invention on the strength of a passage in the *Perspectiva*, there is nothing to show that he constructed any instrument of the kind. His arrangement of concave and plane mirrors, by which the realistic images of objects inside the house or in the street could be rendered visible though intangible, there alluded to, may apply to a camera on Cardan's principle or to a method of aerial projection by means of concave mirrors, which Bacon was quite familiar with, and indeed was known long before his time. On the strength of similar arrangements of lenses and mirrors the invention of the camera obscura has also been claimed for Leonard Digges, the author of *Pantometria* (1571), who is said to have constructed a telescope from information given in a book of Bacon's experiments.

Archbishop Peckham, or Pisanus, in his *Perspectiva Communis* (1279), and Vitello, in his *Optics* (1270), also attempted the solution of Aristotle's problem, but unsuccessfully. Vitello's work is to a very great extent based upon Alhazen and some of the earlier writers, and was first published in 1535. A later edition was published, together with a translation of Alhazen, by F. Risner in 1572.

The first practical step towards the development of the camera obscura seems to have been made by the famous painter and architect, Leon Battista Alberti, in 1437, contemporaneously with the invention of printing. It is not clear, however, whether his invention was a camera obscura or a show box, but in a fragment of an anonymous biography of him, published in Muratori's *Rerum Italicarum Scriptores* (xxv. 296), quoted by Vasari, it is stated that he produced wonderfully painted pictures, which were exhibited by him in some sort of small closed box through a very small aperture, with great verisimilitude. These demonstrations were of two kinds, one nocturnal, showing the moon and bright stars, the other diurnal, for day scenes. This description seems to refer to an arrangement of a transparent painting illuminated either from the back or the front and the image projected through a hole on to a white screen in a darkened room, as described by Porta (*Mag. Nat.* xvii. cap. 7) and figured by A. Kircher (*Ars Magna Lucis et Umbrae*), who notes elsewhere that Porta had taken some arrangement of projecting images from an Albertus, whom he distinguished from Albertus Magnus, and who was probably L.B. Alberti, to whom Porta also refers, but not in this connexion.

G.B.I.T. Libri-Carucci dalla Sommaja (1803-1869), in his account of the invention of the camera obscura in Italy (*Histoire des sciences mathématiques en Italic,* iv. 303), makes no mention of Alberti, but draws attention to an unpublished MS. of Leonardo da Vinci, which was first noticed by Venturi in 1797, and has since been published in facsimile in vol. ii. of J.G.F. Ravaisson-Mollien's reproductions of the MSS. in the Institut de France at Paris (MS. *D*, fol. 8 *recto*). After discussing the structure of the eye he gives an experiment in which the appearance of the reversed images of outside objects on a piece of paper held in front of a small hole in a darkened room, with

their forms and colours, is quite clearly described and explained with a diagram, as an illustration of the phenomena of vision. Another similar passage is quoted by Richter from folio 404b of the reproduction of the *Codice Atlantico,* in Milan, published by the Italian government. These are probably the earliest distinct accounts of the natural phenomena of the camera obscura, but remained unpublished for some three centuries. Leonardo also discussed the old Aristotelian problem of the rotundity of the sun's image after passing through an angular aperture, but not so successfully as Maurolycus. He has also given methods of measuring the sun's distance by means of images thrown on screens through small apertures. He was well acquainted with the use of magnifying glasses and suggested a kind of telescope for viewing the moon, but does not seem to have thought of applying a lens to the camera.

The first published account of the simple camera obscura was discovered by Libri in a translation of the *Architecture* of Vitruvius, with commentary by Cesare Caesariano, one of the architects of Milan cathedral, published at Conio in 1521, shortly after the death of Leonardo, and some twenty years before Porta was born. He describes an experiment made by a Benedictine monk and architect, Dom Papnutio or Panuce, of the same kind as Leonardo's but without the demonstration.

About the same time Francesco Maurolico, or Maurolycus, the eminent mathematician of Messina, in his *Theoremata de Lumine et Umbra*, written in 1521, fully investigated the optical problems connected with vision and the passage of rays of light through small apertures with and without lenses, and made great advances in this direction over his predecessors. He was the first correctly to solve Aristotle's problem, stated above, and to apply it practically to solar observations in a darkened room (*Cosmographia*, 1535). Erasmus Reinhold has described the method in his edition of G. Purbach's *Theoricae Novae Planetarum* (1542), and probably got it from Maurolycus. He says it can also be applied to terrestrial objects, though he only used it for the sun. His pupil, Rainer Gemma-Frisius, used it for the observation of the solar eclipse of January 1544 at Louvain, and fully described the methods he adopted for making measurements and drawings of the eclipsed sun, in his *De Radio Astronomico et Geometrico* (1545). He says they can be used for observation of the moon and stars and also for longitudes. The same arrangement was used by Copernicus, Tycho Brahe, by M. Moestlin and his pupil Kepler—the latter applying it in 1607 to the observation of a transit of Mercury—also by Johann Fabricius, in 1611, for the first observations of sun-spots. It is interesting to note this early employment of the camera obscura in the field of astronomical research, in which its latest achievements have been of such pre-eminent value.

The addition of optical appliances to the simple dark chamber for the purpose of seeing what was going on outside, was first described by Girolamo Cardan in his *De Subtilitate* (1550), as noted by Libri. The sun shining, he fixed a round glass speculum (*orbem e vitro*) in a window-shutter, and then closing it the images of outside objects would be seen transmitted through the aperture on to the opposite wall, or better, a white paper screen suitably placed. The account is not very clear, but seems to imply the use of a concave mirror rather than a lens, which might be suggested by the word *orbem*. He refers to Maurolycus' work with concave specula.

We now come to Giovanni Battista della Porta, whose account of the camera obscura in the first edition of the *Magia Naturalis,* in four books (1558, lib. iv. cap. 2), is very similar to Caesariano's—a darkened room, a pyramidal aperture towards the sun, and a whitened wall or white paper screens, but no lens. He discloses as a great secret the use of a concave speculum in front of the aperture, to collect the rays passing through it, when the images will be seen reversed, but by prolonging them beyond the centre they would be seen larger and unreversed. This is much the same as Cardan's method published eight years earlier, but though more detailed is not very clear. He then notes the application to portraiture and to painting by laying colours on the projected images. Nothing is said about the use of a lens or of solar observations. The second edition, in which he in the same words discloses the use of a convex lens in the aperture as a secret he had intended to keep, was not published till 1589, thirty-one years after the first. In this interval the use of the lens was discovered and clearly described by Daniello Barbaro, a Venetian noble, patriarch of Aquileia, in his work *La Pratica della perspettiva* (p. 192), published in 1568, or twenty-one years before Porta's mention of it. The lens used by Barbaro was an ordinary convex or old man's spectacle-glass; concave, he says, will not do. He shows how the paper must be moved till it is brought into the focus of the lens, the use of a diaphragm to make the image clearer, and also the application of the method for drawing in true perspective. That Barbaro was really the first to apply the lens to the camera obscura is supported by Marius Bettinus in his *Apiaria* (1645), and by Kaspar Schott in his *Magia Universalis* (1657), the former taunting Porta with the appropriation.

In an Italian translation of Euclid's *Optica*, with commentary, Egnacio Danti (1573), after discussing the effects of plane, convex and concave reflectors, fully describes the method of showing reversed images passing through an aperture in a darkened room, and shows how, by placing a mirror behind the aperture, unreversed images might be obtained, both effects being illustrated by diagrams. F. Risner, who died in 1580, also in his *Opticae* (1606) very clearly explained the reversal of the images of the simple camera obscura. He notes the convenience of the method for solar observations and its previous use by some of the observers already mentioned, as well as its advantages for easily and accurately copying on an enlarged or reduced scale, especially for chorographical or topographical documents. This is probably the first notice of the application of the camera to cartography and the reproduction of drawings, which is one of its principal uses at the present time. In the *Diversarum Speculationum Mathematicarum el Physicarum* (1585), by the Venetian Giovanni Battista Benedetti, there is a letter in which he discusses the simple camera obscura and mentions the improvement some one had made in it by the use of a double convex lens in the aperture; he also says that the images could be made erect by reflection from any plane mirror.

Thus the use of the camera and of the lens with it was well known before Porta published his second edition of the *Magia Naturalis* in 1589. In this the description of the camera obscura is in lib. xvii. cap. 6. The use of the convex lens, which is given as a great secret, in place of the concave speculum of the first edition, is not so clearly described as by Barbaro; the addition of the concave speculum is proposed for making the images larger and clearer, and also for making them erect, but no details are given. He describes some entertaining peep-show arrangements, possibly similar to Alberti's, and indicates how the dark chamber with a concave speculum can be used for observing eclipses. There is no mention whatever of a portable box or construction beyond the darkened room, nor is there in his later work, *De Refractione Optices Parte* (1593), in which he discusses the analogy between vision and the simple dark room with an aperture, but incorrectly. Though Porta's merits were undoubtedly great, he did not invent or improve the camera obscura. His only novelty was the use of it as a peep-show; his descriptions of it are vague, but being published in a book of general reference, which became popular, he acquired credit for the invention.

The first to take up the camera obscura after Porta was Kepler, who used it in the old way for solar observations in 1600, and in his *Ad Vitellionem Paralipomena* (1604) discusses the early problems of the passages of light through small apertures, and the rationale of the simple dark chamber. He was the first to describe an instrument fitted with a sight and paper screen for observing the diameters of the sun and moon in a dark room. In his later book, *Dioptrice* (1611), he fully discusses refraction and the use of lenses, showing the action of the double convex lens in the camera obscura, with the principles which regulate its use and the reason of the reversal of the image. He also demonstrates how enlarged images can be produced and projected on paper by using a concave lens at a suitable distance behind the convex, as in modern telephotographic lenses. He was the first to use the term *camera obscura*, and in a letter from Sir H. Wotton written to Lord Bacon in 1620 we learn that Kepler had made himself a portable dark tent fitted with a telescope lens and used for sketching landscapes. Further, he extended the work of Maurolycus, and demonstrated the exact analogy between the eye and the camera and the arrangement by which an inverted image is produced on the retina.

In 1609 the telescope came into use, and the danger of observing the sun with it was soon discovered. In 1611 Johann Fabricius published his observations of sun-spots and describes how he and his father fell back upon the old method of projecting the sun's image in a darkened room, finding that they could observe the spots just as well as with the telescope. They do not seem to have used a lens, or thought of using the telescope for projecting an enlarged imase on Kepler's principle. This was done in 1612 by Christoph Schemer, who fully described his method of solar observation in the *Rosa Ursina* (1630), demonstrating very clearly and practically the advantages and disadvantages of using the camera, without a lens, with a single convex lens, and with a telescopic combination of convex object-glass and concave enlarging lens, the last arrangement being mounted with an adjustable screen or tablet on an equatorial stand. Most of the earlier astronomical work was done in a darkened room, but here we first find the dark chamber constructed of wooden rods covered with cloth or paper, and used separately to screen the observing-tablet.

Various writers on optics in the 17th century discussed the principle of the simple dark chamber alone and with single or compound lenses, among them Jean Tarde (*Les Astres de Borbon*, 1623); Descartes, the pupil of Kepler (*Dioptrique*, 1637); Bettinus (*Apiaria*, 1645); A. Kircher (*Ars Magna Lucis et Umbrae*, 1646); J. Hevelius (*Selenographia*, 1647); Schott (*Magia Universalis Naturae et Artis*, 1674); C.F.M. Deschales (*Cursus, seu Mundus Mathematicus*, 1674); Z. Traber (*Nervus Opticus*, 1675), but their accounts are generally more interesting theoretically than as recording progress in the practical use and development of the instrument.

The earliest mention of the camera obscura in England is probably in Francis Bacon's *De Augmentis Scientiarum*, but it is only as an illustration of the projected images showing better on a white screen than on a black one. Sir H. Wotton's letter of 1620, already noted, was not published till 1651 (*Reliquiae Wottonianae*, p. 141), but in 1658 a description of Kepler's portable tent camera for sketching, taken from it, was published in a work called *Graphice, or the most excellent Art of Painting*, but no mention is made of Kepler. In W. Oughtred's English edition (1633) of the *Récréations mathématiques* (1627) of Jean Leurechon ("Henry van Etten") there is a quaint description, with figures, of the simple dark chamber with aperture, and also of a sort of tent with a lens in it and the projection on an inner wall of the face of a man standing outside. The English translation of Porta's *Natural Magick* was published in 1658.

Robert Boyle seems to have been the first to construct a box camera with lens for viewing landscapes. It is mentioned in his essay *On the Systematic or Cosmical Qualities of Things* (ch. vi.), written about 1570, as having been made several years before and since imitated and improved. It could be extended or shortened like a telescope. At one end of it paper was stretched, and at the other a convex lens was fitted in a hole, the image being viewed through an aperture at the top of the box. Robert Hooke, who was some time Boyle's assistant, described (*Phil. Trans.*, 1668, 3, p. 741) a camera lucida on the principle of the magic lantern, in which the images of illuminated and inverted objects were projected on any desired scale by means of a broad convex lens through an aperture into a room where they were viewed by the spectators. If the objects could not be inverted, another lens was used for erecting the images. From Hooke's *Posthumous Works* (1705), p. 127, we find that in one of the Cutlerian lectures on Light delivered in 1680, he illustrated the phenomena of vision by a darkened room, or perspective box, of a peculiar pattern, the back part, with a concave white screen at the end of it, being cylindrical and capable of being moved in and out, while the fore part was conical, a double convex lens being fixed in a hole in front. The image was viewed through a large hole in the side. It was between 4 and 5 ft. long.

Johann Zahn, in his *Oculus Artificialis Teledioptricus* (1685-1686), described and figured two forms of portable box cameras with lenses. One was a wooden box with a projecting tube in which a combination of a concave with a convex lens was fitted, for throwing an enlarged image upon the focusing screen, which in its proportions and application is very similar to our modern telephotographic objectives. The image was first thrown upon an inclined mirror and then reflected upwards to a paper screen on the top of the box. In an earlier form the image is thrown upon a vertical thin paper screen and viewed through a hole in the back of the camera. There is a great deal of practical information on lenses in connexion with the camera and other optical instruments, and the book is valuable as a repertory of early practical optics, also for the numerous references to and extracts from previous writers. An improved edition was published in 1702.

Most of the writers already noticed worked out the problems connected with the projection of images in the camera obscura more by actual practice than by calculation, but William Molyneux, of Dublin, seems to have been the first to treat them mathematically in his *Dioptrica Nova* (1692), which was also the first work in English on the subject, and is otherwise an interesting book. He has fully discussed the optical theory of the dark chamber, with and without a lens, and its analogy to the eye, also several optical problems relating to lenses of various forms and their combinations for telescopic projection, rules for finding foci, &c. He does not, however, mention the camera obscura as an instrument in use, but in John Harris's *Lexicon Technicum* (1704) we find that the camera obscura with the arrangement called the "scioptric ball," and known as *scioptricks*, was on sale in London, and after this must have been in common use as a sketching instrument or as a show.

Sir Isaac Newton, in his *Opticks* (1704), explains the principle of the camera obscura with single convex lens and its analogy with vision in illustration of his seventh axiom, which aptly embodies the correct solution of Aristotle's old problem. He also made great use of the simple dark chamber for his optical experiments with prisms, &c. Joseph Priestley (1772) mentions the application of the solar microscope, both to the small and portable and the large camera obscura. Many patterns of these two forms for sketching and for viewing surrounding scenes are described in W.J.'s Gravesande's *Essai de perspective* (1711), Robert Smith's *Compleat*

System of Optics (1738), Joseph Harris's *Treatise on Optics* (1775), Charles Hutton's *Philosophical and Mathematical Dictionary*, and other books on optics and physics of that period. The camera obscura was first applied to photography (*q.v.*) probably about 1794, by Thomas Wedgwood. His experiments with Sir Humphrey Davy in endeavouring to fix the images of natural objects as seen in the camera were published in 1802 (*Journ. Roy. Inst.*).

(J. Wa.)

CAMERARIUS, JOACHIM (1500-1574), German classical scholar, was born at Bamberg on the 12th of April 1500. His family name was Liebhard, but he was generally called Kammermeister, previous members of his family having held the office of chamberlain (*camerarius*) to the bishops of Bamberg. He studied at Leipzig, Erfurt and Wittenberg, where he became intimate with Melanchthon. For some years he was teacher of history and Greek at the gymnasium, Nuremberg. In 1530 he was sent as deputy for Nuremberg to the diet of Augsburg, where he rendered important assistance to Melanchthon in drawing up the Confession of Augsburg. Five years later he was commissioned by Duke Ulrich of Württemberg to reorganize the university of Tübingen; and in 1541 he rendered a similar service at Leipzig, where the remainder of his life was chiefly spent. He translated into Latin Herodotus, Demosthenes, Xenophon, Homer, Theocritus, Sophocles, Lucian, Theodoretus, Nicephorus and other Greek writers. He published upwards of 150 works, including a *Catalogue of the Bishops of the Principal Sees*; *Greek Epistles*; *Accounts of his Journeys*, in Latin verse; a Commentary on Plautus; a treatise on Numismatics; *Euclid* in Latin; and the Lives of Helius Eobanus Hessus, George of Anhalt and Philip Melanchthon. His *Epistolae Familiares* (published after his death) are a valuable contribution to the history of his time. He played an important part in the Reformation movement, and his advice was frequently sought by leading men. In 1535 he entered into a correspondence with Francis I. as to the possibility of a reconciliation between the Catholic and Protestant creeds; and in 1568 Maximilian II. sent for him to Vienna to consult him on the same subject. He died at Leipzig on the 17th of April 1574.

See article by A. Horawitz in *Allgemeine deutsche Biographie*; C. Bursian, *Die Geschichte der klassischen Philologie in Deutschland* (1883); J.E. Sandys, *Hist. Class. Schol.* (ed. 1908), ii. 266.

CAMERARIUS, JOACHIM (1534-1598), German botanist and physician, son of the classical scholar of the same name, was born at Nuremberg on the 6th of November 1534. After finishing his studies in Germany he visited Italy, where he graduated as doctor of medicine. On his return he was invited to reside at the courts of several princes, but preferred to settle in his native town of Nuremberg, where he had a botanical garden and formed extensive collections. He wrote a *Hortus Medicus* (1588) and several other works. He died at Nuremberg on the 11th of October 1598.

CAMERARIUS, RUDOLF JAKOB (1665-1721), German botanist and physician, was born at Tübingen on the 12th of February 1665, and became professor of medicine and director of the botanical gardens at Tübingen in 1687. He died at Tübingen on the 11th of September 1721. He is chiefly known for his investigations on the reproductive organs of plants (*De sexu plantarum epistola*, 1694).

CAMERINO (anc. *Camerinum*), a city and episcopal see (since 465, if not sooner; Treia is now combined with it) of the Marches, Italy, in the province of Macerata, 6 m. S. of the railway station of Castelraimondo (to which there is an electric tramway) which is 24 m. W. of Macerata; 2148 ft. above sea-level. Pop. (1901) of town, 4005; of commune, 12,083. The cathedral is modern, the older building having fallen in 1799; the church of S. Venanzio suffered similarly, but preserves a portal of the 15th century. The citadel, perhaps constructed from the plans of Leonardo da Vinci, dates from 1503. Camerino occupies the site of the ancient Camerinum, the inhabitants of which (*Camertes Umbri*) became allies of the Romans in 310 B.C. (at the time of the attack on the Etruscans in the Ciminian Forest). On the other hand, the Καμέρτιοι referred to in the history of the year 295 B.C. are probably the inhabitants of Clusium. Later it appears as a dependent autonomous community with the *foedus aequum* (Mommsen, *Röm. Staatsrecht*, iii. 664). Two cohorts of Camertes fought with distinction under Marius against the Cimbri. It was much affected by the conspiracy of Catiline, and is frequently mentioned in the Civil Wars; under the empire it was a *municipium*. It belonged to ancient Umbria, but was on the borders of Picenum. No ancient buildings are visible, the Roman level lying as much as 30 ft. below the modern.

See P. Savini, *Storia delta Città di Camerino* (2nd ed., Camerino, 1895); M. Mariani, *Intorno agli antichi Camerti Umbri* (Camerino, 1900).

(T. As.)

CAMERON, JOHN (1579-1623), Scottish theologian, was born at Glasgow about 1579, and received his early education in his native city. After having taught Greek in the university for twelve months, he removed to Bordeaux, where he was soon appointed a regent in the college of Bergerac. He did not remain long at Bordeaux, but accepted the offer of a chair of philosophy at Sedan, where he passed two years. He then returned to Bordeaux, and in the beginning of 1604 he was nominated one of the students of divinity who were maintained at the expense of the church, and who for the period of four years were at liberty to prosecute their studies in any Protestant seminary. During this period he acted as tutor to the two sons of Calignon, chancellor of Navarre. They spent one year at Paris, and two at Geneva, whence they removed to Heidelberg. In this university, on the 4th of April 1608, he gave a public proof of his ability by maintaining a series of theses, *De triplici Dei cum Homine Foedere*, which were printed among his works. The same year he was recalled to Bordeaux, where he was appointed the colleague of Dr Primrose; and when Francis Gomarus was removed to Leiden, Cameron, in 1618, was appointed professor of divinity at Saumur, the principal seminary of the French Protestants.

In 1620 the progress of the civil troubles in France obliged Cameron to seek refuge for himself and family in England. For a short time he read private lectures on divinity in London; and in 1622 the king appointed him principal of the university of Glasgow in the room of Robert Boyd, who had been removed from his office in consequence of his adherence to Presbyterianism. Cameron was prepared to accept Episcopacy, and was cordially disliked for his adherence to the doctrine of passive obedience. He resigned his office in less than a year.

He returned to France, and lived at Saumur. After an interval of a year he was appointed professor of divinity at Montauban. The country was still torn by civil and religious dissensions; and Cameron excited the indignation of the more strenuous adherents of his own party. He withdrew to the neighbouring town of Moissac; but he soon returned to Montauban, and a few days afterwards he died at the age of about forty-six. Cameron left by his first wife several children, whose maintenance was undertaken by the Protestant churches in France. All his works were published after his death.

His name has a distinct place in the development of Calvinistic theology in Europe. He and his followers maintained that the will of man is determined by the practical judgment of the mind; that the cause of men's doing good or evil proceeds from the knowledge which God infuses into them; and that God does not move the will physically, but only morally, by virtue of its dependence on the judgment of the mind. This peculiar doctrine of grace and free-will was adopted by Amyraut, Cappel, Bochart, Daillé and others of the more learned among the Reformed ministers, who dissented from Calvin's. The Cameronites (not to be confused with the Scottish sect called Cameronians) are moderate Calvinists, and approach to the opinion of the Arminians. They are also called Universalists, as holding the universal reference of Christ's death, and sometimes Amyraldists. The rigid adherents to the synod of Dort accused them of Pelagianism, and even of Manichaeism, and the controversy between the parties was carried on with great zeal; yet the whole question between them was only, whether the will of man is determined by the immediate action of God upon it, or by the intervention of a knowledge which God impresses on the mind.

CAMERON, RICHARD (1648?-1680), founder of a Scottish religious sect of Cameronians, which formed the nucleus of the regiment of this name in the British army, was born at Falkland in the county of Fife. He was educated at the village school, and his success was so great that, while still a youth, he was appointed schoolmaster. In this situation he became acquainted with some of the more enthusiastic field-preachers. Persuaded by them he resigned his post and entered the family of Sir Walter Scott of Harden as chaplain and tutor. Refusing to acknowledge the Indulgence, he joined the ranks of the non-conforming ministers, and incited the inhabitants of the southern counties of Scotland to protest openly against the new edict. So formidable was the agitation that the government pronounced illegal all armed assemblages for religious purposes. Cameron took refuge in Holland, where he resided for some time; but in the autumn of 1679 (probably) he returned to Scotland, and once more made himself formidable to the government. Shortly after the defeat of the Covenanters at Bothwell Bridge in that year, Cameron was slain in a skirmish at the Aird's, or Airs, Moss, fighting bravely at the head of the few troops which he had been able to collect. His prayer before going into battle became a tradition —"Lord spare the green and take the ripe." After the accession of William III. the survivors were amnestied, and the Cameronian regiment was formed from them.

See Andrew Lang, *History of Scotland*, vol. iii. (1907); Herzog-Hauck, *Realencyklopädie* (1897), *s.v.* "Cameronianer"; A. Smellie, *Men of the Covenant*; Herkless, *Richard Cameron*; P. Walker, *Six Saints of the Covenant.*

CAMERON, SIMON (1799-1889), American politician, was born in Lancaster county, Pennsylvania, on the 8th of March 1799. Left an orphan at the age of nine, he early entered journalism, and, in banking and railway enterprises, accumulated a considerable fortune. He became influential in Pennsylvania politics, and in 1845-1849 served in the United States Senate, being elected by a combination of Democratic, Whig and "American" votes to succeed James Buchanan. In 1854, having failed to secure the nomination for senator from the "Know-Nothing" Party, which he had recently joined, he became a leader of the "People's Party," as the Republican Party was at first called in Pennsylvania. In 1857 he was elected to the United States Senate as a Republican, despite a Democratic majority in the state legislature, a fact that gave rise to charges of bribery. His prominence as a candidate first for the presidential and then for the vice-presidential nomination in the Republican national convention of 1860 led to his being selected by President Lincoln as secretary of war. His administration of this office at a critical time was marked by his accustomed energy, but unfortunately also by partiality in the letting of government contracts, which brought about his resignation at Lincoln's request in January 1862 and his

subsequent censure by the House of Representatives. Lincoln sent him as minister to Russia, but he returned in November 1862. He again served in the Senate (after 1872, being chairman of the committee on foreign relations) from 1867 until 1877, when he resigned to make room for his son, whose election he dictated. Cameron was one of the ablest political organizers the United States has ever known, and his long undisputed control of Pennsylvania politics was one of the most striking examples of "boss rule" in American history. The definition of an honest politician as "one who when he is bought will stay bought" has been attributed to him. He died on the 26th of June 1889.

His son JAMES DONALD CAMERON (1833-) was born at Middletown, Pennsylvania, on the 14th of May 1833, graduated at Princeton in 1852, became actively interested in his father's banking and railway enterprises, and from 1863 to 1874 was president of the Northern Central railway. Trained in the political school of his father, he developed into an astute politician. From June 1876 to March 1877 he was secretary of war in President Grant's cabinet. In the Republican national convention of 1876 he took an influential part in preventing the nomination of James G. Elaine, and later was one of those who directed the policy of the Republicans in the struggle for the presidency between Tilden and Hayes. From 1877 until 1897 he was a member of the United States Senate, having been elected originally to succeed his father, who resigned in order to create the vacancy. He was chairman of the Republican national committee during the campaign of 1880.

CAMERON, VERNEY LOVETT (1844-1894), English traveller in Central Africa, was born at Radipole, near Weymouth, Dorsetshire, on the 1st of July 1844. He entered the navy in 1857, served in the Abyssinian campaign of 1868, and was employed for a considerable time in the suppression of the East African slave trade. The experience thus obtained led to his being selected to command an expedition sent by the Royal Geographical Society in 1873, to succour Dr. Livingstone. He was also instructed to make independent explorations, guided by Livingstone's advice. Soon after the departure of the expedition from Zanzibar, Livingstone's servants were met bearing the dead body of their master. Cameron's two European companions turned back, but he continued his march and reached Ujiji, on Lake Tanganyika, in February 1874, where he found and sent to England Livingstone's papers. Cameron spent some time determining the true form of the south part of the lake, and solved the question of its outlet by the discovery of the Lukuga river. From Tanganyika he struck westward to Nyangwe, the Arab town on the Lualaba previously visited by Livingstone. This river Cameron rightly believed to be the main stream of the Congo, and he endeavoured to procure canoes to follow it down. In this he was unsuccessful, owing to his refusal to countenance slavery, and he therefore turned south-west. After tracing the Congo-Zambezi watershed for hundreds of miles he reached Bihe and finally arrived at the coast on the 28th of November 1875, being the first European to cress Equatorial Africa from sea to sea. His travels, which were published in 1877 under the title *Across Africa*, contain valuable suggestions for the opening up of the continent, including the utilization of the great lakes as a "Cape to Cairo" connexion. In recognition of his work he was promoted to the rank of commander, made a Companion of the Bath and given the gold medal of the Geographical Society. The remainder of Cameron's life was chiefly devoted to projects for the commercial development of Africa, and to writing tales for the young. He visited the Euphrates valley in 1878-1879 in connexion with a proposed railway to the Persian Gulf, and accompanied Sir Richard Burton in his West African journey of 1882. At the Gold Coast Cameron surveyed the Tarkwa region, and he was joint author with Burton of *To the Gold Coast for Gold* (1883). He was killed, near Leighton Buzzard, by a fall from horseback when returning from hunting, on the 24th of March 1894.

A second edition of *Across Africa*, with new matter and corrected maps, appeared in 1885. A summary of Cameron's great journey, from his own pen, appears in Dr Robert Brown's *The Story of Africa*, vol. ii. pp. 266-279 (London, 1893).

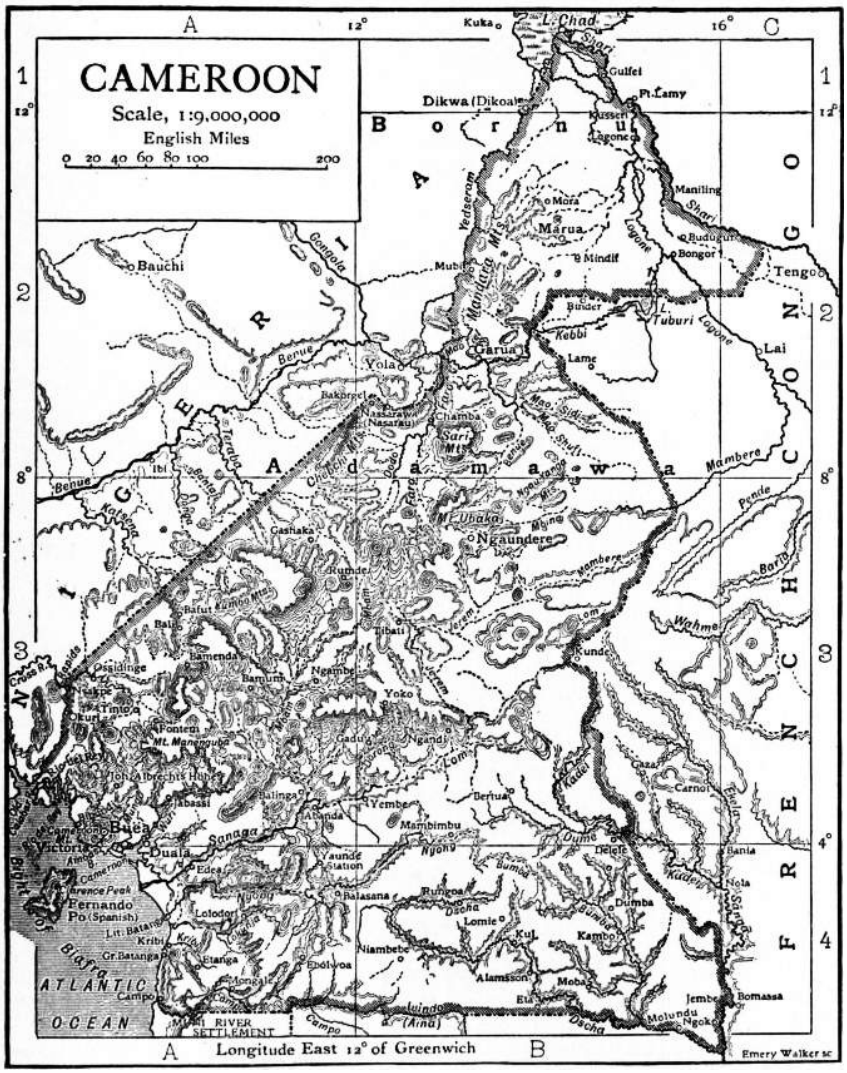
CAMERON OF LOCHIEL, SIR EWEN (1629-1719), Scottish Highland chieftain, was the eldest son of John Cameron and the grandson of Alan Cameron, the head of the clan Cameron. Having lost his father in infancy he passed part of his youth with the marquess of Argyll at Inveraray, leaving his guardian about 1647 to take up his duties as chief of the clan Cameron, a position in which he succeeded his grandfather. In 1653 Lochiel joined the earl of Glencairn in his rising on behalf of Charles II., and after the defeat of this attempt he served the Royalist cause by harassing General Monk. In 1681 he was knighted by Charles II., and in July 1689 he was with Viscount Dundee at Killiecrankie. He was too old to share personally in the Jacobite rising of 1715, but his sympathies were with the Stuarts, and his son led the Camerons at Sheriffmuir. Lochiel, who died in February 1719, is called by Macaulay the "Ulysses of the Highlands." He was a man of enormous strength and size, and one who met him in 1716 says "he wrung some blood from the point of my fingers with a grasp of his hand." An incident showing his strength and ferocity in single combat is used by Sir Walter Scott in *The Lady of the Lake* (canto v.). Lochiel's son and successor, John, who was attainted for sharing in the rebellion of 1715, died in Flanders in 1748. John's son Donald, sometimes called "gentle Lochiel," joined Charles Edward, the Young Pretender, in 1745, was wounded at Culloden, and escaped to France, dying in the same year as his father. The 79th regiment, or Cameron Highlanders, was raised from among the members of the clan in 1793 by Sir Alan Cameron (1753-1828).

See *Memoirs of Sir Ewen Cameron of Lochiel* (Bannatyne Club, 1842).

CAMERONIANS, the name given to that section of the Scottish Covenanters (*q.v.*) who followed Richard Cameron (*q.v.*), and who were chiefly found among those who signed the Sanquhar Declaration in 1680. Known also as “Society Men,” “Sanquharians” and “Hillmen,” they became a separate church after the religious settlement of 1690, taking the official title of Reformed Presbyterians in 1743. Societies of Cameronians for the maintenance of the Presbyterian form of worship were formed about 1681; their testimony, “The Informatory Vindication,” is dated 1687; and they quickly became the most pronounced and active adherents of the covenanting faith. Holding fast to the two covenants, the National Covenant of 1580 and the Solemn League and Covenant of 1643, they wished to restore the ecclesiastical order which had existed between 1638 and 1649, and were dissatisfied with the moderate character of the religious settlement of 1690. Refusing to take the oaths of allegiance to an “uncovenanted” ruler, or to exercise any civil function, they passed through a period of trial and found some difficulty in maintaining a regular ministry; but in 1706 they were reinforced by some converts from the established church. They objected strongly to the proposal for the union of England and Scotland, and were suspected of abetting a rising which took place in the west of Scotland in 1706; but there appears to be no foundation for the statement that they intrigued with the Jacobites, and they gave no trouble to the government either in 1715 or in 1745. In 1712 they publicly renewed the covenants at Auchensauch Hill in Lanarkshire, and in 1743 their first presbytery was constituted at Braehead, while a presbytery was formed in North America in 1774. In 1863 the Cameronians, or Reformed Presbyterians, decided to inflict no penalties upon those members who had taken the oaths, or had exercised civil functions, and consequently a few congregations seceded. In 1876 the general body of the Reformed Presbyterians united with the Free Church of Scotland, leaving the few seceding congregations as the representatives of the principles of the Cameronians. In the British army the first battalion of the Cameronians (Scottish Rifles) is directly descended from the “Cameronian guard,” which, composed of Cameronians, was embodied by the convention parliament in 1689, and was afterwards employed to restore order in the Highlands.

See J.H. Burton, *History of Scotland*, vols. vii. and viii. (Edinburgh, 1905); and A. Lang, *History of Scotland*, vol. iv. (Edinburgh, 1907).

CAMEROON[1] (Ger. *Kamerun*), a German protectorate in West Africa, bounded W. by the Atlantic, N.W. by British Nigeria, N. by Lake Chad, E. and S. by French Congo, save for a short distance on the south where it is conterminous with the Spanish Muni river settlement.



Boundaries and Area.—The sea frontier extends from the Rio del Rey, just where the great bend of the coast-line east to south begins, forming the Bight of Biafra, to the Campo river, a distance of 200 m. The north-western boundary, laid down in an agreement between Germany and Great Britain on the 15th of November 1893, runs

from the mouth of the Rio del Rey to the “rapids” of the Cross river in 8° 48′ E. Thence it is continued in a north-east line towards Yola, as far as the confines of that town. The boundary is then deflected south so as to leave Yola in British territory, turning north again to cross the Benue river at a spot 3 m. west of where the Faro joins the Benue. From this point the frontier goes north-east to the border of Lake Chad, 35 m. east of the meridian of the town of Kuka. The southern shores of Lake Chad for a distance of some 40 m. belong to the protectorate. The south and east boundaries were laid down by agreements between Germany and France on the 24th of December 1885, the 15th of March 1894 and the 18th of April 1908. The south boundary runs in a fairly direct line from the mouth of the Campo river to the river Dscha (or Ngoko), which it follows to its confluence with the Sanga. The eastern boundary runs from the Sanga irregularly north to 10° N., where it approaches the British frontier at Yola, so that at its narrowest part the protectorate is little more than 50 m. across. From 10° N. the frontier turns eastwards to the Logone, thence going north-east to the Shari river, which it follows to Lake Chad. The protectorate has an area of about 190,000 sq. m. Estimated population (1908) 3,500,000, of whom 1128 were whites.

Origin of the Name.—The name Camarões was first given by the Portuguese discoverers of the 15th and 16th centuries to a large bay or estuary, lying south-east of a great mountain close to the sea, met with after passing the Niger delta. This estuary they called the Rio dos Camarões (the river of Prawns), from the abundance of the crustacea found therein. The name Camarões was also used to designate the neighbouring mountains. The English usage until nearly the end of the 19th century was to confine the term “the Cameroons” to the mountain range, and to speak of the estuary as the Cameroons river. Locally it was often called “the Bay.” On their acquisition of the country in 1884 the Germans extended the use of the name in its Teutonic form— Kamerun—to the whole protectorate.

Physical Features.—Cameroon forms the north-west corner of the great Central African plateau. This becomes evident in its eastern section, where are wide-spreading plains, which farther west assume an undulating character, and gradually merge into a picturesque mountain range. This range, running from north to south, is flanked by a parallel and lower range in the west, with a wide valley between. In the north-west the Upper Guinea mountains send their eastern spurs across the boundary, and from a volcanic rift, which runs south-west to north-east, the Cameroon peak towers up, its summit 13,370 ft. high. This mountain, whose south-western base is washed by the Atlantic, is the highest point on the western side of Africa, and it alone of the great mountains of the continent lies close to the coast. From any vantage point, but especially from the sea, it presents a magnificent spectacle, while some 30 m. westward rises Clarence peak, the culminating point of Fernando Po. With an area, on an isolated base, of 700 to 800 sq. m., Cameroon mountain has but two distinct peaks, Great Cameroon and Little Cameroon (5820 ft.), which is from foot to top covered with dense forest. The native designation of the highest peak is Mongo-ma-Loba, or the Mountain of Thunder, and the whole upper region is usually called Mongo-mo-Ndemi, or the Mountain of Greatness. On the principal summit there are a group of craters. In 1909 the mountain was in eruption and huge streams of lava were ejected. Inland the Chebchi and Mandara mountains indicate the direction and extent of the rift.

The mountains of the plateau sweep grandly round to the east on reaching the eighth degree of N. lat. Here they give rise to a number of small rivers, which collect in the rift and form the Benue, the great eastern affluent of the Niger. This part of the protectorate is known as Adamawa (*q.v.*). Farther north, beyond the Mandara mountains, the country, here part of the ancient sultanate of Bornu, slopes to the shores of Lake Chad, and has a general level of 800 to 1000 ft. The greater part of Cameroon is thus a mountainous country, with, on the coast, a strip of low land. In the south this is very narrow; it widens towards the north savewhere the Cameroon peak reaches to the sea.

At the foot of the Cameroon peak a number of estuaries cut deep bays which form excellent harbours. The small rivers which empty into them can be ascended for some miles by steam launches. The principal estuary, which is over 20 m. wide, is called, as already noted, the Cameroon river or bay. The term river is more particularly confined to a ramification of the estuary which receives the waters of the Mungo river (a considerable stream which flows south from the Cameroon mountains), the Wuri, a river coming from the north-east, and various smaller rivers. Under the shadow of Cameroon peak lies the bay of Ambas, with the islands of Ndami (Ambas) and Mondola. It forms a tolerable harbour, capable of receiving large vessels.

Traversing the central portion of the country is a large river known in its upper course as the Lom, and in its lower as the Sanaga, which enters the ocean just to the south of the Cameroon estuary. Both the Lom and the Nyong (a more southerly stream) rise in the central plateau, from which they descend in splendid cascades, breaking through the parallel coast range in rapids, which indicate the extent of their navigability. The Lokunja and Kribi are smaller rivers with courses parallel to and south of the Nyong. In the south-east of the colony the streams—of which the chief are the Dscha and Bumba—are tributaries of the Sanga, itself an affluent of the Congo (*q.v.*). About 100 m. of the right bank of the Sanga, from the confluence of the Dscha upwards, are in German territory. In the north the country drains into Lake Chad through the Logone and Shari (*q.v.*). Including the headwaters of the Benue the colony has four distinct river-systems, one connecting with the Niger, another with the Congo, and a third with Lake Chad, the fourth being the rivers which run direct to the sea. The Niger and Shari systems communicate, with, at high water, but one obstruction to navigation. The connecting link is a marshy lake named Tuburi. From it issues the Kebbi (Mao Kebi) a tributary of the Benue, and through it flows a tributary of the Logone, the chief affluent of the Shari. The one obstruction in the waterway is a fall of 165 ft. in the Kebbi.

Geology.—The oldest rocks, forming the greater mass of the hinterland, are gneisses, schists and granites of Archaean age. Along the Benue river a sandstone (Benue sandstone) forms the banks to 14° E. Cretaceous rocks occur around the basalt platform of the Cameroon mountain and generally along the coastal belt. Basalt and tuff, probably of Tertiary age, form the great mass of the Cameroon mountain, also the island of Fernando Po. Extensive areas in the interior, more especially towards Lake Chad, are covered with black earth of alluvial or lacustrine origin.

Climate.—The country lies wholly within the tropics and has a characteristic tropical climate. In the interior four seasons can be distinguished; a comparatively dry and a wet one alternating. July to October are the coldest months, and also bring most rain, but there is hardly a month without rain. On the coast the temperature is high all the year round, but on the plateau it is cooler. Malarial fever is frequent, and even the Africans, especially those coming from other countries, suffer from it. The middle zone of the Cameroon mountain has, however, a

temperate climate and affords excellent sites for sanatoria.

Flora and Fauna.—The southern part of the low coast is chiefly grass land, while the river mouths and arms of the bays are lined with mangroves. The mountainous region is covered with primeval forest, in which timber and valuable woods for cabinet-making are plentiful. Most important are the *Elaeis guineensis, Sterculia acuminata* and the wild coffee tree. On Cameroon peak the forest ascends to 8000 ft.; above it is grass land. Towards the east the forest gradually grows thinner, assumes a park-like appearance, and finally disappears, wide grass uplands taking its place. The country north of the Benue is rich and well cultivated. Cotton and rubber are found in considerable quantities, and fields of maize, corn, rice and sugarcane bear witness to the fertility of the soil.

Animals are plentiful, including the great pachyderms and carnivora. The latter prey on the various kinds of antelopes which swarm on the grass lands. Two kinds of buffaloes are found in the forests, which are the home of the gorilla and chimpanzee. Large rodents, like the porcupine and cane rat, are numerous. Of birds there are 316 species, and several of venomous snakes.

Inhabitants.—The north of Cameroon is inhabited by Fula (*q.v.*) and Hausa (*q.v.*) and allied tribes, the south by Bantu-speaking races. The Fula came from the north and north-east, gradually driving the Bantu-negroes before them. They brought horses and horned cattle, unknown in these regions until then, and they founded well-organized states, like that of Adamawa, now divided between Cameroon and the British protectorate of Nigeria. In the vicinity of the rivers Benue, Faro and Kebbi, the people, who are good agriculturists, raise cereals and other crops, while on the plateaus stock-raising forms the chief pursuit of the inhabitants. In this northern region villages are built in the Sudanese zeriba style, surrounded with thorn fences; more important places are enclosed by a well-built wall and strongly fortified. Of martial disposition, the people often waged war with their neighbours, and also amongst themselves until the pacification of the hinterland by Germany at the beginning of the 20th century.

The Bantu-negroes inhabit the country south of about 7° N. Chief among the tribes are the Dualla (*q.v.*), the Ba-kwiri (*q.v.*), the Ba-Long, the Ba-Farami, the Wuri, the Abo and the Ba-Kundu. They build square houses, are active traders and are ruled by independent chiefs, having no political cohesion. Among the Dualla a curious system of drum signals is noteworthy. In the coast towns are numbers of Krumen, who, however, rarely settle permanently in the country. The Fula, as also most of the Hausa, are Moslems, the other tribes are pagans. Missionary societies, both Protestant and Roman Catholic, are represented in the colony, and their schools are well attended, as are the schools belonging to the government. In all the schools German is taught, but pidgin-English is largely spoken at the coast towns.

Chief Towns.—Duala, the chief town in the protectorate, is situated on the Cameroon estuary at the mouth of the Wuri river in 4° 2′ N. 9° 42′ E. It consists of various trading stations and native towns close to one another on the south bank of the river and known, before the German occupation, as Cameroon, Bell town, Akwa town, &c. Hickory, on the north side of the stream and the starting point of the railway to the interior, is also part of Duala, which has a total population of 22,000, including about 170 Europeans. Duala is the headquarters of the merchants and missionaries. The principal streets are wide and tree lined, the sanitation is good. The government offices are placed in a fine park in which are statues of Gustav Nachtigal and others. The port is provided with a floating dock. The seat of government is Buea, a post 3000 ft. above the sea on the slopes of the Cameroon mountain. Victoria is a flourishing town in Ambas Bay, founded by the British Baptist missionaries expelled from Fernando Po in 1858 (see below). Batanga and Campo are trading stations in the southern portion of the colony. On the route from Duala to Lake Chad is the large commercial town of Ngaundere, inhabited chiefly by Hausas and occupied by the Germans in 1901. Another large town is Garua on the Benue river. Farther north and within 30 m. of Lake Chad is Dikwa (Dikoa), in Bornu, the town chosen by Rabah (*q.v.*) as his capital after his conquest of Bornu. Gulfei on the lower Shari and Kusseri on the Logone are also towns of some note. Ngoko is a trading station on the Dscha, in the south-east of the protectorate, near the confluence of that river with the Sanga.

Products and Industry.—Cameroon is rich in natural products, one of the most important being the oil-palm. 112
Cocoa cultivation was introduced by the Germans and proved remarkably successful. Rubber is collected from the Landolphia and various species of Ficus. Palm-oil, palm kernels, cocoa, copal, copra, Calabar beans, kola-nuts and ivory are the principal exports. There are several kinds of finely-grained wood, amongst which a very dark ebony is specially remarkable. Cotton, indigo and various fibres of plants deserve notice. The natives grow several kinds of bananas, yams and batatas, maize, pea-nuts, sugar-cane, sorghum and pepper. Minerals have not been found in paying quantities. Iron is smelted by the natives, who, especially amongst the Hausas, are very clever smiths, and manufacture fine lances and arrow heads, knives and swords, and also hoes. Dikwa is the centre of an important trade of which the chief articles are coffee, sugar, velvet, silk and weapons, as well as gold and silver objects brought by caravans from Tripoli. The natives round the Cameroon estuary are clever carvers of wood, and make highly ornamental figure heads for their canoes, which also sometimes show very fine workmanship. In the interior the people use the wild-growing cotton and fibres of plants to manufacture coarse drapery and plait-work. Plantations founded by German industry are fairly successful. Large reserves are set apart for the natives by government when marking off the land granted to plantation companies. The best-known of these companies, the *Süd-Kamerun,* holds a concession over a large tract of country by the Sanga river, exporting its rubber, ivory and other produce via the Congo. The principal imports are cotton goods, spirits, building material, firearms, hardware and salt. The annual value of the external trade in the period 1900-1905 averaged about £800,000. In 1907 the value of the trade had increased to £1,700,000. Some 70% of the import and export trade was with Germany, the remainder being almost entirely with Great Britain. The percentage of the trade with Germany was increasing, that with Britain decreasing.

Communications.—There is regular steamship communication with Europe by German and British boats. On the rivers which run into the Cameroon estuary small steam launches ply. The protectorate belongs to the Postal Union, and is connected by cable with the British telegraph station at Bonny in the Niger delta.

An imperial guarantee of interest was obtained in 1905 for the construction of a railway from Hickory to Bayong, a place 100 m. to the north, the district traversed being fertile and populous. From Victoria a line runs to Soppo (22 m.) near Buea and is continued thence northward. Another line, sanctioned in 1908, runs S.E. from Duala to the upper waters of the Nyong. In the neighbourhood of government stations excellent roads have been built. The chief towns in the coast region are connected by telegraph and telephone.

Government Revenue, &c.—The administration is under the direction of a governor appointed by and

responsible to the imperial authorities. The governor is assisted by a chancellor and other officials and an advisory council whose members are merchants resident in the protectorate. Decrees having the force of law are issued by the imperial chancellor on the advice of the governor. In Adamawa and German Bornu are various Mahommedan sultanates controlled by residents stationed at Garua and Kusseri. Revenue is raised chiefly by customs dues on spirits and tobacco and a general 10% *ad valorem* duty on most goods. A poll tax is imposed on the natives. The local revenue (£131,000 in 1905) is supplemented by an imperial grant, the protectorate in the first twenty-one years of its existence never having raised sufficient revenue to meet its expenditure, which in 1905 exceeded £230,000. Order is maintained by a native force officered by Germans.

History.—Cameroon and the neighbouring coast were discovered by the Portuguese navigator, Fernando Po, towards the close of the 15th century. They were formerly regarded as within the Oil Rivers district, sometimes spoken of as the Oil Coast. Trading settlements were established by Europeans as early as the 17th century. The trade was confined to the coast, the Dualla and other tribes being recognized intermediaries between the coast "factories" and the tribes in the interior, whither they allowed no strange trader to proceed. They took a quantity of goods on trust, visited the tribes in the forest, and bartered for ivory, rubber and other produce. This method of trade, called the trust system, worked well, but when the country came under the administration of Germany, the system broke down, as inland traders were allowed to visit the coast. Before this happened the "kings" of the chief trading stations—Akwa and Bell—were wealthy merchant princes. From the beginning until near the end of the 19th century they were very largely under British influence. In 1837 the king of Bimbia, a district on the mainland on the north of the estuary, made over a large part of the country round the bay to Great Britain. In 1845, at which time there was a flourishing trade in slaves between Cameroon and America, the Baptist Missionary Society made its first settlement on the mainland of Africa, Alfred Saker (1814-1880) obtaining from the Akwa family the site for a mission station. In 1848 another mission station was established at Bimbia, the king agreeing to abolish human sacrifices at the funerals of his great men. Into the Cameroon country Saker and his colleagues introduced the elements of civilization, and with the help of British men-of-war the oversea slave trade was finally stopped (*c.* 1875). The struggles between the Bell (Mbeli) and Akwa families were also largely composed. In 1858, on the expulsion of the Baptists from Fernando Po (*q.v.*), Saker founded at Ambas Bay a colony of the freed negroes who then left the island, the settlement being known as Victoria. Two years after this event the first German factory was established in the estuary by Messrs Woermann of Hamburg. In 1870 the station at Bimbia was given up by the missionaries, but that at Akwa town continued to flourish, the Dualla showing themselves eager to acquire education, while Saker reduced their language to writing. He left Cameroon in 1876, the year before George Grenfell, afterwards famous for his work on the Congo, came to the country, where he remained three years. Like the earlier missionaries he explored the adjacent districts, discovering the Sanaga in its lower course. Although British influence was powerful and the British consul for the Oil Rivers during this period exercised considerable authority over the native chiefs, requests made by them—in particular by the Dualla chiefs in 1882—for annexation by Great Britain, were refused or neglected, with the result that when Germany started on her quest to pick up unappropriated parts of the African coast she was enabled to secure Cameroon. A treaty with King Bell was negotiated by Dr Gustav Nachtigal, the signature of the king and the other chiefs being obtained at midnight on the 15th of July 1884. Five days later Mr E.H. Hewett, British consul, arrived with a mission to annex the country to Great Britain.[2] Though too late to secure King Bell's territory, Mr Hewett concluded treaties with all the neighbouring chiefs, but the British government decided to recognize the German claim not only to Bell town, but to the whole Cameroon region. Some of the tribes, disappointed at not being taken over by Great Britain, refused to acknowledge German sovereignty. Their villages were bombarded and they were reduced to submission. The settlement of the English Baptists at Victoria, Ambas Bay, was at first excluded from the German protectorate, but in March 1887 an arrangement was made by which, while the private rights of the missionaries were maintained, the sovereignty of the settlement passed to Germany. The Baptist Society thereafter made over its missions, both at Ambas Bay and in the estuary, to the Basel Society.

The extension of German influence in the interior was gradually accomplished, though not without considerable bloodshed. That part of Adamawa recognized as outside the British frontier was occupied in 1901 after somewhat severe fighting. In 1902 the imperial troops first penetrated into that part of Bornu reserved to Germany by agreements with Great Britain and France. They found the country in the military occupation of France. The French officers, who stated that their presence was due to the measures rendered necessary by the ravages of Rabah and his sons, withdrew their troops into French territory. The shores of Lake Chad were first reached by a German military force on the 2nd of May 1902. In 1904 and again in 1905 there were native risings in various parts of the protectorate. These disturbances were followed, early in 1906, by the recall of the governor, Herr von Puttkamer, who was called upon to answer charges of maladministration. He was succeeded in 1907 by Dr T. Seitz. Collisions on the southern border of the protectorate between French and German troops led in 1905-1906 to an accurate survey of the south and east frontier regions and to a new convention (1908) whereby for the straight lines marking the frontier in former agreements natural features were largely substituted. Germany gained a better outlet to the Sanga river.

The ascent of the Cameroon mountain was first attempted by Joseph Merrick of the Baptist Missionary Society in 1847; but it was not till 1861 that the summit was gained, when the ascent was made by Sir Richard Burton, Gustav Mann, a noted botanist, and Señor Calvo. The starting-point was Babundi, a place on the seashore west of the mountain. From the south-east the summit was reached by Mary Kingsley in 1895.

See Mary H. Kingsley, *Travels in West Africa* (London, 1897); Sir R. Burton, *Abeokuta and the Cameroons Mountains* (2 vols., London, 1863); E.B. Underhill, *Alfred Saker ... A Biography* (London, 1884); Sir H.H. Johnston, *George Grenfell and the Congo ... and Notes on the Cameroons ...* (London, 1908); Max Buchner, *Kamerun Skizzen und Betrachtungen* (Leipzig, 1887); S. Passarge, *Adamaua* (Berlin, 1895); E. Zintgraph, *Nord-Kamerun* (Berlin, 1895); F. Hutter, *Wanderungen und Forschungen im Nord-Hinterland von Kamerun* (Brunswick, 1902); F. Bauer, *Die deutsche Niger-Benue-Tsadsee-Expedition*, 1902-1903 (Berlin, 1904); C. René, *Kamerun und die deutsche Tsâdsee Eisenbahn* (Berlin, 1905); O. Zimmermann, *Durch Busch und Steppe vom Campo bis zum Schari, 1892-1902* (Berlin, 1909); also British Foreign Office Reports. For special study of particular sciences see F. Wohltmann, *Der Plantagenbau in Kamerun und seine Zukunft* (Berlin, 1896); F. Plehn, *Die Kamerunküste, Studien zur Klimatologie, Physiologie und Pathologie in den Tropen* (Berlin, 1898); E. Esch, F. Solger, M. Oppenheim and 0. Jaekel, *Beiträge zur Geologie von Kamerun* (Stuttgart, 1904). For geology the following works may also be consulted: Stromer von Reichenbach, *Geologie der deutschen Schutzgebiete in Afrika* (Berlin, 1896); A. von Koenen, "Über Fossilien der unteren Kreide am Ufer des Mungo in Kamerun," *Abh. k. Wiss.*, Göttingen, 1897; E. Cohen, "Lava vom Camerun-Gebirge," *Neues Jahrb. f. Min.*, 1887.

(F. R. C.)

1 This English form of the name, adopted in the 10th ed. of the *Ency. Brit.*, from the German, appears preferable both to the un-English Kamerun and to the older and clumsy "the Cameroons."

2 On the 26th of July a French gunboat also entered the estuary on a belated annexation mission.

CAMILING, a town of the province of Tarlac, Luzon, Philippine Islands, on the Camiling river, about 80 m. N.N.W. of Manila. Pop. (1903) 25,243. In 1903 after the census had been taken, the adjacent towns of Santa Ignacia (pop. 1911) and San Clemente (pop. 1822) were annexed to Camiling. Its products are rice, Indian corn and sugar. Fine timber grows in the vicinity. The principal language is Ilocano; Pangasinan, too, is spoken. Being in an isolated position, very difficult of access during the rainy season, Camiling has always been infested with thieves and bands of outlaws, who come here for concealment.

CAMILLUS, MARCUS FURIUS, Roman soldier and statesman, of patrician descent, censor in 403 B.C. He triumphed four times, was five times dictator, and was honoured with the title of Second Founder of Rome. When accused of having unfairly distributed the spoil taken at Veii, which was captured by him after a ten years' siege, he went into voluntary exile at Ardea. The real cause of complaint against him was no doubt his patrician haughtiness and his triumphal entry into Rome in a chariot drawn by white horses. Subsequently the Romans, when besieged in the Capitol by the Gauls, created him dictator; he completely defeated the enemy (but see BRENNUS and ROME: *History*, ii., "The Republic") and drove them from Roman territory. He dissuaded the Romans, disheartened by the devastation wrought by the Gauls, from migrating to Veii, and induced them to rebuild the city. He afterwards fought successfully against the Aequi, Volsci and Etruscans, and repelled a fresh invasion of the Gauls in 367. Though patrician in sympathy, he saw the necessity of making concessions to the plebeians and was instrumental in passing the Licinian laws. He died of the plague in the eighty-first year of his age (365). The story of Camillus is no doubt largely traditional. To this element probably belongs the story of the schoolmaster who, when Camillas was attacking Falerii (*q.v.*), attempted to betray the town by bringing into his camp the sons of some of the principal inhabitants of the place. Camillus, it is said, had him whipped back into the town by his pupils, and the Faliscans were so affected by this generosity that they at once surrendered.

See Livy v. 10, vi. 4; Plutarch, *Camillus*. For the Gallic retreat, see Polybius ii. 18; T. Mommsen, *Römische Forschungen*, ii. pp. 113-152 (1879).

CAMILLUS and **CAMILLA,** in Roman antiquity, originally terms used for freeborn children. Later, they were used to denote the attendants on certain priests and priestesses, especially the flamen dialis and flaminica and the curiones. It was necessary that they should be freeborn and the children of parents still alive (Dion. Halic. ii. 21). The name Camillus has been connected with the Cadmilus or Casmilus of the Samothracian mysteries, identified with Hermes (see CABEIRI).

CAMISARDS (from *camisade*, obsolete Fr. for "a night attack," from the Ital. *camiciata*, formed from *camicia*—Fr. *chemise*—a shirt, from the fact of a shirt being worn over the armour in order to distinguish friends from foes), the name given to the peasantry of the Cévennes who, from 1702 to 1705 and for some years afterwards, carried on an organized military resistance to the *dragonnades*, or conversion by torture, death and confiscation of property, by which, in the Huguenot districts of France, the revocation of the edict of Nantes was attempted to be enforced. The Camisards were also called Barbets ("water-dogs," a term also applied to the Waldenses), Vagabonds, Assemblers (*assemblée* was the name given to the meeting or conventicle of Huguenots), Fanatics and the Children of God. They belonged to that romance-speaking people of Gothic descent whose mystic imagination and independent character made the south of France the most fertile nursing-ground of medieval heresy (see CATHARS and ALBIGENSES). At the time of the Reformation the same causes produced like results. Calvin was warmly welcomed when he preached at Nîmes; Montpellier became the chief centre for the instruction of the Huguenot youth. It was, however, in the great triangular plateau of mountain called the Cévennes that, among the small farmers, the cloth and silk weavers and vine dressers, Protestantism was most intense and universal. These people were (and still are) very poor, but intelligent and pious, and of a character at once grave and fervent. From the lists of Huguenots sent from Languedoc to the galleys (1684 to 1762), we gather that the common type of *physique* is "belle taille, cheveux bruns, visage ovale." The chief theatre of the revolt comprised that region of the Cévennes bounded by the towns of Florac, Pont-de-Montvert, Alais and Lasalle, thus embracing the southern portion of the department of Lozère (the Bas-Gévaudan) and the neighbouring district in the east of the department of Gard.

In order to understand the War of the Cévennes it is necessary to recall the persecutions which preceded and

followed the revocation of the edict of Nantes. It is also necessary to remember the extraordinary religious movement which had for a great number of years agitated the Protestants of France. Faced by the violation of that most solemn of treaties, a treaty which had been declared perpetual and irrevocable by Henry IV., Louis XIII. and even Louis XIV. himself, they could not, in the enthusiasm of their faith, believe that such a crime would be left unpunished. But being convinced that no human power could give them liberty of conscience, they went to the Bible to find when their deliverance would come. As far back as 1686 Pierre Jurieu published his work *L'Accomplissement des prophéties*, in which, speaking of the Apocalypse, he predicted the end of the persecution and the fall of Babylon—that is to say of Roman Catholicism—for 1689. The Revolution in England seemed to provide a striking corroboration of his prophecies, and the apocalyptic enthusiasm took so strong a hold on people's minds that Bossuet felt compelled to refute Jurieu's arguments in his *Apocalypse expliquée*, published in 1689. The *Lettres pastorales* of Jurieu (Rotterdam, 1686-1687), a series of brief tracts which were secretly circulated in France, continued to narrate events and prodigies in which the author saw the intervention of God, and thus strengthened the courage of his adherents. This religious enthusiasm, under the influence of Du Serre, was manifested for the first time in the Dauphiné. Du Serre, who was a pupil of Jurieu, communicated his mystic faith to young children who were called the "petits prophètes," the most famous of whom was a girl named "La belle Isabeau." Brought up on the study of the prophets and the Apocalypse, these children went from village to village quoting and requoting the most obscure and terrible passages from these ancient prophecies (see Antichrist). It is necessary to remember that at this time the Protestants were without ministers, all being in exile, and were thus deprived of all real religious instruction. They listened with enthusiasm to this strange preaching, and thousands of those who were called New Catholics were seen to be giving up attendance at Mass. The movement advanced in Languedoc with such rapidity that at one time there were more than three hundred children shut up in the prisons of Uzès on the charge of prophesying, and the Faculty of Medicine of Montpellier, which was entrusted with their examination, went so far in their ignorance as to pronounce these irresponsible infants guilty of fanaticism. After the peace of Ryswick, 1697, the fierceness of the persecution was redoubled in the South. "I will show no mercy to the preachers," wrote the terrible Baville, the so-called "king of Languedoc," and he kept his word. The people of the Cévennes were in despair, for their loyalty to the king had been remarkable. In 1683 on the 6th of September an assembly composed of fifty pastors, sixty-four noblemen and thirty-four notables, held at Colognac, had drawn up a statement of its unalterable loyalty to Louis XIV. It is important to notice that the revolt of the Cévennes was essentially a popular movement. Among its leaders there was not a single nobleman, but only men of the people, a baker, a blacksmith, some ex-soldiers; but by far the most extraordinary characterisic is the presence, no longer of children, but of men and women who declared themselves inspired, who fell into religious ecstasies and roused in their comrades the most heroic bravery in battle and at the stake.

The assassination of the abbé du Chayla marks the beginning of the war of the Cévennes. The abbé, a veteran Catholic missionary from Siam, had been appointed inspector of missions in the Cévennes. There he introduced the "squeezers" (which resembled the Scottish "boot"), and his systematic and refined cruelty at last broke the patience of his victims. His murder, on the 23rd of July 1702, at Pont de Monvert, was the first blow in the war. It was planned by Esprit Séguier, who at once began to carry out his idea of a general massacre of the Catholic priests. He soon fell, and was succeeded by Laporte, an old soldier, who, as his troop increased, assumed the title of "the Colonel of the Children of God," and named his camp the "Camp of the Eternal." He used to lead his followers to the fight, singing Clement Marot's grand version of the 68th Psalm, "Que Dieu se montre seulement," to the music of Goudimel. Besides Laporte, the forest-ranger Castanet, the wool-carders Conderc and Mazel, the soldiers Catinat, Joany and Ravenel were selected as captains—all men whom the *théomanie* or prophetic malady had visited. But the most important figures are those of Roland, who afterwards issued the following extraordinary despatch to the inhabitants of St André:—"Nous, comte et seigneur Roland, généralissime des Protestants de France, nous ordonnons que vous ayez à congédier dans trois jours tous les prêtres et missionnaires qui sont chez vous, sous peine d'être brûlés tout vifs, vous et eux" (Court, i.p. 219); and Jean Cavalier, the baker's boy, who, at the age of seventeen, commanded the southern army of the Camisards, and who, after defeating successively the comte de Broglie and three French marshals, Montrevel, Berwick and Villars, made an honourable peace. (See Cavalier, Jean.)

Cavalier for nearly two years continued to direct the war. Regular taxes were raised, arsenals were formed in the great limestone caves of the district, the Catholic churches and their decorations were burned and the clergy driven away. Occasionally routed in regular engagements, the Camisards, through their desperate valour and the rapidity of their movements, were constantly successful in skirmishes, night attacks and ambuscades. A force of 60,000 was now in the field against them; among others, the Irish Brigade which had just returned from the persecutions of the Waldenses. The rising was far from being general, and never extended to more than three or four thousand men, but it was rendered dangerous by the secret and even in many places the open support of the people in general. On the other hand their knowledge of a mountainous country clothed in forests and without roads, gave the insurgents an enormous advantage over the royal troops. The rebellion was not finally suppressed until Baville had constructed roads throughout this almost savage country.

Montrevel adopted a policy of extermination, and 466 villages were burned in the Upper Cévennes alone, the population being for the most part put to the sword. Pope Clement XI. assisted in this work by issuing a bull against the "execrable race of the ancient Albigenses," and promising remission of sins to the holy militia which was now formed among the Catholic population, and was called the Florentines, Cadets of the Cross or White Camisards. Villars, the victor of Hochstädt and Friedlingen, saw that conciliation was necessary; he took advantage of the feeling of horror with which the quiet Protestants of Nimes and other towns now regarded the war, and published an amnesty. In May 1704 a formal meeting between Cavalier and Villars took place at Nimes. The result of the interview was that a document entitled *Trés humble requête des réformés du Languedoc au Roi* was despatched to the court. The three leading requests for liberty of conscience and the right of assembly outside walled towns, for the liberation of those sentenced to prison or the galleys under the revocation, and for the restitution to the emigrants of their property and civil rights, were all granted,—the first on condition of no churches being built, and the third on condition of an oath of allegiance being taken. The greater part of the Camisard army under Roland, Ravenel and Joany would not accept the terms which Cavalier had arranged. They insisted that the edict of Nantes must be restored,—"*point de paix, que nous n'ayons nos temples*." They continued the war till January 1705, by which time all their leaders were either killed or dispersed.

In 1709 Mazel and Claris, with the aid of two preaching women, Marie Desubas and Elizabeth Catalon, made a serious effort to rekindle revolt in the Vivarais. In 1711 all opposition and all signs of the reformed religion had

disappeared. On the 8th of March 1715, by medals and a proclamation, Louis XIV. announced the entire extinction of heresy.

What we know of the spiritual manifestations in the Cévennes (which much resembled those of the Swedish Raestars of Smaland in 1844) is chiefly derived from *Le Théâtre sacré des Cévennes*, London, 1707, reprinted at Paris in 1847; *A Cry From the Desert*, &c., by John Lacy, London, 1707; *La Clef des prophéties de M. Marion*, London, 1707; *Avertissements prophétiques d'Élie Marion*, &c., London, 1707. About the date of these publications the three prophets of the Cévennes, Marion, Durand-Fage and Cavalier (a cousin of the famous Jean Cavalier) were in London and were objects of lively curiosity. The consistory of the French church in the Savoy sent a protest to the lord mayor against "cette secte impie et extravagante" and the matter was tried at the Guildhall. Misson, author of the *Théâtre sacré*, declared in defence of the accused, that the same spirit which had caused Balaam's ass to speak could speak through the mouths of these prophets from the Cévennes. Marion and his two friends Fatio, a member of the Royal Society of London, and Daudé, a leading savant, who acted as his secretaries, were condemned to the pillory and to the stocks. Voltaire relates (*Siécle de Louis XIV.* c. 36) that Marion wished to prove his inspiration by attempting to raise a dead body (Thomas Ernes) from St Paul's churchyard. He was at last compelled to leave England.[1]

The inspiration (of which there were four degrees, *avertissement, souffle, prophetie, dons*) was sometimes communicated by a kiss at the assembly. The patient, who had gone through several fasts three days in length, became pale and fell insensible to the ground. Then came violent agitations of the limbs and head, as Voltaire remarks, "quite according to the ancient custom of all nations, and the rules of madness transmitted from age to age." Finally the patient (who might be a little child, a woman, a half-witted person) began to speak in the good French of the Huguenot Bible words such as these: "Mes frères, amendez-vous, faites pénitence, la fin du monde approche; le jugement général sera dans trois mois; répentez-vous du grand péché que vous avez commis d'aller à la messe; c'est le Saint-Esprit qui parle par ma bouche" (Brueys, *Histoire du fanatisme de notre temps*, Utrecht, 1737, vol. i. p. 153). The discourse might go on for two hours; after which the patient could only express himself in his native patois,—a Romance idiom,—and had no recollection of his "ecstasy." All kinds of miracles attended on the Camisards. Lights in the sky guided them to places of safety, voices sang encouragement to them, shots and wounds were often harmless. Those entranced fell from trees without hurting themselves; they shed tears of blood; and they subsisted without food or speech for nine days. The supernatural was part of their life. Much literature has been devoted to the discussion of these marvels. The Catholics Fléchier (in his *Lettres choisies*) and Brueys consider them the product of fasting and vanity, nourished on apocalyptic literature. The doctors Bertrand (*Du magnétisme animal*, Paris, 1826) and Calmeil (*De la folie*, Paris, 1845) speak of magnetism, hysteria and epilepsy, a prophetic monomania based on belief in divine possession. The Protestants especially emphasized the spirituality of the inspiration of the Camisards; Peyral, *Histoire des pasteurs du désert*, ii. 280, wrote: "Il fallait à cet effort gigantesque un ressort prodigieux, l'enthousiasme ordinaire n'y eût pas suffi." Dubois, who has made a careful study of the problem, says: "L'inspiration cévenole nous apparait comme un phénomène purement spirituel." Conservative Catholics, such as Hippolyte Blanc in his book on *L'inspiration des Camisards* (1859), regard the whole thing as the work of the devil. The publication of J.F.K. Hecker's work, *Die Volkskrankheiten des Mittelalters*, made it possible to consider the subject in its true relation. This was translated into English in 1844 by B.G. Babington as *The Epidemics of the Middle Ages*.

Although the Camisards were guilty of great cruelties in the prosecution of the war, there does not seem to be sufficient ground for the charge made by Marshal de Villars: "Le plupart de leurs chefs ont leurs demoiselles" (letter of 9th August 1704, in the *War Archives*, vol. 1797). Court replied to these unjust charges: "Their enemies have accused them of leading a life of licence because there were women in their camps. These were their wives, their daughters, their mothers, who were there to prepare their food and to nurse the wounded" (*Histoire*, vol. i. p. 71).

Bibliography.—The works devoted to the history of the Camisards are very numerous. Nevertheless there exists no work specifically devoted to this extremely interesting period in French history, for in none of the published works has proper use been made of the valuable documents preserved in the archives of the ministry of war. Among the chief works are:—Père Louvreleuil (priest, former curé of St. Germain de Calberte), *Histoire du fanatisme renouvelé où l'on raconte les sacrilèges, les maladies et les meurtres commis dans les Cévennes* (Toulouse, 1704); M. de Brueys, *Suite de l'histoire du fanatisme de notre temps où l'on voit les derniers troubles des Cévennes* (Paris, 1709); *Lettres choisies de M. Fléchier évêque de Nîmes avec une relation des fanatiques du Vivarez* (Paris, 1715); Madame de Merez de l'Incarnation, *Memoires et journal très fidèle de ce qui s'est passé le 11 de may 1703 jusqu'au 1 juin 1705 à Nîmes touchant les phanatiques*, published by E. de Barthélemy (Montpellier, 1874). These works are written by Catholic writers immediately after the war of the Cévennes, and, despite their partiality, include some valuable documents. *Mémoires du marquis de Guiscard* (Delft, 1705); Maximilien Misson, *Le Théâtre sacré des Cévennes ou Récit de diverses merveilles nouvellement opérées dans cette partie de la province de Languedoc* (London, 1707); Misson, the author of the *Voyages en Italie*, which met with such a great success, gave prominence to the facts relating to the inspiration of the Camisards; the *Théâtre* also contains important extracts from the works of Benoit, Brueys, Guiscard and Boyer, and several original letters from Camisards; *Histoire des Camisards, &c.* (London, 1740), the anonymous work of a distinguished writer, which was eventually condemned by the parlement of Toulouse to be torn up and burnt in 1759; Antoine Court, *Histoire des troubles des Cévennes* (3 vols., 1760), the best work of this period, compiled from numerous manuscript references. The war of the Cévennes has been treated in several English works, *e.g. A Compleat History of the Cevennes, giving a Particular Account of the Situation, &c.*, by a doctor of civil law (London, 1703). This work includes a dedication to the queen, an historical account of the people of the Cévennes, the bull of Pope Clement against the Camisards, and the bishop of Nîmes's mandate publishing the bull, and a discourse on the obligations of the English to help the Camisards, and a form of prayer used in the Camisard assembly, printed in London in 1703 under the title *Formulaire de prières des Cévennois dans leurs assemblées. The History of the Rise and Downfal of the Camisards, &c.* (London, 1709), dealt with the prophets of the Cévennes in London, and is only an abridged translation of Père Louvreleuil's work. Among modern works are, Ernest Moret, *Quinze ans du règne de Louis XIV* (3 vols., 1859), a work which gives a remarkable history of the war of the Cévennes; *Les Insurgés protestants sous Louis XIV.*, studies and unedited documents published by G. Frosterus (1868); *Mémoires de Bonbonnoux,* chief Camisard and pastor of the desert, published by Vielles (1883); Bonnemère, *Histoire de la guerre des Camisards* (1859). Two popular works are—F. Puaux, *Histoire populaire de la guerre des Camisards* (1875); Anna E. Bray, *The Revolt of the Protestants of the Cévennes with some Account of the Huguenots of the Seventeenth Century* (London, 1870).

(F. Px.)

1 This curious affair provoked a lengthy controversy, which is described in “La Relation historique de ce qui s’est passe a Londres au sujet des prophètes camisards” (*Republique des Lettres*, 1708), in the study of M. Vesson, *Les Prophètes camisards à Londres* (1893), and also in the book *Les Prophètes cévenols*, ch. iii. (1861) by Alfred Dubois.

CAMOENS [CAMÕES], **LUIS VAZ DE** (1524-1580), the prince of Portuguese poets, sprang from an illustrious and wealthy family of Galician origin, whose seat, called the castle of Camoens, lay near Cape Finisterre. His ancestor, the poet Vasco Pires de Camoens, followed the party of Peter the Cruel of Castile against Henry II., and on the defeat of the former had to take refuge along with other Galician nobles in Portugal, where he founded the Portuguese family of his name. King Fernando received him well, and gave him posts of honour and estates, and though the master of Aviz sequestered some of these and Vasco lost others after the battle of Aljubarrota, where he fought on the Spanish side, considerable possessions still remained to him. Antão Vaz, the grandfather of Luis, married one of the Algarve Gamas, so that Vasco da Gama and Camoens, the discoverer of the sea route to India and the poet who immortalized the voyage in his *Lusiads*, were kinsmen. Antão’s eldest son Simão Vaz was born in Coimbra at the close of the 15th century, and married Anna de Sá e Macedo, who bore him an only son, Luis Vaz de Camoens; thus the poet, like his father and grandfather, was a *cavalleiro fidalgo*, that is, an untitled noble.

Four cities dispute the honour of being his birthplace, though Lisbon has the better title; and there is a like dispute about the year, which, however, was almost certainly 1524. The poet spent his childhood in Coimbra, where his father owned a property, and made his first studies at the college of All Saints, designed for “honourable poor students,” and there contracted friendships with noblemen like D. Gonçalo da Silveira and his brother D. Alvaro, who were inmates of the nobles’ college of St Michael. These colleges were offshoots from and attached to the Augustinian monastery of Santa Cruz, an important religious and scholastic establishment, where the poet’s uncle D. Bento de Camoens, a virtuous and very learned man, was professed. The Renaissance, though late in penetrating into Portugal, had by this time definitely triumphed, and the university of Coimbra, after its reform in 1537 under the auspices of King John III., boasted the best teachers drawn from every country, among them George Buchanan. The possession of classical culture was regarded as the mark of a gentleman; the colleges of Santa Cruz required conversation within the walls to be in Greek or Latin, and the university, when it absorbed the colleges, adopted the same rule. In these surroundings, aided by a retentive memory, Camoens steeped himself in the literature and mythology of the ancients, as his works show, and he was thus able in after years to perfect the Portuguese language and to enrich it with many neologisms of classical origin. It is fortunate, however, for his country and his fame that he never followed the fashion of writing in Latin; on the contrary, except for his Spanish poems, he always employed his native tongue. After completing his grammar and rhetoric the poet entered on his university course for the degree of bachelor of arts, which lasted for three years, from 1539 to 1542, and during this period he met Jorge de Montemayor, the author of *Dianá*, who was then studying 116
music. He seems to have imbibed much of that encyclopaedic instruction to which the humanists aspired, for his writings show a very extensive reading, and his scientific knowledge and faculty of observation compelled the admiration of the great Humboldt. The thoroughness of his teaching is apparent when we remember that he wrote his epic in the fortresses of Africa and Asia, far from books, and yet gave proof of acquaintance with universal history, geography, astronomy, Greek and Latin literature, and the modern poetry of Italy and Spain. Much of the credit for this learning must be attributed to the encouragement of D. Bento, now prior of Santa Cruz, who became chancellor of the university the very year when Camoens entered it. There is a tradition that this uncle destined him for the church and caused him to study theology. The poet’s knowledge of dogma and the Bible, his friendly intercourse with the Lisbon Dominicans at the end of his life, and the share he is said to have taken in their disputations, make the hypothesis a likely one, but he made his own choice and preferred a lay life. We have very little verse of his Coimbra time, but it seems that he began in the Italian manner, following the new classical school of Sá de Miranda (*q.v.*), and that, though attached to the popular muse and well acquainted with the national songs and romances, legends and lore, his poetry in the old style (*medida velha*) is mostly of later date. An exception may perhaps be found in his *Auto* after the manner of Gil Vicente (*q.v.*), *The Amphitryons*, a Portuguese adaptation from Plautus which was very well received. At the age of eighteen Camoens left Coimbra, bidding adieu to the old city in verses breathing the most tender *saudade*. Lisbon, which impressed Cervantes so much as to draw from him a classic description in the novel *Persiles y Sigismunda*, made an even greater impression on the youthful Camoens, and the *Lusiads* are full of eulogistic epithets on the city and the Tagus.

Arriving in 1543, it has been conjectured that he became tutor to D. Antonio de Noronha, son of the great noble D. Francisco de Noronha, count of Linhares, who had lately returned from a French embassy to his palace at Xabregas. The poet’s birth and talents admitted him to the society of men like D. Constantine de Braganza, the duke of Aveiro, the marquis of Cascaes, the count of Redondo, D. Manoel de Portugal and D. Gonçalo da Silveira, son of the count of Sortelha, who died a Christian martyr in Monomotapa. At Xabregas Camoens must have met Francisco de Moraes (*q.v.*), who had served as secretary to the count of Linhares on his embassy, and there he probably read the MS. of *Palmeirim*; this would explain the origin of two of his roundels which are clearly founded on passages in the romance. Camoens had had a youthful love affair in Coimbra, but on Good Friday of the year 1544 he experienced the passion of his life. On that day in some Lisbon church he caught sight of D. Catherina de Ataide (daughter of D. Antonio de Lima, high chamberlain to the infant D. Duarte), who had recently become a lady-in-waiting to the queen. This young girl, the Nathercia of his after songs, counted then some thirteen years, and was destined to be his Beatrice. To see more of her, he persuaded the count of Linhares to introduce him to the court, where his poetical gifts and culture ensured him a ready welcome, and his fifth idyll, addressed to his patron on this occasion, paved the way for his entrance. Though inferior to his later compositions, it excels in harmony any verse previously written in Portuguese. At first his suit probably met with few difficulties, and if Catherina’s family regarded it seriously, their poverty, combined with the fact that the poet came of a good stock and had the future in his hands, may have prevented any real opposition. It was his own imprudence that marred his fortunes, and his consciousness of this fact gave his muse that moving expression, truth and *saudade*, which are lacking in the somewhat artificial productions of the sentimental Petrarch. But while Camoens gained protectors and admirers, his temperament and conduct ensured him envious foes, and the secret of his love got out and became the subject of gossip. All was not smooth with the lady, who showed herself coy; now yielding to her heart, she was kind; and then listening to her friends, who would have preferred a better

match for her, she repelled her lover. Jealousy then seized him, and sick of court life for the moment, he gladly accompanied his patron to the latter's country house; but once there he recognized that Lisbon was the centre of attraction for him and that he could not be happy at a distance. His verses at this time reveal his parlous condition. He oscillates between joy and depression. He passes from tender regrets to violent outbursts, which are followed by calm and peace, while expressions of passionate love alternate with bold desires and lofty ambitions. It is clear that there was an understanding between him and Catherina and that they looked forward to a happy ending, and this encouraged him in his weary waiting and his search for a lucrative post which would enable him to approach her family and ask for her hand. From this period date the greater part of his roundels and sonnets, some of the odes and nearly all the eclogues.

His fifth eclogue shows that he was seriously thinking of his patriotic poem in 1544; and from the fourth it seems likely that the *Lusiads* were in course of composition, and that cantos 3 and 4 were practically completed. He had by now established his fame and was known as the Lusitanian Virgil, but presently he had a rude awakening from his dreams of love and glory. He had shown his affection too openly, and some infraction of court etiquette, about which the queen was strict, caused the tongue of scandal to wag; perhaps it was an affair with one of Catherina's brothers, even a duel, that led to the decree which exiled him from Lisbon.

Camoens's rashness, self-confidence and want of respect for the authorities all contributed to the penalty, and the composition of the play *El Rei Seleuco* would aggravate his offence in the eyes of John III. Produced in 1545 and derived from Plutarch, the plot was calculated to draw attention to the relations between the king and his stepmother, and to recall the action of D. Manoel in robbing his son John III. of his intended bride. Camoens composed it for a wedding festivity in the house of Estacio da Fonseca, and some of the verses refer so openly to his passion, that if, as is likely, he spoke them himself, emphasizing them with voice and gesture so as to publish his love to the world, this new boldness, combined with the subject of the piece, must have rendered his exile a certainty. All we know definitely, however, is that the court was henceforth closed to him, and in 1546 he had to leave Lisbon, the abode of his love and the scene of his triumph. Tradition says that he went to the Ribatejo and spent seven or eight months with his mother's relatives in or near Santarem, whence he poured out a number of his finest poems, including his *Elegy of Exile* and some magnificent sonnets, which, in vigour of ideas and beauty of expression, exceeded anything he had hitherto produced. Poets cannot live on bays, however, and pressed by necessity he determined to become a soldier.

One of his best modern biographers thinks that he petitioned the king for liberty to commute his penalty into military service in Africa; but whether this be so, or whether he merely went there to gain his spurs, certain it is that in the autumn of 1547 he proceeded to Ceuta. For the next two years, the usual period of service there, he lived the routine life of a common soldier in this famous trade emporium and outpost-town, and he lost his right eye in a skirmish with the Moroccans, though some writers make the incident occur on the voyage across the straits when his ship was attacked by Sallee rovers. Elegy ii. and a couple of odes date from his stay in Ceuta. He is full of sadness and almost in despair, but is saved from suicide by love and memory of the past. He has intervals of calm and resignation, even of satirical humour, and these become more frequent as the term of his exile draws near, and in one of them he wrote his prose letter to a "Lisbon friend." The octaves on the *Discontent of the World*, which breathe a philosophic equanimity and lift the reader out of the tumult of daily life, go to show that his restless heart had found peace at last and that he had accustomed himself to solitude.

In November 1549 the aged governor of Ceuta, D. Affonso de Noronha, was summoned to court and created viceroy of India, and Camoens accompanied him to Lisbon, intending to follow him to the East in the armada which was due to sail in the spring of 1550. Reaching the capital in December, the poet almost immediately enlisted, but when the time came for departure he had changed his mind. His affection for Catherina and dreams of literary glory detained him, and he lived on in the expectation of obtaining a post on the strength of his services and wound. But month after month passed by without result, and in his disappointment he allied himself with a group of hot-blooded youths, including the ex-friar Antonio Ribeiro, nicknamed "the Chiado", after whom the main street of Lisbon takes its name, and endeavoured to forget his troubles in their society. He took part in their extravagances and gained the name of "Trinca-fortes" ("Crack-braves") from his bohemian companions, while there were ladies who mocked at his disfigurement, dubbing him "devil" and "eyeless face". In the course of his adventures he had often to draw his sword, either as attacker or attacked, and he boasted that he had seen the soles of the feet of many but none had seen his. When the reply to his application came from the palace it was a negative one, and he had now nothing further to expect. His stock of money brought from Ceuta was certainly exhausted, and misery stared him in the face, making him desperate. On the feast of Corpus Christi, the 16th of June 1552, he found two masked friends of his engaged in a street fight near St Dominic's convent, and joining in the fray he wounded one Gonçalo Borges, a palace servant, with the result that he was apprehended and lodged in gaol. This unprovoked attack upon a royal servant on so holy a day constituted a serious offence and cost him eight months' imprisonment. In a pathetic sonnet he describes his terrible experiences, which made such an impression on him that years afterwards he recurred to them in his great autobiographical Canzon 10. When Borges' wound was completely healed, the poet's friends intervened to assist him, and it was arranged that on his formally imploring pardon Borges should grant it and desist from proceeding with the case. This was effected on the 13th of February 1553, and on the 7th of March the king, taking into consideration that Camoens was "a youth and poor and decided to serve this year in India", confirmed the pardon. He had been obliged to humble his pride and enlist again, but while he complained of his troubles he recognized, in his frank, honest way, that his own mistakes were in part the causes of them.

After bidding good-bye to Catherina for the last time, Camoens set sail on Palm Sunday, the 24th of March 1553, in the "S. Bento", the flagship of a fleet of four vessels, under Fernaõ Alvares Cabral. His last words, he says in a letter, were those of Scipio Africanus, "Ingrata patria, non possidebis ossa mea".

He relates some of his experiences on board and the events of the voyage in various sonnets in Elegy iii. and in the *Lusiads*. In those days the sailors navigated the ships, while the men-at-arms kept the day and night watches, helped in the cleaning and, in case of necessity, at the pumps, but the rank of Camoens doubtless saved him from manual work. He had much time to himself in his six months' voyage and was able to lay in a store of nautical knowledge, while tempestuous weather off the Cape of Good Hope led him to conceive the dramatic episode of Adamastor (*Lusiads*, canto 5). The "S. Bento", the best ship of the fleet, weathered the Cape safely, and without touching at Mozambique, the watering-place of ships bound for India, anchored at Goa in September. It seems probable that the idea of the *Lusiads* took further shape on the voyage out, and that Camoens modified his plan; cantos 3 and 4 were already written, but from an historical he now made it a maritime epic. The discovery of

India became the main theme, while the history of Portugal was interlaced with it, and the poem ended with the espousals between Portugal and the ocean, and a prophecy of the future greatness of the fatherland.

At the time of his arrival Goa boasted 100,000 inhabitants, and with its magnificent harbour was the commercial capital of the west of India. The first viceroy had been content with a sea dominion, but the great Affonso de Albuquerque saw that this was not enough to secure the supremacy of the Portuguese; recognizing the strategic value of Goa, he seized it and made it the capital of a land empire, and built fortresses in every important point through the East. Since his death a succession of remarkable victories had made the flag of Portugal predominant, but the enervating climate, the pleasures and the plunder of Asia, began to tell on the conquerors. Corruption was rife from the governor downwards, because the ruling ambition was to get rich and return home, and the hero of one day was a pirate the next. After all, it was only human nature, for a governorship lasted but three years and Portugal was far away, so the saying went round—"They are installed the first year, they rob the second, and then pack up in the third to sail away." Camoens was well received at first, owing to his talents and bravery, and he found the life cheap and merry, but having left his country with high ideals, the injustice and demoralization of manners he found in India soon disgusted him. He compared Goa to Babylon, and called it "the mother of villains and the stepmother of honest men."

His first military service in the East took place in November 1553, when he went with a force led by the viceroy to chastise a petty king on the Malabar coast. The expedition only lasted two or three months, and after some trivial combats it returned to Goa. In February of the following year Camoens accompanied the viceroy's son, D. Fernando de Menezes, who led an armada to the mouth of the Red Sea and thence up the Arabian coast to snap up hostile merchantmen and suppress piracy. Next the fleet went on to Ormuz, as was the custom with these annual cruises, and then to Bassora, where the poet helped to make some valuable prizes, and wrote a sonnet—it was ever, with him, "in one hand the sword, in the other the pen"! Returning to Goa in November he learnt of the deaths of Prince John, and of his friend and pupil the young D. Antonio de Noronha, and paid his tribute in a feeling sonnet and eclogue. In February 1555 he sailed on another pirate hunt and spent six weary months off Cape Guardafui, varied by a visit to Mombasa and by further work on his epic, and only got back to Goa in the following September. His experiences are recorded in the profound and sad 10th Canzon.

Meanwhile Francisco Barreto, an honourable and generous man, had become governor-general of India in the June of 1555, and, his appointment being popular, a reign of festivities began in Golden Goa to welcome his succession, in the course of which Camoens produced his *Filodemo*, a dramatized novel written in his court days. The same occasion probably gave birth to the *Disparates na India* ("Follies of India"), and certainly to the *Satyra do Torneio* ("Satire of the Tourney"), which confirmed the poet's reputation as a sayer of sharp things and gave considerable umbrage to those whom the cap fitted. However, it was not the enmities thus aroused but military duty which compelled him to quit Goa once more in the spring of 1556. He had enlisted in Lisbon for five years, the usual term, and in compliance with the orders of the governor he sailed for the Moluccas in April and there fought and versified for two years, though nearly all is guesswork at this period of his life. He appears to have spent the time between September 1556 and February 1557 in the island of Ternate, where he wrote Canzon 6, revealing a state of moral depression similar to that of Canzon 10, and he perhaps visited Banda and Amboina. In the following year he took part in the military occupation of Macao, which the emperor of China had presented to the Portuguese in return for their destruction of a pirate fleet which had besieged Canton. The poet's five years' term of service was now over, and he remained at Macao many months waiting for a ship to carry him back to India. He had made some profit out of the *Mercî de Viagem*, granted by the governor Barreto to free him from the poverty in which he habitually lived, and he spent his money royally. At the same time he continued his epic, working in the grotto which still bears his name.

All seemed to be going smoothly with him until suddenly his fortunes took a serious turn for the worse. As the result of an intrigue the captain of the yearly ship from China to India, who acted as governor of Macao during his stay in port, imprisoned Camoens, and took him on board with a view of bringing him to trial in India. The ship, however, was wrecked in October 1559 at the mouth of the Mekong river, and the poet had to save his life and his *Lusiads* by swimming to shore, and though he preserved the six or seven finished cantos of the poem, he lost everything else. While wandering about on the Cambodian coast awaiting the monsoon and a vessel to take him to Malacca, he composed those magnificent stanzas "By the Waters of Babylon," called by Lope de Vega "the pearl of all poetry," in which he recalls the happy days of his youth, sighs for Lisbon (Sion) and his love, and mourns his long exile from home. He got somehow to Malacca, and after a short stay there reached Goa, still as prisoner, in June 1561. He was straightway lodged in gaol, where he heard for the first time of the death of Catherina, and he poured out his grief in the great sonnet, *Alma Minha Gentil*. The viceroy, D. Constantius de Bragança, had recently returned from Jafanapatam, bringing as prize a tooth of Buddha, and Camoens approached him with a splendid epistle in twenty octaves, after the manner of Horace's ode to Augustus. It failed, however, to hasten the consideration of his case, but in September the Conde de Redondo, a good friend, came into office and immediately ordered his release from prison. His troubles were not yet at an end, however, for one Miguel Rodriguez Coutinho, a well-known soldier and citizen of Goa who lent money at usurious rates, thought the opportunity a good one to obtain repayment of a debt, and had Camoens lodged once more in gaol. As soon as he came out the poet composed a burlesque roundel satirizing his persecutor under the nickname of Fios Seccos ("dry threads").

Though very poor he now led an easier, even a pleasant life for a time. He was able to see his friends D. Vasco de Ataide, D. Francisco de Almeida, Heitor da Silveira, João Lopes Leitaõ and Francisco de Mello, all men of family and note. One day he invited them to a banquet, at which, instead of the usual dishes, each guest was served with a set of witty verses, and after these had been read out and chaff had gone round, the food came and they formed a merry party. The poet used his interest with the viceroy to recommend to him the naturalist Garcia da Orta, whose *Colloquies* on the simples and drugs of the East, the first product of the press in India, appeared in April 1563 with an ode by Camoens. His life for the next three years is almost a blank, but we know that he was hard at work finishing his epic, assisted by the advice of the historian Diogo do Couto, who became its commentator, and further that the new viceroy, his friend D. Antão de Noronha, nominated him to a reversion of the factory of Chaul, which, however, never fell into possession. It is clear from his writings that fourteen years in the East had told on Camoens. His best friends were dead or scattered, and he was overwhelmed with *saudade*. His sole ambition was to go home and print his poem, but he had no money to pay his passage. In September 1567, however, Pedro Barreto was named captain of Mozambique, and insisted on the poet accompanying him to Sofala, at the same time lending him two hundred cruzades. It was part of the way home, so Camoens accepted,

but after they reached Mozambique Barreto called in this money, and his debtor, being unable to pay, was detained there for two whole years. Here Diogo do Couto found him “so poor that he ate at the cost of friends, and in order that he might embark for the Kingdom we friends collected for him the clothes he needed and some gave him to eat, and that winter he finished perfecting the *Lusiads* for the press and wrote much in a book he was making, which he called *Parnaso of Luiz de Camoes*, a book of much learning, doctrine and philosophy, which was stolen from him.” Thanks to Couto and others, Camoens was able to liquidate his debt and set sail in November 1569 in the “Santa Clara,” and he reached Portugal on the 7th of April 1570, after an absence of seventeen years.

The only wealth he brought with him from India was the MS. of his great poem, a *”Tesoro del Luso”* in the words of Cervantes. Moreover, he returned at an unfortunate moment—one of pest and famine. The great plague which had killed a quarter, or, as some say, half of the population of the capital, was declining, but a rigid quarantine prevailed, and the ship had to lie off Cascaes until the sanitary authorities allowed her to enter the Tagus. Camoens was welcomed by his mother, whom he found “very old and very poor”—his father had died at Goa about 1555—and after a visit to Catherina’s tomb, which inspired the poignant sonnet 337, he set about obtaining the royal licence to print the *Lusiads*. This was dated the 24th of September 1571 and gave him a ten years’ copyright, and as soon as the book appeared some friendly and influential hand, perhaps D. Manoel de Portugal, perhaps D. Francisca de Aragão for whom he had rhymed in the happy days of his youth, presented the national epic to King Sebastian. Shortly afterwards, on the 28th of July 1572, the king gave the poet a pension of fifteen milreis for the term of three years, as a reward for his services in India and for his poem. It was relatively a considerable sum, seeing that he had no great military record, and it seems even generous when we remember that Magellan had only received twelve, and had left Portugal because King Manoel would not give him a slight increase. Many functionaries with families had less to live on, and Camoens’s subsistence was secure for the time being, and he could afford an attendant, so that the legend of the slave Antonio may well be true. Moreover, he was in the enjoyment of the fame his poem brought him. Philip II. is said to have read and admired it, and the powerful minister, Pedro de Alcaçova Carneiro, echoed the general opinion when he remarked that it had only one defect, in not being short enough to learn by heart or long enough to have no ending. Tributes came from abroad too. Tasso wrote and sent Camoens a sonnet in his praise, Fernando de Herrera celebrated him, and the year 1580 saw the publication of two Spanish versions, one at Alcalá, the other at Salamanca. His pension lapsed in 1575, but on the 2nd of August it was renewed for a further term; owing, however, to a mistake of the treasury officials, Camoens drew nothing for about a year and a half and fell into dire distress. This explains the story of Ruy da Camara, who had engaged him to translate the penitential psalms, and not receiving the version, called on the poet, who said in excuse that he had no spirit for such work now that he wanted for everything, and that his slave had asked him for a penny for fuel and he could not give it.

On the 2nd of June 1578, just before his start for the expedition to Africa which cost him his life and Portugal her independence, King Sebastian had renewed the poet’s pension for a further period. Though Camoens had neither the health nor the means to accompany the splendid train of nobles and courtiers who followed the last crusading monarch to his doom, he began an epic to celebrate the enterprise, but burnt it when he heard the news of the battle of Alcacer. Instead, he mourned the death of his royal benefactor in a magnificent sonnet, and in Elegy x. reproached the cowardly soldiery who contributed to the rout. On the 31st of January 1580 the cardinal king Henry died, and, foreseeing the Spanish invasion, Camoens wrote in March to his old friend D. Francisco de Almeida: “All will see that I so loved my country that I was content not only to die in her but with her.” A great plague had been raging in Lisbon since the previous year, and the poet, who lay ill in his poor cottage in the rua de Santa Anna, depressed by the calamities of his country, fell a victim to it. He was removed to a hospital and there passed away, unmarried and the last of his line, on the 10th of June 1580. A Carmelite, Frei José Indio, attended him in his last moments and received the only recognition Camoens could give, his copy of the *Lusiads*. He wrote afterwards: “What more grievous thing than to see so great a genius thus unfortunate. I saw him die in a hospital in Lisbon, without a sheet to cover him, after having triumphed in the East Indies and sailed 5000 leagues by sea.” The house of Vimioso supplied the winding-sheet, and Camoens was buried with other victims of the plague in a common grave in the cemetery of Santa Anna. Years later D. Gonçalo Coutinho erected in the church of that invocation an *in memoriam* slab of marble with an inscription, and subsequently epitaphs were added by other admirers, but the earthquake of 1755 damaged the building, and all traces of these last acts of homage to genius have disappeared. The third centenary of the poet’s death was made the occasion of a national apotheosis, and on the 8th of June 1880 some remains, piously believed to be his, were borne with those of Vasco da Gama to the national pantheon, the Jeronymos at Belem.

The masterpiece of Camoens, the *Lusiads*, is the *epos* of discovery. It is written in hendecasyllabic *ottava rima*, and is divided into ten cantos containing in all 1102 stanzas. Its argument is briefly as follows. After an exordium proposing the subject, invoking the Tagus muses and addressing King Sebastian, Vasco da Gama’s ships are shown sailing up the East African coast on their way to India. At a council of the gods the fate of the fleet is discussed, and Bacchus promises to thwart the voyage, while Venus and Mars favour the navigators. They arrive at Mozambique, where the governor endeavours to destroy them by stratagem, and, this failing, Bacchus tries other plots against them at Quiloa and Mombasa which are foiled by Venus. In answer to her appeal, Jupiter foretells the glorious feats of the Portuguese in the East, and sends Mercury to direct the voyagers to Melinde, where they are hospitably received and get a pilot to guide them to India. The local ruler visits the fleet and asks Gama about his country and its history, and in response the latter gives an account of the origin of the kingdom of Portugal, its kings and principal achievements, ending with the incidents of the voyage out. This recital occupies cantos 3, 4 and 5, and includes some of the most admired and most powerful episodes in the poem, *e.g.* those of Ignez de Castro, King Manoel’s dream of the rivers Ganges and Indus, the speech of the old man of Belem and the apparition of Adamastor off the Cape of Good Hope. Canto 6 describes the crossing of the Indian Ocean from Melinde to Calicut and a fresh hostile attempt on the part of Bacchus. He descends to Neptune’s palace, and at a council of the sea-gods it is resolved to order Aeolus to loose the winds against the Portuguese, but the tempest is quelled by Venus and her nymphs in answer to Gama’s prayer, and the morning light reveals the Ghats of India. Just before the storm, occurs the night scene in which Velloso entertains his shipmates with the story of the Twelve of England, another of the famous episodes. Canto 7 is taken up with the arrival at Calicut, a description of the country and the details of Gama’s reception by the raja. The governor of the city visits the fleet and inquires about the pictures on their banners, whereupon Paulo da Gama, Vasco’s brother, tells him of the deeds of the early Portuguese kings. Meanwhile Bacchus, not to be baulked, appears to a priest in the guise of Mahomet, and stirs up the Moslems against the Christian adventurers, with the result that the raja charges Gama with being a leader of convicts and pirates. To this the captain makes a spirited reply and gets his despatch, but

he has new snares to avoid and further difficulties to overcome before he is finally able to set sail on the return voyage. Pitying their toils, Venus determines to give the voyagers repose and pleasure on their way home, and directs their course to an enchanted island, which is described in canto 9, in the longest and perhaps the most beautiful episode in the poem. On landing they are received by the goddess and her nymphs, and general joy ensues, heightened by banquets and amorous play. In a prophetic song, the siren tells of the exploits of the Portuguese viceroys, governors and captains in India until the time of D John de Castro, after which Tethys ascends a mountain with Gama, shows him the spheres after the system of Ptolemy and the globe of Asia and Africa, and describes the Indian life of St Thomas the apostle. Finally the navigators quit the island and reach Lisbon, and an epilogue contains a patriotic exhortation to King Sebastian and visions of glory, which ended so disastrously at the battle of Alcacer.

Though the influence of Camoens on Portuguese has been exaggerated, it was very considerable, and he so far fixed the written language that at the present day it is commonly and not inaccurately called “the language of Camoens.” The *Lusiads* is the most successful modern epic cast in the ancient mould, and it has done much to preserve the corporate life of the Portuguese people and to keep alive the spirit of nationality in times of adversity like the “Spanish Captivity” and the Napoleonic invasion. Even now it forms a powerful bond between the mother-country and her potentially mighty daughter-nation across the Atlantic, the United States of Brazil. The men of the Renaissance saw nothing incongruous in that mixture of paganism and Christianity which is found in the *Lusiads* as in Ariosto, though some modern critics, like Voltaire, consider it a grave artistic defect in the poem. The fact that the *Lusiads* is written in a little-known language, and its intensely national and almost exclusively historical character, undoubtedly militate against a right estimate of its value, now that Portugal, once a world power, has long ceased to hold the East in fee or to guide the destinies of Europe. But though political changes may and do react on literary appreciations, the *Lusiads* remains none the less a great poem, breathing the purest religious fervour, love of country and spirit of chivalry, with splendid imaginative and descriptive passages full of the truest and deepest poetry. The structure is Virgilian, but the whole conception is the author’s own, while the style is natural and noble, the diction nearly always correct and elegant, and the verse, as a rule, sonorous and full of harmony.

In addition to his epic, Camoens wrote sonnets, canzons, odes, sextines, eclogues, elegies, octaves, roundels, letters and comedies. The roundels include *cartas, motes, voltas, cantigas, trovas, pastorals* and *endechas*. In the opinion of many competent judges Camoens only attains his true stature in his lyrics; and a score of his sonnets, two or three of the canzons, eclogues and elegies, and the Babylonian roundels will bear comparison with any composition of the same kind that other literatures can show. Referring to the *Lusiads*, A. von Humboldt calls Camoens a “great maritime painter,” but in his best lyrics he is a thinker as well as a poet, and when free from the trammels of the epic and inherited respect for classical traditions, he reveals a personality so virile and deep, a philosophy so broad and human, a vision so wide, and a form and style so nearly perfect, as not only to make him the foremost of Peninsular bards but to entitle him to a place in that small company of universal poets of the first rank.

The oldest and most authentic portrait of Camoens appeared in 1624 with his life, by Manoel Severim de Faria. It is a kitcat and shows the poet in armour wearing a laurel crown; his right hand holds a pen, his left rests on a copy of the *Lusiads*, while a shield above shows the family arms, a dragon rising from between rocks. The likeness exhibits a Gothic or northern type, and the tradition of his red beard and blue eyes confirms it. Except for an ode, sonnet and elegy, all Camoens’s lyrics were published posthumously.

AUTHORITIES.—The most modern and most critical biographies are those of Dr Theophilo Braga, *Camões, epoca e Vide* (Oporto, 1907), and of Dr Wilhelm Storck, *Luis de Camões Leben* (Paderborn, 1890), while the most satisfactory edition of the complete works is due to the Visconde de Juromenha (6 vols., Lisbon, 1860-1869), though it contains some spurious matter. While rejecting without good reason many of the traditions accepted by Juromenha in his life of the poet, Storck embroiders on his own account, and Braga must be preferred to him. Two volumes of Innocencio da Silva’s *Diccionario Bibliographico Portuguez* (14 and 15) are entirely devoted to Camoens and Camoniana, the second of them dealing fully with the tercentenary celebrations. Among modern Portuguese studies of the national epic the most important are perhaps *Camões e a Renascença em Portugal*, by Oliveira Martins, and *Camões e o Sentimento Nacional*, by Dr T. Braga (Oporto, 1891). The latter volume contains useful information on the various editions of Camoens, with an account of the texts and remarks on his plagiarists. Very few poets have been so often translated, and a list and estimate of the English translations of the *Lusiads* from the time of Sir Richard Fanshawe (1655) downwards, will be found in Sir Richard Burton’s *Camoens: His Life and His Lusiads*, which, notwithstanding some errors, is a most informing book, and the result of a curious similarity of temperament and experience between master and disciple. Burton translated the *Lusiads* (2 vols., London, 1880) and the *Lyricks* (sonnets, canzons, odes and sextines; 2 vols., London, 1884), and left a version of all the minor works in MS. The accurate and readable version of the epic by Mr J.J. Aubertin, with the Portuguese text opposite, has gone through two editions (2nd ed., 2 vols., London, 1884), and there is a version of seventy of the sonnets, accompanied by the Portuguese text, by the same author (London, 1881).

(E. PR.)

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