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THE ENCYCLOPÆDIA BRITANNICA

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ELEVENTH EDITION

VOLUME XII SLICE III

Gordon, Lord George to Grasses

Articles in This Slice

GORDON, LORD GEORGE (1751-1793), third and youngest son of Cosmo George, duke of Gordon, was born in London on the 26th of December 1751. After completing his education at Eton, he entered the navy, where he rose to the rank of lieutenant in 1772, but Lord Sandwich, then at the head of the admiralty, would not promise him the command of a ship, and he resigned his commission shortly before the beginning of the American War. In 1774 the pocket borough of Ludgershall was bought for him by General Fraser, whom he was opposing in Inverness-shire, in order to bribe him not to contest the county. He was considered flighty, and was not looked upon as being of any importance. In 1779 he organized, and made himself head of the Protestant associations, formed to secure the repeal of the Catholic Relief Act of 1778. On the 2nd of June 1780 he headed the mob which marched in procession from St George's Fields to the Houses of Parliament in order to present the monster petition against the acts. After the mob reached Westminster a terrific riot ensued, which continued several days, during which the city was virtually at their mercy. At first indeed they dispersed after threatening to make a forcible entry into the House of Commons, but reassembled soon afterwards and destroyed several Roman Catholic chapels, pillaged the private dwellings of many Roman Catholics, set fire to Newgate and broke open all the other prisons, attacked the Bank of England and several other public buildings, and continued the work of violence and conflagration until the interference of the military, by whom no fewer than 450 persons were killed and wounded before the riots were quelled. For his share in instigating the riots Lord Gordon was apprehended on a charge of high treason; but, mainly through the skilful and eloquent defence of Erskine, he was acquitted on the ground that he had no treasonable intentions. His life was henceforth full of crack-brained schemes, political and financial. In 1786 he was excommunicated by the archbishop of Canterbury for refusing to bear witness in an ecclesiastical suit; and in 1787 he was convicted of libelling the queen of France, the French ambassador and the administration of justice in England. He was, however, permitted to withdraw from the court without bail, and made his escape to Holland; but on account of representations from the court of Versailles he was commanded to quit that country, and, returning to England, was apprehended, and in January 1788 was sentenced to five years' imprisonment in Newgate, where he lived at his ease, giving dinners and dances. As he could not obtain securities for his good behaviour on the termination of his term of imprisonment, he was not allowed to leave Newgate, and there he died of delirious fever on the 1st of November 1793. Some time before his apprehension he had become a convert to Judaism, and had undergone the initiatory rite.

A serious defence of most of his eccentricities is undertaken in *The Life of Lord George Gordon, with a Philosophical Review of his Political Conduct*, by Robert Watson, M.D. (London, 1795). The best accounts of Lord George Gordon are to be found in the *Annual Registers* from 1780 to the year of his death.

GORDON, SIR JOHN WATSON (1788-1864), Scottish painter, was the eldest son of Captain Watson, R.N., a cadet of the family of Watson of Overmains, in the county of Berwick. He was born in Edinburgh in 1788, and was educated specially with a view to his

joining the Royal Engineers. He entered as a student in the government school of design, under the management of the Board of Manufactures. His natural taste for art quickly developed itself, and his father was persuaded to allow him to adopt it as his profession. Captain Watson was himself a skilful draughtsman, and his brother George Watson, afterwards president of the Scottish Academy, stood high as a portrait painter, second only to Sir Henry Raeburn, who also was a friend of the family. In the year 1808 John sent to the exhibition of the Lyceum in Nicolson Street a subject from the *Lay of the Last Minstrel*, and continued for some years to exhibit fancy subjects; but, although freely and sweetly painted, they were altogether without the force and character which stamped his portrait pictures as the works of a master. After the death of Sir Henry Raeburn in 1823, he succeeded to much of his practice. He assumed in 1826 the name of Gordon. One of the earliest of his famous sitters was Sir Walter Scott, who sat for a first portrait in 1820. Then came J. G. Lockhart in 1821; Professor Wilson, 1822 and 1850, two portraits; Sir Archibald Alison, 1839; Dr Chalmers, 1844; a little later De Quincey, and Sir David Brewster, 1864. Among his most important works may be mentioned the earl of Dalhousie (1833), in the Archers' Hall, Edinburgh; Sir Alexander Hope (1835), in the county buildings, Linlithgow; Lord President Hope, in the Parliament House; and Dr Chalmers. These, unlike his later works, are generally rich in colour. The full length of Dr Brunton (1844), and Dr Lee, the principal of the university (1846), both on the staircase of the college library, mark a modification of his style, which ultimately resolved itself into extreme simplicity, both of colour and treatment.

During the last twenty years of his life he painted many distinguished Englishmen who came to Edinburgh to sit to him. And it is significant that David Cox, the landscape painter, on being presented with his portrait, subscribed for by many friends, chose to go to Edinburgh to have it executed by Watson Gordon, although he neither knew the painter personally nor had ever before visited the country. Among the portraits painted during this period, in what may be termed his third style, are De Quincey, in the National Portrait Gallery, London; General Sir Thomas Macdougall Brisbane, in the Royal Society; the prince of Wales, Lord Macaulay, Sir M. Packington, Lord Murray, Lord Cockburn, Lord Rutherford and Sir John Shaw Lefevre, in the Scottish National Gallery. These latter pictures are mostly clear and grey, sometimes showing little or no positive colour, the flesh itself being very grey, and the handling extremely masterly, though never obtruding its cleverness. He was very successful in rendering acute observant character. A good example of his last style, showing pearly flesh-painting freely handled, yet highly finished, is his head of Sir John Shaw Lefevre.

John Watson Gordon was one of the earlier members of the Royal Scottish Academy, and was elected its president in 1850; he was at the same time appointed limner for Scotland to the queen, and received the honour of knighthood. Since 1841 he had been an associate of the Royal Academy, and in 1851 he was elected a royal academician. He died on the 1st of June 1864.

GORDON, LEON, originally Judah Loeb Ben Asher (1831-1892), Russian-Jewish poet and novelist (Hebrew), was born at Wilna in 1831 and died at St Petersburg in 1892. He took a leading part in the modern revival of the Hebrew language and culture. His satires did much to rouse the Russian Jews to a new sense of the reality of life, and Gordon was the apostle of enlightenment in the Ghettos. His Hebrew style is classical and pure. His poems were collected in four volumes, *Kol Shire Yehudah* (St Petersburg, 1883-1884); his novels in *Kol Kithbe Yehuda* (Odessa, 1889).

For his works see *Jewish Quarterly Review*, xviii. 437 seq.

GORDON, PATRICK (1635-1699), Russian general, was descended from a Scottish family of Aberdeenshire, who possessed the small estate of Auchleuchries, and were connected with the house of Haddo. He was born in 1635, and after completing his education at the parish schools of Cruden and Ellon, entered, in his fifteenth year, the Jesuit college at

Braunsberg, Prussia; but, as “his humour could not endure such a still and strict way of living,” he soon resolved to return home. He changed his mind, however, before re-embarking, and after journeying on foot in several parts of Germany, ultimately, in 1655, enlisted at Hamburg in the Swedish service. In the course of the next five years he served alternately with the Poles and Swedes as he was taken prisoner by either. In 1661, after further experience as a soldier of fortune, he took service in the Russian army under Alexis I., and in 1665 he was sent on a special mission to England. After his return he distinguished himself in several wars against the Turks and Tatars in southern Russia, and in recognition of his services he in 1678 was made major-general, in 1679 was appointed to the chief command at Kiev, and in 1683 was made lieutenant-general. He visited England in 1686, and in 1687 and 1689 took part as quartermaster-general in expeditions against the Crim Tatars in the Crimea, being made full general for his services, in spite of the denunciations of the Greek Church to which, as a heretic, he was exposed. On the breaking out of the revolution in Moscow in 1689, Gordon with the troops he commanded virtually decided events in favour of the tsar Peter I., and against the tsaritsa Sophia. He was therefore during the remainder of his life in high favour with the tsar, who confided to him the command of his capital during his absence from Russia, employed him in organizing his army according to the European system, and latterly raised him to the rank of general-in-chief. He died on the 29th of November 1699. The tsar, who had visited him frequently during his illness, was with him when he died, and with his own hands closed his eyes.

General Gordon left behind him a diary of his life, written in English. This is preserved in MS. in the archives of the Russian foreign office. A complete German translation, edited by Dr Maurice Possalt (*Tagebuch des Generals Patrick Gordon*) was published, the first volume at Moscow in 1849, the second at St Petersburg in 1851, and the third at St Petersburg in 1853; and *Passages from the Diary of General Patrick Gordon of Auchleuchries* (1635-1699), was printed, under the editorship of Joseph Robertson, for the Spalding Club, Aberdeen, 1859.

GORDON-CUMMING, ROUALEYN GEORGE (1820-1866), Scottish traveller and sportsman, known as the “lion hunter,” was born on the 15th of March 1820. He was the second son of Sir William G. Gordon-Cumming, 2nd baronet of Altyre and Gordonstown, Elginshire. From his early years he was distinguished by his passion for sport. He was educated at Eton, and at eighteen joined the East India Co.’s service as a cornet in the Madras Light Cavalry. The climate of India not suiting him, after two years’ experience he retired from the service and returned to Scotland. During his stay in the East he had laid the foundation of his collection of hunting trophies and specimens of natural history. In 1843 he joined the Cape Mounted Rifles, but for the sake of absolute freedom sold out at the end of the year and with an ox wagon and a few native followers set out for the interior. He hunted chiefly in Bechuanaland and the Limpopo valley, regions then swarming with big game. In 1848 he returned to England. The story of his remarkable exploits is vividly told in his book, *Five Years of a Hunter’s Life in the Far Interior of South Africa* (London, 1850, 3rd ed. 1851). Of this volume, received at first with incredulity by stay-at-home critics, David Livingstone, who furnished Gordon-Cumming with most of his native guides, wrote: “I have no hesitation in saying that Mr Cumming’s book conveys a truthful idea of South African hunting” (*Missionary Travels*, chap. vii.). His collection of hunting trophies was exhibited in London in 1851 at the Great Exhibition, and was illustrated by a lecture delivered by Gordon-Cumming. The collection, known as “The South Africa Museum,” was afterwards exhibited in various parts of the country. In 1858 Gordon-Cumming went to live at Fort Augustus on the Caledonian Canal, where the exhibition of his trophies attracted many visitors. He died there on the 24th of March 1866.

An abridgment of his book was published in 1856 under the title of *The Lion Hunter of South Africa*, and in this form was frequently reprinted, a new edition appearing in 1904.

GORE, CATHERINE GRACE FRANCES (1799-1861), English novelist and dramatist, the

daughter of Charles Moody, a wine-merchant, was born in 1799 at East Retford, Nottinghamshire. In 1823 she was married to Captain Charles Gore; and, in the next year, she published her first work, *Theresa Marchmont, or the Maid of Honour*. Then followed, among others, the *Lettre de Cachet* (1827), *The Reign of Terror* (1827), *Hungarian Tales* (1829), *Manners of the Day* (1830), *Mothers and Daughters* (1831), and *The Fair of May Fair* (1832), *Mrs Armytage* (1836). Every succeeding year saw several volumes from her pen: The *Cabinet Minister* and *The Courtier of the Days of Charles II.*, in 1839; *Preferment* in 1840. In 1841 *Cecil, or the Adventures of a Coxcomb*, attracted considerable attention. *Greville, or a Season in Paris* appeared in the same year; then *Ormington, or Cecil a Peer, Fascination, The Ambassador's Wife*; and in 1843 *The Banker's Wife*. Mrs Gore continued to write, with unfailing fertility of invention, till her death on the 29th of January 1861. She also wrote some dramas of which the most successful was the *School for Coquettes*, produced at the Haymarket (1831). She was a woman of versatile talent, and set to music Burns's "And ye shall walk in silk attire," one of the most popular songs of her day. Her extraordinary literary industry is proved by the existence of more than seventy distinct works. Her best novels are *Cecil, or the Adventures of a Coxcomb*, and *The Banker's Wife*. *Cecil* gives extremely vivid sketches of London fashionable life, and is full of happy epigrammatic touches. For the knowledge of London clubs displayed in it Mrs Gore was indebted to William Beckford, the author of *Vathek*. *The Banker's Wife* is distinguished by some clever studies of character, especially in the persons of Mr Hamlyn, the cold calculating money-maker, and his warm-hearted country neighbour, Colonel Hamilton.

Mrs Gore's novels had an immense temporary popularity; they were parodied by Thackeray in *Punch*, in his "Lords and Liveries by the author of *Dukes and Déjeuners*"; but, tedious as they are to present-day readers, they presented on the whole faithful pictures of the contemporary life and pursuits of the English upper classes.

GORE, CHARLES (1853-), English divine, was born in 1853, the 3rd son of the Hon. Charles Alexander Gore, brother of the 4th earl of Arran. His mother was a daughter of the 4th earl of Bessborough. He was educated at Harrow and at Balliol College, Oxford, and was elected fellow of Trinity College in 1875. From 1880 to 1883 he was vice-principal of the theological college at Cuddesdon, and, when in 1884 Pusey House was founded at Oxford as a home for Dr Pusey's library and a centre for the propagation of his principles, he was appointed principal, a position which he held until 1893. As principal of Pusey House Mr Gore exercised a wide influence over undergraduates and the younger clergy, and it was largely, if not mainly, under this influence that the "Oxford Movement" underwent a change which to the survivors of the old school of Tractarians seemed to involve a break with its basic principles. "Puseyism" had been in the highest degree conservative, basing itself on authority and tradition, and repudiating any compromise with the modern critical and liberalizing spirit. Mr Gore, starting from the same basis of faith and authority, soon found from his practical experience in dealing with the "doubts and difficulties" of the younger generation that this uncompromising attitude was untenable, and set himself the task of reconciling the principle of authority in religion with that of scientific authority by attempting to define the boundaries of their respective spheres of influence. To him the divine authority of the Catholic Church was an axiom, and in 1889 he published two works, the larger of which, *The Church and the Ministry*, is a learned vindication of the principle of Apostolic Succession in the episcopate against the Presbyterians and other Protestant bodies, while the second, *Roman Catholic Claims*, is a defence, couched in a more popular form, of the Anglican Church and Anglican orders against the attacks of the Romanists.

So far his published views had been in complete consonance with those of the older Tractarians. But in 1890 a great stir was created by the publication, under his editorship, of *Lux Mundi*, a series of essays by different writers, being an attempt "to succour a distressed faith by endeavouring to bring the Christian Creed into its right relation to the modern growth of knowledge, scientific, historic, critical; and to modern problems of politics and ethics." Mr Gore himself contributed an essay on "The Holy Spirit and Inspiration." The book, which ran through twelve editions in a little over a year, met with a somewhat mixed reception. Orthodox churchmen, Evangelical and Tractarian alike, were alarmed by views on the incarnate nature of Christ that seemed to them to impugn his Divinity, and by concessions to the Higher Criticism in the matter of the inspiration of Holy Scriptures which

appeared to them to convert the “impregnable rock,” as Gladstone had called it, into a foundation of sand; sceptics, on the other hand, were not greatly impressed by a system of defence which seemed to draw an artificial line beyond which criticism was not to advance. None the less the book produced a profound effect, and that far beyond the borders of the English Church, and it is largely due to its influence, and to that of the school it represents, that the High Church movement developed thenceforth on “Modernist” rather than Tractarian lines.

In 1891 Mr Gore was chosen to deliver the Bampton lectures before the university, and chose for his subject the Incarnation. In these lectures he developed the doctrine, the enunciation of which in *Lux Mundi* had caused so much heart-searching. This is an attempt to explain how it came that Christ, though incarnate God, could be in error, *e.g.* in his citations from the Old Testament. The orthodox explanation was based on the principle of accommodation (*q.v.*). This, however, ignored the difficulty that if Christ during his sojourn on earth was not subject to human limitations, especially of knowledge, he was not a man as other men, and therefore not subject to their trials and temptations. This difficulty Gore sought to meet through the doctrine of the κένωσις. Ever since the Pauline epistles had been received into the canon theologians had, from various points of view, attempted to explain what St Paul meant when he wrote of Christ (2 Phil. ii. 7) that “he emptied himself and took upon him the form of a servant” (ἑαυτὸν ἐκένωσεν μορφὴν δουλοῦ λαβῶν). According to Mr Gore this means that Christ, on his incarnation, became subject to all human limitations, and had, so far as his life on earth was concerned, stripped himself of all the attributes of the Godhead, including the Divine omniscience, the Divine nature being, as it were, hidden under the human.[1]

Lux Mundi and the Bampton lectures led to a situation of some tension which was relieved when in 1893 Dr Gore resigned his principalship and became vicar of Radley, a small parish near Oxford. In 1894 he became canon of Westminster. Here he gained commanding influence as a preacher and in 1898 was appointed one of the court chaplains. In 1902 he succeeded J. J. S. Perowne as bishop of Worcester and in 1905 was installed bishop of Birmingham, a new see the creation of which had been mainly due to his efforts. While adhering rigidly to his views on the divine institution of episcopacy as essential to the Christian Church, Dr Gore from the first cultivated friendly relations with the ministers of other denominations, and advocated co-operation with them in all matters when agreement was possible. In social questions he became one of the leaders of the considerable group of High Churchmen known, somewhat loosely, as Christian Socialists. He worked actively against the sweating system, pleaded for European intervention in Macedonia, and was a keen supporter of the Licensing Bill of 1908. In 1892 he founded the clerical fraternity known as the Community of the Resurrection. Its members are priests, who are bound by the obligation of celibacy, live under a common rule and with a common purse. Their work is pastoral, evangelistic, literary and educational. In 1898 the House of the Resurrection at Mirfield, near Huddersfield, became the centre of the community; in 1903 a college for training candidates for orders was established there, and in the same year a branch house, for missionary work, was set up in Johannesburg in South Africa.

Dr Gore’s works include *The Incarnation* (Bampton Lectures, 1891), *The Creed of the Christian* (1895), *The Body of Christ* (1901), *The New Theology and the Old Religion* (1908), and expositions of *The Sermon on the Mount* (1896), *Ephesians* (1898), and *Romans* (1899), while in 1910 he published *Orders and Unity*.

1 Cf. the Lutheran theologian Ernst Sartorius in his *Lehre von der heiligen Liebe* (1844), *Lehre* ii. pp. 21 et seq.: “the Son of God veils his all-seeing eye and descends into human darkness and as child of man opens his eye as the gradually growing light of the world of humanity, until at the right hand of the Father he allows it to shine forth in all its glory.” See Loofs, Art. “Kenosis” in Herzog-Hauck, *Realencyklopädie* (ed. 1901), x. 247.

GORE. (1) (O. Eng. *gor*, dung or filth), a word formerly used in the sense of dirt, but now confined to blood that has thickened after being shed. (2) (O. Eng. *gára*, probably connected with *gare*, an old word for “spear”), something of triangular shape, resembling therefore a spear-head. The word is used for a tapering strip of land, in the “common or open field” system of agriculture, where from the shape of the land the acre or half-acre strips could not

be portioned out in straight divisions. Similarly “gore” is used in the United States, especially in Maine and Vermont, for a strip of land left out in surveying when divisions are made and boundaries marked. The triangular sections of material used in forming the covering of a balloon or an umbrella are also called “gores,” and in dressmaking the term is used for a triangular piece of material inserted in a dress to adjust the difference in widths. To gore, *i.e.* to stab or pierce with any sharp instrument, but more particularly used of piercing with the horns of a bull, is probably directly connected with *gare*, a spear.

GOREE, an island off the west coast of Africa, forming part of the French colony of Senegal. It lies at the entrance of the large natural harbour formed by the peninsula of Cape Verde. The island, some 900 yds. long by 330 broad, and 3 m. distant from the nearest point of the mainland, is mostly barren rock. The greater part of its surface is occupied by a town, formerly a thriving commercial entrepôt and a strong military post. Until 1906 it was a free port. With the rise of Dakar (*q.v.*), c. 1860, on the adjacent coast, Goree lost its trade and its inhabitants, mostly Jolofs, had dwindled in 1905 to about 1500. Its healthy climate, however, makes it useful as a sanatorium. The streets are narrow, and the houses, mainly built of dark-red stone, are flat-roofed. The castle of St Michael, the governor’s residence, the hospital and barracks, testify to the former importance of the town. Within the castle is an artesian well, the only water-supply, save that collected in rain tanks, on the island. Goree was first occupied by the Dutch, who took possession of it early in the 17th century and called it Goeree or Goedereede, in memory of the island on their own coast now united with Overflakkee. Its native name is Bir, *i.e.* a belly, in allusion to its shape. It was captured by the English under Commodore (afterwards Admiral Sir Robert) Holmes in 1663, but retaken in the following year by de Ruyter. The Dutch were finally expelled in 1677 by the French under Admiral d’Estrées. Goree subsequently fell again into the hands of the English, but was definitely occupied by France in 1817 (see Senegal: *History*).

GORGE, strictly the French word for the throat considered externally. Hence it is applied in falconry to a hawk’s crop, and thus, with the sense of something greedy or ravenous, to food given to a hawk and to the contents of a hawk’s crop or stomach. It is from this sense that the expression of a person’s “gorge rising at” anything in the sense of loathing or disgust is derived. “Gorge,” from analogy with “throat,” is used with the meaning of a narrow opening as of a ravine or valley between hills; in fortification, of the neck of an outwork or bastion; and in architecture, of the narrow part of a Roman Doric column, between the echinus and the astragal. From “gorge” also comes a diminutive “gorget,” a portion of a woman’s costume in the middle ages, being a close form of wimple covering the neck and upper part of the breast, and also that part of the body armour covering the neck and collarbone (see Gorget). The word “gorgeous,” of splendid or magnificent appearance, comes from the O. Fr. *gorgias*, with the same meaning, and has very doubtfully been connected with gorge, a ruffle or neck-covering, of a supposed elaborate kind.

GÖRGEI, ARTHUR (1818-), Hungarian soldier, was born at Toporcz, in Upper Hungary, on the 30th of January 1818. He came of a Saxon noble family who were converts to Protestantism. In 1837 he entered the Bodyguard of Hungarian Nobles at Vienna, where he combined military service with a course of study at the university. In 1845, on the death of his father, he retired from the army and devoted himself to the study of chemistry at Prague, after which he retired to the family estates in Hungary. On the outbreak of the revolutionary War of 1848, Görgei offered his sword to the Hungarian government. Entering the Honvéd army with the rank of captain, he was employed in the purchase of arms, and

soon became major and commandant of the national guards north of the Theiss. Whilst he was engaged in preventing the Croatian army from crossing the Danube, at the island of Csepel, below Pest, the wealthy Hungarian magnate Count Eugene Zichy fell into his hands, and Görgei caused him to be arraigned before a court-martial on a charge of treason and immediately hanged. After various successes over the Croatian forces, of which the most remarkable was that at Ozora, where 10,000 prisoners fell into his hands, Görgei was appointed commander of the army of the Upper Danube, but, on the advance of Prince Windischgrätz across the Leitha, he resolved to fall back, and in spite of the remonstrances of Kossuth he held to his resolution and retreated upon Waitzen. Here, irritated by what he considered undue interference with his plans, he issued (January 5th, 1849) a proclamation throwing the blame for the recent want of success upon the government, thus virtually revolting against their authority. Görgei retired to the Hungarian Erzgebirge and conducted operations on his own initiative. Meanwhile the supreme command had been conferred upon the Pole Dembinski, but the latter fought without success the battle of Kapolna, at which action Görgei's corps arrived too late to take an effective part, and some time after this the command was again conferred upon Görgei. The campaign in the spring of 1849 was brilliantly conducted by him, and in a series of engagements, he defeated Windischgrätz. In April he won the victories of Gödöllö Izaszeg and Nagy Sarló, relieved Komorn, and again won a battle at Acs or Waitzen. Had he followed up his successes by taking the offensive against the Austrian frontier, he might perhaps have dictated terms in the Austrian capital itself. As it was, he contented himself with reducing Ofen, the Hungarian capital, in which he desired to re-establish the diet, and after effecting this capture he remained inactive for some weeks. Meanwhile, at a diet held at Debreczin, Kossuth had formally proposed the dethronement of the Habsburg dynasty and Hungary had been proclaimed a republic. Görgei had refused the field-marshal's bâton offered him by Kossuth and was by no means in sympathy with the new régime. However, he accepted the portfolio of minister of war, while retaining the command of the troops in the field. The Russians had now intervened in the struggle and made common cause with the Austrians; the allies were advancing into Hungary on all sides, and Görgei was defeated by Haynau at Pered (20th-21st of June). Kossuth, perceiving the impossibility of continuing the struggle and being unwilling himself to make terms, resigned his position as dictator, and was succeeded by Görgei, who meanwhile had been fighting hard against the various columns of the enemy. Görgei, convinced that he could not break through the enemy's lines, surrendered, with his army of 20,000 infantry and 2000 cavalry, to the Russian general Rüdiger at Vilagos. Görgei was not court-marshaled, as were his generals, but kept in confinement at Klagenfurt, where he lived, chiefly employed in chemical work, until 1867, when he was pardoned and returned to Hungary. The surrender, and particularly the fact that his life was spared while his generals and many of his officers and men were hanged or shot, led, perhaps naturally, to his being accused of treason by public opinion of his countrymen. After his release he played no further part in public life. Even in 1885 an attempt which was made by a large number of his old comrades to rehabilitate him was not favourably received in Hungary. After some years' work as a railway engineer he retired to Visegrád, where he lived thenceforward in retreat. (See also HUNGARY: *History*.)

General Görgei wrote a justification of his operations (*Mein Leben und Wirken in Ungarn* 1848-1859, Leipzig, 1852), an anonymous paper under the title *Was verdanken wir der Revolution?* (1875), and a reply to Kossuth's charges (signed "Joh. Demár") in *Budapesti Szemle*, 1881, 25-26. Amongst those who wrote in his favour were Captain Stephan Görgei (*1848 és 1849 böl*, Budapest, 1885), and Colonel Aschermann (*Ein offenes Wort in der Sache des Honvéd-Generals Arthur Görgei*, Klausenburg, 1867).

See also A. G. Horn, *Görgei, Oberkommandant d. ung. Armee* (Leipzig, 1850); Kinety, *Görgei's Life and Work in Hungary* (London, 1853); Szinyei, in *Magyár Irók* (iii. 1378), Hentaller, *Görgei as a Statesman* (Hungarian); Elemár, *Görgei in 1848-1849* (Hungarian, Budapest, 1886).

GORGES, SIR FERDINANDO (*c.* 1566-1647), English colonial pioneer in America and the founder of Maine, was born in Somersetshire, England, probably in 1566. From youth both a soldier and a sailor, he was a prisoner in Spain at the age of twenty-one, having been captured by a ship of the Spanish Armada. In 1589 he was in command of a small body of troops fighting for Henry IV. of France, and after distinguishing himself at the siege of

Rouen was knighted there in 1591. In 1596 he was commissioned captain and keeper of the castle and fort at Plymouth and captain of St Nicholas Isle; in 1597 he accompanied Essex on the expedition to the Azores; in 1599 assisted him in the attempt to suppress the Tyrone rebellion in Ireland, and in 1600 was implicated in Essex's own attempt at rebellion in London. In 1603, on the accession of James I., he was suspended from his post at Plymouth, but was restored in the same year and continued to serve as "governor of the forts and island of Plymouth" until 1629, when, his garrison having been without pay for three and a half years, his fort a ruin, and all his applications for aid having been ignored, he resigned. About 1605 he began to be greatly interested in the New World; in 1606 he became a member of the Plymouth Company, and he laboured zealously for the founding of the Popham colony at the mouth of the Sagadahoc (now the Kennebec) river in 1607. For several years following the failure of that enterprise in 1608 he continued to fit out ships for fishing, trading and exploring, with colonization as the chief end in view. He was largely instrumental in procuring the new charter of 1620 for the Plymouth Company, and was at all times of its existence perhaps the most influential member of that body. He was the recipient, either solely or jointly, of several grants of territory from it, for one of which he received in 1639 the royal charter of Maine (see MAINE). In 1635 he sought to be appointed governor-general of all New England, but the English Civil War—in which he espoused the royal cause—prevented him from ever actually holding that office. A short time before his death at Long Ashton in 1647 he wrote his *Briefe Narration of the Originall Undertakings of the Advancement of Plantations into the Parts of America*. He was an advocate, especially late in life, of the feudal type of colony.

See J. P. Baxter (ed.), *Sir Ferdinando Gorges and his Province of Maine* (3 vols., Boston, 1890; in the Prince Society Publications), the first volume of which is a memoir of Gorges, and the other volumes contain a reprint of the *Briefe Narration*, Gorges's letters, and other documentary material.

GORGET (O. Fr. *gorgete*, dim. of *gorge*, throat), the name applied after about 1480 to the collar-piece of a suit of armour. It was generally formed of small overlapping rings of plate, and attached either to the body armour or to the armet. It was worn in the 16th and 17th centuries with the half-armour, with the plain cuirass, and even occasionally without any body armour at all. During these times it gradually became a distinctive badge for officers, and as such it survived in several armies—in the form of a small metal plate affixed to the front of the collar of the uniform coat—until after the Napoleonic wars. In the German army to-day a gorget-plate of this sort is the distinctive mark of military police, while the former officer's gorget is represented in British uniforms by the red patches or tabs worn on the collar by staff officers and by the white patches of the midshipmen in the Royal Navy.

GORGIAS (*c.* 483-375 B.C.), Greek sophist and rhetorician, was a native of Leontini in Sicily. In 427 he was sent by his fellow-citizens at the head of an embassy to ask Athenian protection against the aggression of the Syracusans. He subsequently settled in Athens, and supported himself by the practice of oratory and by teaching rhetoric. He died at Larissa in Thessaly. His chief claim to recognition consists in the fact that he transplanted rhetoric to Greece, and contributed to the diffusion of the Attic dialect as the language of literary prose. He was the author of a lost work *On Nature or the Non-existent* (Περὶ τοῦ μὴ ὄντος ἢ περὶ φύσεως, fragments edited by M. C. Valeton, 1876), the substance of which may be gathered from the writings of Sextus Empiricus, and also from the treatise (ascribed to Theophrastus) *De Melisso, Xenophane, Gorgia*. Gorgias is the central figure in the Platonic dialogue *Gorgias*. The genuineness of two rhetorical exercises (*The Encomium of Helen* and *The Defence of Palamedes*, edited with Antiphon by F. Blass in the Teubner series, 1881), which have come down under his name, is disputed.

For his philosophical opinions see SOPHISTS and SCEPTICISM. See also Gomperz, *Greek Thinkers*, Eng. trans. vol. i. bk. iii. chap. vii.; Jebb's *Attic Orators*, introd. to vol. i. (1893); F. Blass, *Die attische Beredsamkeit*, i. (1887); and article RHETORIC.

GORGON, GORGONS (Gr. Γοργώ, Γοργόνες, the "terrible," or, according to some, the "loud-roaring"), a figure or figures in Greek mythology. Homer speaks of only one Gorgon, whose head is represented in the *Iliad* (v. 741) as fixed in the centre of the aegis of Zeus. In the *Odyssey* (xi. 633) she is a monster of the under-world. Hesiod increases the number of Gorgons to three—Stheno (the mighty), Euryale (the far-springer) and Medusa (the queen), and makes them the daughters of the sea-god Phorcys and of Keto. Their home is on the farthest side of the western ocean; according to later authorities, in Libya (Hesiod, *Theog.* 274; Herodotus ii. 91; Pausanias ii. 21). The Attic tradition, reproduced in Euripides (*Ion* 1002), regarded the Gorgon as a monster, produced by Gaea to aid her sons the giants against the gods and slain by Athena (the passage is a *locus classicus* on the aegis of Athena).

The Gorgons are represented as winged creatures, having the form of young women; their hair consists of snakes; they are round-faced, flat-nosed, with tongues lolling out and large projecting teeth. Sometimes they have wings of gold, brazen claws and the tusks of boars. Medusa was the only one of the three who was mortal; hence Perseus was able to kill her by cutting off her head. From the blood that spurted from her neck sprang Chrysaor and Pegasus, her two sons by Poseidon. The head, which had the power of turning into stone all who looked upon it, was given to Athena, who placed it in her shield; according to another account, Perseus buried it in the market-place of Argos. The hideously grotesque original type of the Gorgoneion, as the Gorgon's head was called, was placed on the walls of cities, and on shields and breastplates to terrify an enemy (cf. the hideous faces on Chinese soldiers' shields), and used generally as an amulet, a protection against the evil eye. Heracles is said to have obtained a lock of Medusa's hair (which possessed the same powers as the head) from Athena and given it to Sterope, the daughter of Cepheus, as a protection for the town of Tegea against attack (Apollodorus ii. 7. 3). According to Roscher, it was supposed, when exposed to view, to bring on a storm, which put the enemy to flight. Frazer (*Golden Bough*, i. 378) gives examples of the superstition that cut hair caused storms. According to the later idea of Medusa as a beautiful maiden, whose hair had been changed into snakes by Athena, the head was represented in works of art with a wonderfully handsome face, wrapped in the calm repose of death. The Rondanini Medusa at Munich is a famous specimen of this conception. Various accounts of the Gorgons were given by later ancient writers. According to Diod. Sic. (iii. 54. 55) they were female warriors living near Lake Tritonis in Libya, whose queen was Medusa; according to Alexander of Myndus, quoted in Athenaeus (v. p. 221), they were terrible wild animals whose mere look turned men to stone. Pliny (*Nat. Hist.* vi. 36 [31]) describes them as savage women, whose persons were covered with hair, which gave rise to the story of their snaky hair and girdle. Modern authorities have explained them as the personification of the waves of the sea or of the barren, unproductive coast of Libya; or as the awful darkness of the storm-cloud, which comes from the west and is scattered by the sun-god Perseus. More recent is the explanation of anthropologists that Medusa, whose virtue is really in her head, is derived from the ritual mask common to primitive cults.

See Jane E. Harrison, *Prolegomena to the Study of Greek Religion* (1903); W. H. Roscher, *Die Gorgonen und Verwandtes* (1879); J. Six, *De Gorgone* (1885), on the types of the Gorgon's head; articles by Roscher and Furtwängler in Roscher's *Lexikon der Mythologie*, by G. Glotz in Daremberg and Saglio's *Dictionnaire des antiquités*, and by R. Gädechens in Ersch and Gruber's *Allgemeine Encyclopädie*; N. G. Polites (Ὁ περὶ τῶν Γοργόνων μῦθος παρὰ τῷ Ἑλληνικῷ λαῷ, 1878) gives an account of the Gorgons, and of the various superstitions connected with them, from the modern Greek point of view, which regards them as malevolent spirits of the sea.

GORGONZOLA, a town of Lombardy, Italy, in the province of Milan, from which it is 11 m. E.N.E. by steam tramway. Pop. (1901) 5134. It is the centre of the district in which is produced the well-known Gorgonzola cheese.

GORI, a town of Russian Transcaucasia, in the government of Tiflis and 49 m. by rail N.W. of the city of Tiflis, on the river Kura; altitude, 2010 ft. Pop. (1897) 10,457. The surrounding country is very picturesque. Gori has a high school for girls, and a school for Russian and Tatar teachers. At one time celebrated for its silk and cotton stuffs, it is now famous for corn, reputed the best in Georgia, and the wine is also esteemed. The climate is excellent, delightfully cool in summer, owing to the refreshing breezes from the mountains, though these are, however, at times disagreeable in winter. Gori was founded (1123) by the Georgian king David II., the Renovater, for the Armenians who fled their country on the Persian invasion. The earliest remains of the fortress are Byzantine; it was thoroughly restored in 1634-1658, but destroyed by Nadir Shah of Persia in the 18th century. There is a church constructed in the 17th century by Capuchin missionaries from Rome. Five miles east of Gori is the remarkable rock-cut town of Uplis-tsykhe, which was a fortress in the time of Alexander the Great of Macedon, and an inhabited city in the reign of the Georgian king Bagrat III. (980-1014).

GORILLA (or PONGO), the largest of the man-like apes, and a native of West Africa from the Congo to Cameroon, whence it extends eastwards across the continent to German East Africa. Many naturalists regard the gorilla as best included in the same genus as the chimpanzee, in which case it should be known as *Anthropopithecus gorilla*, but by others it is regarded as the representative of a genus by itself, when its title will be *Gorilla savagei*, or *G. gorilla*. That there are local forms of gorilla is quite certain: but whether any of these are entitled to rank as distinct species may be a matter of opinion. It was long supposed that the apes encountered on an island off the west coast of Africa by Hanno, the Carthaginian, were gorillas, but in the opinion of some of those best qualified to judge, it is probable that the creatures in question were really baboons. The first real account of the gorilla appears to be the one given by an English sailor, Andrew Battel, who spent some time in the wilds of West Africa during and about the year 1590; his account being presented in Purchas's *Pilgrimage*, published in the year 1613. From this it appears that Battel was familiar with both the chimpanzee and the gorilla, the former of which he terms engeco and the latter pongo—names which ought apparently to be adopted for these two species in place of those now in use. Between Battel's time and 1846 nothing appears to have been heard of the gorilla or pongo, but in that year a missionary at the Gabun accidentally discovered a skull of the huge ape; and in 1847 a sketch of that specimen, together with two others, came into the hands of Sir R. Owen, by whom the name *Gorilla savagei* was proposed for the new ape in 1848. Dr Thomas Savage, a missionary at the Gabun, who sent Owen information with regard to the original skull, had, however, himself proposed the name *Troglodytes gorilla* in 1847. The first complete skeleton of a gorilla sent to Europe was received at the museum of the Royal College of Surgeons in 1851, and the first complete skin appears to have reached the British Museum in 1858. Paul B. du Chaillu's account (1861) of his journeys in the Gabun region popularized the knowledge of the existence of the gorilla. Male gorillas largely exceed the females in size, and attain a height of from 5½ ft. to 6½ ft., or perhaps even more. Some of the features distinguishing the gorilla from the mere gorilla-like chimpanzees will be found mentioned in the article PRIMATES. Among them are the small ears, elongated head, the presence of a deep groove alongside the nostrils, the small size of the thumb, and the great length of the arm, which reaches half-way down the shin-bone (tibia) in the erect posture. In old males the eyes are overhung by a beetling penthouse of bone, the hinder half of the middle line of the skull bears a wall-like bony ridge for the attachment of the powerful jaw-muscles, and the tusks, or canines, are of monstrous size, recalling those of a carnivorous animal. The general colour is blackish, with a more or less marked grey or brownish tinge on the hair of the shoulders, and sometimes of chestnut on the head. Mr G. L. Bates (in *Proc. Zool. Soc.*, 1905, vol. i.) states that gorillas only leave the depths of the forest to enter the outlying clearings in the neighbourhood of human settlements when they are attracted by some special fruit or succulent plant; the favourite being the fruit of the "mejom," a tall cane-like plant (perhaps a kind of *Amomum*) which grows abundantly on deserted clearings. At one isolated village the natives, who were unarmed, reported that they not unfrequently

saw and heard the gorillas, which broke down the stalks of the plantains in the rear of the habitations to tear out and eat the tender heart. On the old clearings of another village Mr Bates himself, although he did not see a gorilla, saw the fresh tracks of these great apes and the torn stems and discarded fruit rinds of the “mejoms,” as well as the broken stalks of the latter, which had been used for beds. On another occasion he came across the bed of an old gorilla which had been used only the night before, as was proved by a negro woman, who on the previous evening had heard the animal breaking and treading down the stalks to form its couch. According to native report, the gorillas sleep on these beds, which are of sufficient thickness to raise them a foot or two above the ground, in a sitting posture, with the head inclined forwards on the breast. In the first case Mr Bates states that the tracks and beds indicated the presence of three or four gorillas, some of which were small. This account does not by any means accord with one given by von Koppenfels, in which it is stated that while the old male gorilla sleeps in a sitting posture at the base of a tree-trunk (no mention being made of a bed), the female and young ones pass the night in a nest in the tree several yards above the ground, made by bending the boughs together and covering them with twigs and moss. Mr Bates’s account, as being based on actual inspection of the beds, is probably the more trustworthy. Even when asleep and snoring, gorillas are difficult to approach, since they awake at the slightest rustle, and an attempt to surround the one heard making his bed by the woman resulted in failure. Most gorillas killed by natives are believed by Mr Bates to have been encountered suddenly in the daytime on the ground or in low trees in the outlying clearings. Many natives, even if armed, refuse, however, to molest an adult male gorilla, on account of its ferocity when wounded. Mr Bates, like Mr Winwood Reade, refused to credit du Chaillu’s account of his having killed gorillas, and stated that the only instance he knew of one of these animals being slain by a European was an old male (now in Mr Walter Rothschild’s museum at Tring) shot by the German trader Paschen in the Yaunde district, of which an illustrated account was published in 1901. Mr E. J. Corns states, however, that two European traders, apparently in the “’eighties” of the 19th century, were in the habit of surrounding and capturing these animals as occasion offered.[1] Fully adult gorillas have never been seen alive in captivity—and perhaps never will be, as the creature is ferocious and morose to a degree. So long ago as the year 1855, when the species was known to zoologists only by its skeleton, a gorilla was actually living in England. This animal, a young female, came from the Gabun, and was kept for some months in Wombwell’s travelling menagerie, where it was treated as a pet. On its death, the body was sent to Mr Charles Waterton, of Walton Hall, by whom the skin was mounted in a grotesque manner, and the skeleton given to the Leeds museum. Apparently, however, it was not till several years later that the skin was recognized by Mr A. D. Bartlett as that of a gorilla; the animal having probably been regarded by its owner as a chimpanzee. A young male was purchased by the Zoological Society in October 1887, from Mr Cross, the Liverpool dealer in animals. At the time of arrival it was supposed to be about three years old, and stood 2½ ft. high. A second, a male, supposed to be rather older, was acquired in March 1896, having been brought to Liverpool from the French Congo. It is described as having been thoroughly healthy at the date of its arrival, and of an amiable and tractable disposition. Neither survived long. Two others were received in the Zoological Society’s menagerie in 1904, and another was housed there for a short time in the following year, while a fifth was received in 1906. Falkenstein’s gorilla, exhibited at the Westminster aquarium under the name of pongo, and afterwards at the Berlin aquarium, survived for eighteen months. “Pussi,” the gorilla of the Breslau Zoological Gardens, holds a record for longevity, with over seven years of menagerie life. Writing in 1903 Mr W. T. Hornaday stated that but one live gorilla, and that a tiny infant, had ever landed in the United States; and it lived only five days after arrival.

(R. L.*)

1 In 1905 the Rev. Geo. Grenfell reported that he had that summer shot a gorilla in the Bwela country, east of the Mongala affluent of the Congo.

GORINCHEM, or Gorcum, a fortified town of Holland in the province of south Holland, on the right bank of the Merwede at the confluence of the Linge, 16 m. by rail W. of Dordrecht. It is connected by the Zederik and Merwede canals with Amsterdam, and steamers ply hence in every direction. Pop. (1900) 11,987. Gorinchem possesses several interesting old houses, and overlooking the river are some fortified gateways of the 17th century. The principal buildings are the old church of St Vincent, containing the monuments of the lords of Arkel;

the town hall, a prison, custom-house, barracks and a military hospital. The charitable and benevolent institutions are numerous, and there are also a library and several learned associations. Gorinchem possesses a good harbour, and besides working in gold and silver, carries on a considerable trade in grain, hemp, cheese, potatoes, cattle and fish, the salmon fishery being noted. Woerkum, or Woudrichem, a little below the town on the left bank of the Merwede, is famous for its quaint old buildings, which are decorated with mosaics.

GORING, GEORGE GORING, Lord (1608-1657), English Royalist soldier, son of George Goring, earl of Norwich, was born on the 14th of July 1608. He soon became famous at court for his prodigality and dissolute manners. His father-in-law, Richard Boyle, earl of Cork, procured for him a post in the Dutch army with the rank of colonel. He was permanently lamed by a wound received at Breda in 1637, and returned to England early in 1639, when he was made governor of Portsmouth. He served in the Scottish war, and already had a considerable reputation when he was concerned in the "Army Plot." Officers of the army stationed at York proposed to petition the king and parliament for the maintenance of the royal authority. A second party was in favour of more violent measures, and Goring, in the hope of being appointed lieutenant-general, proposed to march the army on London and overawe the parliament during Strafford's trial. This proposition being rejected by his fellow officers, he betrayed the proceedings to Mountjoy Blount, earl of Newport, who passed on the information indirectly to Pym in April. Colonel Goring was thereupon called on to give evidence before the Commons, who commended him for his services to the Commonwealth. This betrayal of his comrades induced confidence in the minds of the parliamentary leaders, who sent him back to his Portsmouth command. Nevertheless he declared for the king in August. He surrendered Portsmouth to the parliament in September 1642 and went to Holland to recruit for the Royalist army, returning to England in December. Appointed to a cavalry command by the earl of Newcastle, he defeated Fairfax at Seacroft Moor near Leeds in March 1643, but in May he was taken prisoner at Wakefield on the capture of the town by Fairfax. In April 1644 he effected an exchange. At Marston Moor he commanded the Royalist left, and charged with great success, but, allowing his troopers to disperse in search of plunder, was routed by Cromwell at the close of the battle. In November 1644, on his father's elevation to the earldom of Norwich, he became Lord Goring. The parliamentary authorities, however, refused to recognize the creation of the earldom, and continued to speak of the father as Lord Goring and the son as General Goring. In August he had been dispatched by Prince Rupert, who recognized his ability, to join Charles in the south, and in spite of his dissolute and insubordinate character he was appointed to supersede Henry, Lord Wilmot, as lieut.-general of the Royalist horse (see Great Rebellion). He secured some successes in the west, and in January 1645 advanced through Hampshire and occupied Farnham; but want of money compelled him to retreat to Salisbury and thence to Exeter. The excesses committed by his troops seriously injured the Royalist cause, and his exactions made his name hated throughout the west. He had himself prepared to besiege Taunton in March, yet when in the next month he was desired by Prince Charles, who was at Bristol, to send reinforcements to Sir Richard Grenville for the siege of Taunton, he obeyed the order only with ill-humour. Later in the month he was summoned with his troops to the relief of the king at Oxford. Lord Goring had long been intriguing for an independent command, and he now secured from the king what was practically supreme authority in the west. It was alleged by the earl of Newport that he was willing to transfer his allegiance once more to the parliament. It is not likely that he meditated open treason, but he was culpably negligent and occupied with private ambitions and jealousies. He was still engaged in desultory operations against Taunton when the main campaign of 1645 opened. For the part taken by Goring's army in the operations of the Naseby campaign see Great Rebellion. After the decisive defeat of the king, the army of Fairfax marched into the west and defeated Goring in a disastrous fight at Langport on the 10th of July. He made no further serious resistance to the parliamentary general, but wasted his time in frivolous amusements, and in November he obtained leave to quit his disorganized forces and retire to France on the ground of health. His father's services secured him the command of some English regiments in the Spanish service. He died at Madrid in July or August 1657. Clarendon gives him a very unpleasing character, declaring that "Goring ... would, without hesitation, have broken any trust, or done any act of treachery to have satisfied an ordinary passion or appetite; and in truth wanted nothing but industry (for he had wit, and courage, and understanding and ambition,

uncontrolled by any fear of God or man) to have been as eminent and successful in the highest attempt of wickedness as any man in the age he lived in or before. Of all his qualifications dissimulation was his masterpiece; in which he so much excelled, that men were not ordinarily ashamed, or out of countenance, with being deceived but twice by him."

See the life by C. H. Firth in the *Dictionary of National Biography*; Dugdale's *Baronage*, where there are some doubtful stories of his life in Spain; the *Clarendon State Papers*; Clarendon's *History of the Great Rebellion*; and S. R. Gardiner's *History of the Great Civil War*.

GORKI, MAXIM (1868-), the pen-name of the Russian novelist Alexei Maximovich Pyeshkov, who was born at Nizhni-Novgorod on the 26th of March 1868. His father was a dyer, but he lost both his parents in childhood, and in his ninth year was sent to assist in a boot-shop. We find him afterwards in a variety of callings, but devouring books of all sorts greedily, whenever they fell into his hands. He ran away from the boot-shop and went to help a land-surveyor. He was then a cook on board a steamer and afterwards a gardener. In his fifteenth year he tried to enter a school at Kazan, but was obliged to betake himself again to his drudgery. He became a baker, than hawked about *kvas*, and helped the barefooted tramps and labourers at the docks. From these he drew some of his most striking pictures, and learned to give sketches of humble life generally with the fidelity of a Defoe. After a long course of drudgery he had the good fortune to obtain the place of secretary to a barrister at Nizhni-Novgorod. This was the turning-point of his fortunes, as he found a sympathetic master who helped him. He also became acquainted with the novelist Korolenko, who assisted him in his literary efforts. His first story was *Makar Chudra*, which was published in the journal *Kavkaz*. He contributed to many periodicals and finally attracted attention by his tale called *Chelkash*, which appeared in *Russkoe Bogatsvo* ("Russian wealth"). This was followed by a series of tales in which he drew with extraordinary vigour the life of the *bosniaki*, or tramps. He has sometimes described other classes of society, tradesmen and the educated classes, but not with equal success. There are some vigorous pictures, however, of the trading class in his *Foma Gordeyev*. But his favourite type is the rebel, the man in revolt against society, and him he describes from personal knowledge, and enlists our sympathies with him. We get such a type completely in *Konovalov*. Gorki is always preaching that we must have ideals—something better than everyday life, and this view is brought out in his play *At the Lowest Depths*, which had great success at Moscow, but was coldly received at St Petersburg.

For a good criticism of Gorki see *Ideas and Realities in Russian Literature*, by Prince Kropotkin. Many of his works have been translated into English.

GÖRLITZ, a town of Germany, in the Prussian province of Silesia, on the left bank of the Neisse, 62 m. E. from Dresden on the railway to Breslau, and at the junction of lines to Berlin, Zittau and Halle. Pop. (1885) 55,702, (1905) 80,931. The Neisse at this point is crossed by a railway bridge 1650 ft. long and 120 ft. high, with 32 arches. Görlitz is one of the handsomest, and, owing to the extensive forests of 70,000 acres, which are the property of the municipality, one of the wealthiest towns in Germany. It is surrounded by beautiful walks and fine gardens, and although its old walls and towers have now been demolished, many of its ancient buildings remain to form a picturesque contrast with the signs of modern industry. From the hill called Landskrone, about 1500 ft. high, an extensive prospect is obtained of the surrounding country. The principal buildings are the fine Gothic church of St Peter and St Paul, dating from the 15th century, with two stately towers, a famous organ and a very heavy bell; the Frauen Kirche, erected about the end of the 15th century, and possessing a fine portal and choir in pierced work; the Kloster Kirche, restored in 1868, with handsome choir stalls and a carved altar dating from 1383; and the Roman Catholic church, founded in 1853, in the Roman style of architecture, with beautiful glass windows and oil-paintings. The old town hall (Rathaus) contains a very valuable library, having at its entrance a fine flight of steps. There is also a new town hall which was erected in 1904-1906. Other

buildings are: the old bastion, named Kaisertrutz, now used as a guardhouse and armoury; the gymnasium buildings in the Gothic style erected in 1851; the Ruhmeshalle with the Kaiser Friedrich museum, the house of the estates of the province (Ständehaus), two theatres and the barracks. Near the town is the chapel of the Holy Cross, where there is a model of the Holy Sepulchre at Jerusalem made during the 15th century. In the public park there is a bust of Schiller, a monument to Alexander von Humboldt, and a statue of the mystic Jakob Böhme (1575-1624); a monument has been erected in the town in commemoration of the war of 1870-71, and also one to the emperor William I. and a statue of Prince Frederick Charles. In connexion with the natural history society there is a valuable museum, and the scientific institute possesses a large library and a rich collection of antiquities, coins and articles of *virtu*. Görlitz, next to Breslau, is the largest and most flourishing commercial town of Silesia, and is also regarded as classic ground for the study of German Renaissance architecture. Besides cloth, which forms its staple article of commerce, it has manufactories of various linen and woollen wares, machines, railway wagons, glass, sago, tobacco, leather, chemicals and tiles.

Görlitz existed as a village from a very early period, and at the beginning of the 12th century received civic rights. It was then known as Drebenau, but on being rebuilt after its destruction by fire in 1131 it received the name of Zgorzelice. About the end of the 12th century it was strongly fortified, and for a short time it was the capital of a duchy of Görlitz. It was several times besieged and taken during the Thirty Years' War, and it also suffered considerably in the Seven Years' War. In the battle which took place near it between the Austrians and Prussians on the 7th of September 1757, Hans Karl von Winterfeldt, the general of Frederick the Great, was slain. In 1815 the town, with the greater part of Upper Lusatia, came into the possession of Prussia.

See Neumann, *Geschichte von Görlitz* (1850).

GÖRRES, JOHANN JOSEPH VON (1776-1848), German writer, was born on the 25th of January 1776, at Coblenz. His father was a man of moderate means, who sent his son to a Latin college under the direction of the Roman Catholic clergy. The sympathies of the young Görres were from the first strongly with the French Revolution, and the dissoluteness and irreligion of the French exiles in the Rhineland confirmed him in his hatred of princes. He harangued the revolutionary clubs, and insisted on the unity of interests which should ally all civilized states to one another. He then commenced a republican journal called *Das rote Blatt*, and afterwards *Rübezahl*, in which he strongly condemned the administration of the Rhenish provinces by France.

After the peace of Campo Formio (1797) there was some hope that the Rhenish provinces would be constituted into an independent republic. In 1799 the provinces sent an embassy, of which Görres was a member, to Paris to put their case before the directory. The embassy reached Paris on the 20th of November 1799; two days before this Napoleon had assumed the supreme direction of affairs. After much delay the embassy was received by him; but the only answer they obtained was "that they might rely on perfect justice, and that the French government would never lose sight of their wants." Görres on his return published a tract called *Resultate meiner Sendung nach Paris*, in which he reviewed the history of the French Revolution. During the thirteen years of Napoleon's dominion Görres lived a retired life, devoting himself chiefly to art or science. In 1801 he married Catherine de Lasaulx, and was for some years teacher at a secondary school in Coblenz; in 1806 he moved to Heidelberg, where he lectured at the university. As a leading member of the Heidelberg Romantic group, he edited together with K. Brentano and L. von Arnim the famous *Zeitung für Einsiedler* (subsequently re-named *Tröst-Einsamkeit*), and in 1807 he published *Die teutschen Volksbücher*. He returned to Coblenz in 1808, and again found occupation as a teacher in a secondary school, supported by civic funds. He now studied Persian, and in two years published a *Mythengeschichte der asiatischen Welt*, which was followed ten years later by *Das Heldenbuch von Iran*, a translation of part of the *Shahnama*, the epic of Firdousi. In 1813 he actively took up the cause of national independence, and in the following year founded *Der rheinische Merkur*. The intense earnestness of the paper, the bold outspokenness of its hostility to Napoleon, and its fiery eloquence secured for it almost instantly a position and influence unique in the history of German newspapers. Napoleon himself called it *la cinquième puissance*. The ideal it insisted on was a united Germany, with

a representative government, but under an emperor after the fashion of other days,—for Görres now abandoned his early advocacy of republicanism. When Napoleon was at Elba, Görres wrote an imaginary proclamation issued by him to the people, the intense irony of which was so well veiled that many Frenchmen mistook it for an original utterance of the emperor. He inveighed bitterly against the second peace of Paris (1815), declaring that Alsace and Lorraine should have been demanded back from France.

Stein was glad enough to use the *Merkur* at the time of the meeting of the congress of Vienna as a vehicle for giving expression to his hopes. But Hardenberg, in May 1815, warned Görres to remember that he was not to arouse hostility against France, but only against Bonaparte. There was also in the *Merkur* an antipathy to Prussia, a continual expression of the desire that an Austrian prince should assume the imperial title, and also a tendency to pronounced liberalism—all of which made it most distasteful to Hardenberg, and to his master King Frederick William III. Görres disregarded warnings sent to him by the censorship and continued the paper in all its fierceness. Accordingly it was suppressed early in 1816, at the instance of the Prussian government; and soon after Görres was dismissed from his post as teacher at Coblenz. From this time his writings were his sole means of support, and he became a most diligent political pamphleteer. In the wild excitement which followed Kotzebue's assassination, the reactionary decrees of Carlsbad were framed, and these were the subject of Görres's celebrated pamphlet *Teutschland und die Revolution* (1820). In this work he reviewed the circumstances which had led to the murder of Kotzebue, and, while expressing all possible horror at the deed itself, he urged that it was impossible and undesirable to repress the free utterance of public opinion by reactionary measures. The success of the work was very marked, despite its ponderous style. It was suppressed by the Prussian government, and orders were issued for the arrest of Görres and the seizure of his papers. He escaped to Strassburg, and thence went to Switzerland. Two more political tracts, *Europa und die Revolution* (1821) and *In Sachen der Rheinprovinzen und in eigener Angelegenheit* (1822), also deserve mention.

In Görres's pamphlet *Die heilige Allianz und die Völker auf dem Kongress zu Verona* he asserted that the princes had met together to crush the liberties of the people, and that the people must look elsewhere for help. The "elsewhere" was to Rome; and from this time Görres became a vehement Ultramontane writer. He was summoned to Munich by King Ludwig of Bavaria as Professor of History in the university, and there his writing enjoyed very great popularity. His *Christliche Mystik* (1836-1842) gave a series of biographies of the saints, together with an exposition of Roman Catholic mysticism. But his most celebrated ultramontane work was a polemical one. Its occasion was the deposition and imprisonment by the Prussian government of the archbishop Clement Wenceslaus, in consequence of the refusal of that prelate to sanction in certain instances the marriages of Protestants and Roman Catholics. Görres in his *Athanasius* (1837) fiercely upheld the power of the church, although the liberals of later date who have claimed Görres as one of their own school deny that he ever insisted on the absolute supremacy of Rome. *Athanasius* went through several editions, and originated a long and bitter controversy. In the *Historisch-politische Blätter*, a Munich journal, Görres and his son Guido (1805-1852) continually upheld the claims of the church. Görres received from the king the order of merit for his services. He died on the 29th of January 1848.

Görres's *Gesammelte Schriften* (only his political writings) appeared in six volumes (1854-1860), to which three volumes of *Gesammelte Briefe* were subsequently added (1858-1874). Cp. J. Galland, *Joseph von Görres* (1876, 2nd ed. 1877); J. N. Sepp, *Görres und seine Zeitgenossen* (1877), and by the same author, *Görres*, in the series *Geisteshelden* (1896). A *Görres-Gesellschaft* was founded in 1876.

GORSAS, ANTOINE JOSEPH (1752-1793), French publicist and politician, was born at Limoges (Haute-Vienne) on the 24th of March 1752, the son of a shoemaker. He established himself as a private tutor in Paris, and presently set up a school for the army at Versailles, which was attended by commoners as well as nobles. In 1781 he was imprisoned for a short time in the Bicêtre on an accusation of corrupting the morals of his pupils, his real offence being the writing of satirical verse. These circumstances explain the violence of his anti-monarchical sentiment. At the opening of the states-general he began to publish the *Courrier de Versailles à Paris et de Paris à Versailles*, in which appeared on the 4th of October 1789

the account of the banquet of the royal bodyguard. Gorsas is said to have himself read it in public at the Palais Royal, and to have headed one of the columns that marched on Versailles. He then changed the name of his paper to the *Courrier des quatre-vingt-trois départements*, continuing his incendiary propaganda, which had no small share in provoking the popular insurrections of June and August 1792. During the September massacres he wrote in his paper that the prisons were the centre of an anti-national conspiracy and that the people exercised a just vengeance on the guilty. On the 10th of September 1792 he was elected to the Convention for the department of Seine-et-Oise, and on the 10th of January 1793 was elected one of its secretaries. He sat at first with the Mountain, but having been long associated with Roland and Brissot, his agreement with the Girondists became gradually more pronounced; during the trial of Louis XVI. he dissociated himself more and more from the principles of the Mountain, and he voted for the king's detention during the war and subsequent banishment. A violent attack on Marat in the *Courrier* led to an armed raid on his printing establishment on the 9th of March 1793. The place was sacked, but Gorsas escaped the popular fury by flight. The facts being reported to the Convention, little sympathy was shown to Gorsas, and a resolution (which was evaded) was passed forbidding representatives to occupy themselves with journalism. On the 2nd of June he was ordered by the Convention to hold himself under arrest with other members of his party. He escaped to Normandy to join Buzot, and after the defeat of the Girondists at Pacy-sur-Eure he found shelter in Brittany. He was imprudent enough to return to Paris in the autumn, where he was arrested on the 6th of October and guillotined the next day.

See the *Moniteur*, No. 268 (1792), Nos. 20, 70 new series 18 (1793); M. Tourneux, *Bibl. de l'hist. de Paris*, 10,291 seq. (1894).

GORST, SIR JOHN ELDON (1835-). English statesman, was born at Preston in 1835, the son of Edward Chaddock Gorst, who took the name of Lowndes on succeeding to the family estate in 1853. He graduated third wrangler from St John's College, Cambridge, in 1857, and was admitted to a fellowship. After beginning to read for the bar in London, his father's illness and death led to his sailing to New Zealand, where he married in 1860 Mary Elizabeth Moore. The Maoris had at that time set up a king of their own in the Waikato district and Gorst, who had made friends with the chief Tamihana (William Thomson), acted as an intermediary between the Maoris and the government. Sir George Grey made him inspector of schools, then resident magistrate, and eventually civil commissioner in Upper Waikato. Tamihana's influence secured his safety in the Maori outbreak of 1863. In 1908 he published a volume of recollections, under the title of *New Zealand Revisited: Recollections of the Days of my Youth*. He then returned to England and was called to the bar at the Inner Temple in 1865, becoming Q.C. in 1875. He stood unsuccessfully for Hastings in the Conservative interest in 1865, and next year entered parliament as member for the borough of Cambridge, but failed to secure re-election at the dissolution of 1868. After the Conservative defeat of that year he was entrusted by Disraeli with the reorganization of the party machinery, and in five years of hard work he paved the way for the Conservative success at the general election of 1874. At a bye-election in 1875 he re-entered parliament as member for Chatham, which he continued to represent until 1892. He joined Sir Henry Drummond-Wolff, Lord Randolph Churchill and Mr Arthur Balfour in the "Fourth Party," and he became solicitor-general in the administration of 1885-1886 and was knighted. On the formation of the second Salisbury administration (1886) he became under-secretary for India and in 1891 financial secretary to the Treasury. At the general election of 1892 he became member for Cambridge University. He was deputy chairman of committees in the House of Commons from 1888 to 1891, and on the formation of the third Salisbury administration in 1895 he became vice-president of the committee of the council on education (until 1902). Sir John Gorst adhered to the principles of Tory democracy which he had advocated in the days of the fourth party, and continued to exhibit an active interest in the housing of the poor, the education and care of their children, and in social questions generally, both in parliament and in the press. But he was always exceedingly "independent" in his political action. He objected to Mr Chamberlain's proposals for tariff reform, and lost his seat at Cambridge at the general election of 1906 to a tariff reformer. He then withdrew from the vice-chancellorship of the Primrose League, of which he had been one of the founders, on the ground that it no longer represented the policy of Lord Beaconsfield. In 1910 he contested Preston as a Liberal, but failed to secure election.

His elder son, Sir J. Eldon Gorst (b. 1861), was financial adviser to the Egyptian government from 1898 to 1904, when he became assistant under-secretary of state for foreign affairs. In 1907 he succeeded Lord Cromer as British agent and consul-general in Egypt.

An account of Sir John Gorst's connexion with Lord Randolph Churchill will be found in the *Fourth Party* (1906), by his younger son, Harold E. Gorst.

GORTON, SAMUEL (*c.* 1600-1677), English sectary and founder of the American sect of Gortonites, was born about 1600 at Gorton, Lancashire. He was first apprenticed to a clothier in London, but, fearing persecution for his religious convictions, he sailed for Boston, Massachusetts, in 1636. Constantly involved in religious disputes, he fled in turn to Plymouth, and (in 1637-1638) to Aquidneck (Newport), where he was publicly whipped for insulting the clergy and magistrates. In 1643 he bought land from the Narraganset Indians at Shawomet—now Warwick—where he was joined by a number of his followers; but he quarrelled with the Indians and the authorities at Boston sent soldiers to arrest Gorton and six of his companions. He served a term of imprisonment for heresy at Charlestown, after which he was ejected from the colony. In England in 1646 he published the curious tract "Simplicities Defence against Seven Headed Policy" (reprinted in 1835), giving an account of his grievances against the Massachusetts government. In 1648 he returned to New England with a letter of protection from the earl of Warwick, and joining his former companions at Shawomet, which he named Warwick, in honour of the earl, he remained there till his death at the end of 1677. He is chiefly remembered as the founder of a small sect called the Gortonites, which survived till the end of the 18th century. They had a great contempt for the regular clergy and for all outward forms of religion, holding that the true believers partook of the perfection of God.

Among his quaint writings are: *An Incorruptible Key composed of the CX. Psalms wherewith you may open the rest of the Scriptures* (1647), and *Saltmarsh returned from the Dead*, with its sequel, *An Antidote against the Common Plague of the World* (1657). See L. G. Jones, *Samuel Gorton: a forgotten Founder of our Liberties* (Providence, 1896).

GORTON, an urban district in the Gorton parliamentary division of Lancashire, England, forming an eastern suburb of Manchester. Pop. (1901) 26,564. It is largely a manufacturing district, having cotton mills and iron, engineering and chemical works.

GORTYNA, or Gortyn, an important ancient city on the southern side of the island of Crete. It stood on the banks of the small river Lethaeus (Mitropolipotamo), about three hours distant from the sea, with which it communicated by means of its two harbours, Metallum and Lebena. It had temples of Apollo Pythius, Artemis and Zeus. Near the town was the famous fountain of Sauros, inclosed by fruit-bearing poplars; and not far from this was another spring, overhung by an evergreen plane tree which in popular belief marked the scene of the amours of Zeus and Europa. Gortyna was, next to Cnossus, the largest and most powerful city of Crete. The two cities combined to subdue the rest of the island; but when they had gained their object they quarrelled with each other, and the history of both towns is from this time little more than a record of their feuds. Neither plays a conspicuous part in the history of Greece. Under the Romans Gortyna became the metropolis of the island. Extensive ruins may still be seen at the modern village of Hagii Deka, and here was discovered the great inscription containing chapters of its ancient laws. Though partly ruinous, the church of St Titus is a very interesting monument of early Christian

architecture, dating from about the 4th century.

See also CRETE, and for a full account of the laws see GREEK LAW.

GÖRTZ, GEORG HEINRICH VON, BARON VON SCHLITZ (1668-1719), Holstein statesman, was educated at Jena. He entered the Holstein-Gottorp service, and after the death of the duchess Hedwig Sophia, Charles XII.'s sister, became very influential during the minority of her son Duke Charles Frederick. His earlier policy aimed at strengthening Holstein-Gottorp at the expense of Denmark. With this object, during Charles XII.'s stay at Altranstädt (1706-1707), he tried to divert the king's attention to the Holstein question, and six years later, when the Swedish commander, Magnus Stenbock, crossed the Elbe, Görtz rendered him as much assistance as was compatible with not openly breaking with Denmark, even going so far as to surrender the fortress of Tönning to the Swedes. Görtz next attempted to undermine the grand alliance against Sweden by negotiating with Russia, Prussia and Saxony for the purpose of isolating Denmark, or even of turning the arms of the allies against her, a task by no means impossible in view of the strained relations between Denmark and the tsar. The plan foundered, however, on the refusal of Charles XII. to save the rest of his German domains by ceding Stettin to Prussia. Another simultaneous plan of procuring the Swedish crown for Duke Charles Frederick also came to nought. Görtz first suggested the marriage between the duke of Holstein and the tsarevna Anne of Russia, and negotiations were begun in St Petersburg with that object. On the arrival of Charles XII. from Turkey at Stralsund, Görtz was the first to visit him, and emerged from his presence chief minister or "grand-vizier" as the Swedes preferred to call the bold and crafty satrap, whose absolute devotion to the Swedish king took no account of the intense wretchedness of the Swedish nation. Görtz, himself a man of uncommon audacity, seems to have been fascinated by the heroic element in Charles's nature and was determined, if possible, to save him from his difficulties. He owed his extraordinary influence to the fact that he was the only one of Charles's advisers who believed, or pretended to believe, that Sweden was still far from exhaustion, or at any rate had a sufficient reserve of power to give support to an energetic diplomacy—Charles's own opinion, in fact. Görtz's position, however, was highly peculiar. Ostensibly, he was only the Holstein minister at Charles's court, in reality he was everything in Sweden except a Swedish subject—finance minister, plenipotentiary to foreign powers, factotum, and responsible to the king alone, though he had not a line of instructions. But he was just the man for a hero in extremities, and his whole course of procedure was, of necessity, revolutionary. His chief financial expedient was to debase, or rather ruin, the currency by issuing copper tokens redeemable in better times; but it was no fault of his that Charles XII., during his absence, flung upon the market too enormous an amount of this copper money for Görtz to deal with. By the end of 1718 it seemed as if Görtz's system could not go on much longer, and the hatred of the Swedes towards him was so intense and universal that they blamed him for Charles XII.'s tyranny as well as for his own. Görtz hoped, however, to conclude peace with at least some of Sweden's numerous enemies before the crash came and then, by means of fresh combinations, to restore Sweden to her rank as a great power. It must be admitted that, in pursuance of his "system," Görtz displayed a genius for diplomacy which would have done honour to a Metternich or a Talleyrand. He desired peace with Russia first of all, and at the congress of Åland even obtained relatively favourable terms, only to have them rejected by his obstinately optimistic master. Simultaneously, Görtz was negotiating with Cardinal Alberoni and with the whigs in England; but all his ingenious combinations collapsed like a house of cards on the sudden death of Charles XII. The whole fury of the Swedish nation instantly fell upon Görtz. After a trial before a special commission which was a parody of justice—the accused was not permitted to have any legal assistance or the use of writing materials—he was condemned to decapitation and promptly executed. Perhaps Görtz deserved his fate for "unnecessarily making himself the tool of an unheard-of despotism," but his death was certainly a judicial murder, and some historians even regard him as a political martyr.

See R. N. Bain, *Charles XII.* (London, 1895), and *Scandinavia*, chap. 12 (Cambridge, 1905); B. von Beskow, *Freherre Georg Heinrich von Görtz* (Stockholm, 1868).

(R. N. B.)

GÖRZ (Ital. *Gorizia*; Slovene, *Gorica*), the capital of the Austrian crownland of Görz and Gradisca, about 390 m. S.W. of Vienna by rail. Pop (1900) 25,432, two-thirds Italians, the remainder mostly Slovenes and Germans. It is picturesquely situated on the left bank of the Isonzo in a fertile valley, 35 m. N.N.W. of Trieste by rail. It is the seat of an archbishop and possesses an interesting cathedral, built in the 14th century and the richly decorated church of St Ignatius, built in the 17th century by the Jesuits. On an eminence, which dominates the town, is situated the old castle, formerly the seat of the counts of Görz, now partly used as barracks. Owing to the mildness of its climate Görz has become a favourite winter-resort, and has received the name of the Nice of Austria. Its mean annual temperature is 55° F.; while the mean winter temperature is 38.7° F. It is adorned with several pretty gardens with a luxuriant southern vegetation. On a height to the N. of the town is situated the Franciscan convent of Castagnavizza, in whose chapel lie the remains of Charles X. of France (d. 1836), the last Bourbon king, of the duke of Angoulême (d. 1844), his son, and of the duke of Chambord (d. 1883). Seven miles to the north of Görz is the Monte Santo (2275 ft.), a much-frequented place on which stands a pilgrimage church. The industries include cotton and silk weaving, sugar refining, brewing, the manufacture of leather and the making of rosoglio. There is also a considerable trade in wooden work, vegetables, early fruit and wine. Görz is mentioned for the first time at the beginning of the 11th century, and received its charter as a town in 1307. During the middle ages the greater part of its population was German.

GÖRZ AND GRADISCA, a county and crownland of Austria, bounded E. by Carniola, S. by Istria, the Triestine territory and the Adriatic, W. by Italy and N. by Carinthia. It has an area of 1140 sq. m. The coast line, though extending for 25 m., does not present any harbour of importance. It is fringed by alluvial deposits and lagoons, which are for the most part of very modern formation, for as late as the 4th or 5th centuries Aquileia was a great seaport. The harbour of Grado is the only one accessible to the larger kind of coasting craft. On all sides, except towards the south-west where it unites with the Friulian lowland, it is surrounded by mountains, and about four-sixths of its area is occupied by mountains and hills. From the Julian Alps, which traverse the province in the north, the country descends in successive terraces towards the sea, and may roughly be divided into the upper highlands, the lower highlands, the hilly district and the lowlands. The principal peaks in the Julian Alps are the Monte Canin (8469 ft.), the Manhart (8784 ft.), the Jalouc (8708 ft.), the Krn (7367 ft.), the Matajur (5386 ft.), and the highest peak in the whole range, the Triglav or Terglou (9394 ft.). The Julian Alps are crossed by the Predil Pass (3811 ft.), through which passes the principal road from Carinthia to the Coastland. The southern part of the province belongs to the Karst region, and here are situated the famous cascades and grottoes of Sankt Kanzian, where the river Reka begins its subterranean course. The principal river of the province is the Isonzo, which rises in the Triglav, and pursues a strange zigzag course for a distance of 78 m. before it reaches the Adriatic. At Görz the Isonzo is still 138 ft. above the sea, and it is navigable only in its lowest section, where it takes the name of the Sdobba. Its principal affluents are the Idria, the Wippach and the Torre with its tributary the Judrio, which forms for a short distance the boundary between Austria and Italy. Of special interest not only in itself but for the frequent allusions to it in classical literature is the Timavus or Timavo, which appears near Duino, and after a very short course flows into the Gulf of Trieste. In ancient times it appears, according to the well-known description of Virgil (*Aen.* i. 244) to have rushed from the mountain by nine separate mouths and with much noise and commotion, but at present it usually issues from only three mouths and flows quiet and still. It is strange enough, however, to see the river coming out full formed from the rock, and capable at its very source of bearing vessels on its bosom. According to a probable hypothesis it is a continuation of the above-mentioned river Reka, which is lost near Sankt Kanzian.

Agriculture, and specially viticulture, is the principal occupation of the population, and the vine is here planted not only in regular vineyards, but is introduced in long lines through the ordinary fields and carried up the hills in terraces locally called *ronchi*. The rearing of the silk-worm, especially in the lowlands, constitutes another great source of revenue, and furnishes the material for the only extensive industry of the country. The manufacture of silk is carried on at Görz, and in and around the village of Haidenschaft. Görz and Gradisca had in 1900 a population of 232,338, which is equivalent to 203 inhabitants per square mile. According to nationality about two-thirds were Slovenes, and the remainder Italians, with only about 2200 Germans. Almost the whole of the population (99.6%) belongs to the Roman

Catholic Church. The local diet, of which the archbishop of Görz is a member *ex-officio*, is composed of 22 members, and the crownland sends 5 deputies to the Reichsrat at Vienna. For administrative purposes the province is divided into 4 districts and an autonomous municipality, Görz (pop. 25,432), the capital. Other principal places are Cormons (5824), Monfalcone (5536), Kirchheim (5699), Gradisca (3843) and Aquileia (2319).

Görz first appears distinctly in history about the close of the 10th century, as part of a district bestowed by the emperor Otto III. on John, patriarch of Aquileia. In the 11th century it became the seat of the Eppenstein family, who frequently bore the title of counts of Gorizia; and in the beginning of the 12th century the countship passed from them to the Lurngau family which continued to exist till the year 1500, and acquired possessions in Tirol, Carinthia, Friuli and Styria. On the death of Count Leonhard (12th April 1500) the fief reverted to the house of Habsburg. The countship of Gradisca was united with it in 1754. The province was occupied by the French in 1809, but reverted again to Austria in 1815. It formed a district of the administrative province of Trieste until 1861, when it became a separate crownland under its actual name.

GOSCHEN, GEORGE JOACHIM GOSCHEN, 1st VISCOUNT (1831-1907), British statesman, son of William Henry Göschen, a London merchant of German extraction, was born in London on the 10th of August 1831. He was educated at Rugby under Dr Tait, and at Oriel College, Oxford, where he took a first-class in classics. He entered his father's firm of Frühling & Göschen, of Austin Friars, in 1853, and three years later became a director of the Bank of England. His entry into public life took place in 1863, when he was returned without opposition as member for the city of London in the Liberal interest, and this was followed by his re-election, at the head of the poll, in the general election of 1865. In November of the same year he was appointed vice-president of the Board of Trade and paymaster-general, and in January 1866 he was made chancellor of the duchy of Lancaster, with a seat in the cabinet. When Mr Gladstone became prime minister in December 1868, Mr Goschen joined the cabinet as president of the Poor Law Board, and continued to hold that office until March 1871, when he succeeded Mr Childers as first lord of the admiralty. In 1874 he was elected lord rector of the university of Aberdeen. Being sent to Cairo in 1876 as delegate for the British holders of Egyptian bonds, in order to arrange for the conversion of the debt, he succeeded in effecting an agreement with the Khedive.

In 1878 his views upon the county franchise question prevented him from voting uniformly with his party, and he informed his constituents in the city that he would not stand again at the forthcoming general election. In 1880 he was elected for Ripon, and continued to represent that constituency until the general election of 1885, when he was returned for the Eastern Division of Edinburgh. Being opposed to the extension of the franchise, he was unable to join Mr Gladstone's government in 1880; declining the post of viceroy of India, he accepted that of special ambassador to the Porte, and was successful in settling the Montenegrin and Greek frontier questions in 1880 and 1881. He was made an ecclesiastical commissioner in 1882, and when Sir Henry Brand was raised to the peerage in 1884, the speakership of the House of Commons was offered to him, but declined. During the parliament of 1880-1885 he frequently found himself unable to concur with his party, especially as regards the extension of the franchise and questions of foreign policy; and when Mr Gladstone adopted the policy of Home Rule for Ireland, Mr Goschen followed Lord Hartington (afterwards duke of Devonshire) and became one of the most active of the Liberal Unionists. His vigorous and eloquent opposition to Mr Gladstone's Home Rule Bill of 1886 brought him into greater public prominence than ever, but he failed to retain his seat for Edinburgh at the election in July of that year. On the resignation of Lord Randolph Churchill in December 1886, Mr Goschen, though a Liberal Unionist, accepted Lord Salisbury's invitation to join his ministry, and became chancellor of the exchequer. Being defeated at Liverpool, 26th of January 1887, by seven votes, he was elected for St George's, Hanover Square, on the 9th of February. His chancellorship of the exchequer during the ministry of 1886 to 1892 was rendered memorable by his successful conversion of the National Debt in 1888 (see National Debt). With that financial operation, under which the new 2¾% Consols became known as "Goschens," his name will long be connected. Aberdeen University again conferred upon him the honour of the lord rectorship in 1888, and he received a similar honour from the University of Edinburgh in 1890. In the Unionist opposition of 1893 to 1895

Mr Goschen again took a vigorous part, his speeches both in and out of the House of Commons being remarkable for their eloquence and debating power. From 1895 to 1900 Mr Goschen was first lord of the admiralty, and in that office he earned the highest reputation for his business-like grasp of detail and his statesmanlike outlook on the naval policy of the country. He retired in 1900, and was raised to the peerage by the title of Viscount Goschen of Hawkhurst, Kent. Though retired from active politics he continued to take a great interest in public affairs; and when Mr Chamberlain started his tariff reform movement in 1903, Lord Goschen was one of the weightiest champions of free trade on the Unionist side. He died on the 7th of February 1907, being succeeded in the title by his son George Joachim (b. 1866), who was Conservative M.P. for East Grinstead from 1895 to 1900, and married a daughter of the 1st earl of Cranbrook.

In educational subjects Goschen had always taken the greatest interest, his best known, but by no means his only, contribution to popular culture being his participation in the University Extension Movement; and his first efforts in parliament were devoted to advocating the abolition of religious tests and the admission of Dissenters to the universities. His published works indicate how ably he combined the wise study of economics with a practical instinct for business-like progress, without neglecting the more ideal aspects of human life. In addition to his well-known work on *The Theory of the Foreign Exchanges*, he published several financial and political pamphlets and addresses on educational and social subjects, among them being that on *Cultivation of the Imagination*, Liverpool, 1877, and that on *Intellectual Interest*, Aberdeen, 1888. He also wrote *The Life and Times of Georg Joachim Goschen, publisher and printer of Leipzig* (1903).

(H. Ch.)

GOS-HAWK, *i.e.* goose-hawk, the *Astur palumbarius* of ornithologists, and the largest of the short-winged hawks used in falconry. Its English name, however, has possibly been transferred to this species from one of the long-winged hawks or true falcons, since there is no tradition of the gos-hawk, now so called, having ever been used in Europe to take geese or other large and powerful birds. The genus *Astur* may be readily distinguished from *Falco* by the smooth edges of its beak, its short wings (not reaching beyond about the middle of the tail), and its long legs and toes—though these last are stout and comparatively shorter than in the sparrow-hawks (*Accipiter*). In plumage the gos-hawk has a general resemblance to the peregrine falcon, and it undergoes a corresponding change as it advances from youth to maturity—the young being longitudinally streaked beneath, while the adults are transversely barred. The irides, however, are always yellow, or in old birds orange, while those of the falcons are dark brown. The sexes differ greatly in size. There can be little doubt that the gos-hawk, nowadays very rare in Britain, was once common in England, and even towards the end of the 18th century Thornton obtained a nestling in Scotland, while Irish gos-hawks were of old highly celebrated. Being strictly a woodland-bird, its disappearance may be safely connected with the disappearance of the ancient forests in Great Britain, though its destructiveness to poultry and pigeons has doubtless contributed to its present scarcity. In many parts of the continent of Europe it still abounds. It ranges eastward to China and is much valued in India. In North America it is represented by a very nearly allied species, *A. atricapillus*, chiefly distinguished by the closer barring of the breast. Three or four examples corresponding with this form have been obtained in Britain. A good many other species of *Astur* (some of them passing into *Accipiter*) are found in various parts of the world, but the only one that need here be mentioned is the *A. novae-hollandiae* of Australia, which is remarkable for its dimorphism—one form possessing the normal dark-coloured plumage of the genus and the other being perfectly white, with crimson irides. Some writers hold these two forms to be distinct species and call the dark-coloured one *A. cinereus* or *A. raii*.

(A. N.)

GOSHEN, a division of Egypt settled by the Israelites between Jacob’s immigration and the Exodus. Its exact delimitation is a difficult problem. The name may possibly be of

Semitic, or at least non-Egyptian origin, as in Palestine we meet with a district (Josh. x. 41) and a city (*ib.* xv. 51) of the same name. The Septuagint reads Γέσεμ Ἀραβίας in Gen. xlv. 10, and xlvi. 34, elsewhere simply Γέσεμ. In xlvi. 28 “Goshen ... the land of Goshen” are translated respectively “Heroopolis ... the land of Rameses.” This represents a late Jewish identification. Ptolemy defines “Arabia” as an Egyptian nome on the eastern border of the delta, with capital Phacussa, corresponding to the Egyptian nome Sopt and town Kesem. It is doubtful whether Phacussa be situated at the mounds of Fākūs, or at another place, Saft-el-Henneh, which suits Strabo’s description of its locality rather better. The extent of Goshen, according to the apocryphal book of Judith (i. 9, 10), included Tanis and Memphis; this is probably an overstatement. It is indeed impossible to say more than that it was a place of good pasture, on the frontier of Palestine, and fruitful in edible vegetables and in fish (Numbers xi. 5).

(R. A. S. M.)

GOSHEN, a city and the county-seat of Elkhart county, Indiana, U.S.A., on the Elkhart river, about 95 m. E. by S. of Chicago, at an altitude of about 800 ft. Pop. (1890) 6033; (1900) 7810 (462 foreign-born); (1910) 8514. Goshen is served by the Cleveland, Cincinnati, Chicago & St Louis, and the Lake Shore & Michigan Southern railways, and is connected by electric railway with Warsaw and South Bend. The city has a Carnegie library, and is the seat of Goshen College (under Mennonite control), chartered as Elkhart Institute, at Elkhart, Ind., in 1895, and removed to Goshen and opened under its present name in 1903. The college includes a collegiate department, an academy, a Bible school, a normal school, a summer school and correspondence courses, and schools of business, of music and of oratory, and in 1908-1909 had 331 students, 73 of whom were in the Academy. Goshen is situated in a good farming region and is an important lumber market. There is a good water-power. Among the city’s manufactures are wagons and carriages, furniture, wooden-ware, veneering, sash and doors, ladders, lawn swings, rubber goods, flour, foundry products and agricultural machinery. The municipality owns its water works and its electric-lighting system. Goshen was first settled in 1828 and was first chartered as a city in 1868.

GOSLAR, a town of Germany, in the Prussian province of Hanover, romantically situated on the Gose, an affluent of the Oker, at the north foot of the Harz, 24 m. S.E. of Hildesheim and 31 m. S.W. from Brunswick, by rail. Pop. (1905) 17,817. It is surrounded by walls and is of antique appearance. Among the noteworthy buildings are the “Zwinger,” a tower with walls 23 ft. thick; the market church, in the Romanesque style, restored since its partial destruction by fire in 1844, and containing the town archives and a library in which are some of Luther’s manuscripts; the old town hall (Rathaus), possessing many interesting antiquities; the Kaiserworth (formerly the hall of the tailors’ gild and now an inn) with the statues of eight of the German emperors; and the Kaiserhaus, the oldest secular building in Germany, built by the emperor Henry III. before 1050 and often the residence of his successors. This was restored in 1867-1878 at the cost of the Prussian government, and was adorned with frescoes portraying events in German history. Other buildings of interest are:—the small chapel which is all that remains since 1820 of the old and famous cathedral of St Simon and St Jude founded by Henry III. about 1040, containing among other relics of the cathedral an old altar supposed to be that of the idol Krodo which formerly stood on the Burgberg near Neustadt-Harzburg; the church of the former Benedictine monastery of St Mary, or Neuwerk, of the 12th century, in the Romanesque style, with wall-paintings of considerable merit; and the house of the bakers’ gild now an hotel, the birthplace of Marshal Saxe. There are four Evangelical churches, a Roman Catholic church, a synagogue, several schools, a natural science museum, containing a collection of Harz minerals, the Fenkner museum of antiquities and a number of small foundations. The town has equestrian statues of the emperor Frederick I. and of the German emperor William I. The population is chiefly occupied in connexion with the sulphur, copper, silver and other mines in the neighbourhood. The town has also been long noted for its beer, and possesses some small manufactures and a considerable trade in fruit.

Goslar is believed to have been founded by Henry the Fowler about 920, and when in the time of Otto the Great the mineral treasures in the neighbourhood were discovered it increased rapidly in prosperity. It was often the meeting-place of German diets, twenty-three of which are said to have been held here, and was frequently the residence of the emperors. About 1350 it joined the Hanseatic League. In the middle of the 14th century the famous *Goslar statutes*, a code of laws, which was adopted by many other towns, was published. The town was unsuccessfully besieged in 1625, during the Thirty Years' War, but was taken by the Swedes in 1632 and nearly destroyed by fire. Further conflagrations in 1728 and 1780 gave a severe blow to its prosperity. It was a free town till 1802, when it came into the possession of Prussia. In 1807 it was joined to Westphalia, in 1816 to Hanover and in 1866 it was, along with Hanover, re-united to Prussia.

See T. Erdmann, *Die alte Kaiserstadt Goslar und ihre Umgebung in Geschichte, Sage und Bild* (Goslar, 1892); Crusius, *Geschichte der vormals kaiserlichen freien Reichstadt Goslar* (1842-1843); A. Wolfstieg, *Verfassungsgeschichte von Goslar* (Berlin, 1885); T. Asche, *Die Kaiserpfalz zu Goslar* (1892); Neuburg, *Goslars Bergbau bis 1552* (Hanover, 1892); and the *Urkundenbuch der Stadt Goslar*, edited by G. Bode (Halle, 1893-1900). For the *Goslarische Statuten* see the edition published by Göschen (Berlin, 1840).

GOSLICKI, WAWRZYNIEC (? 1533-1607), Polish bishop, better known under his Latinized name of Laurentius Grimalius Goslicius, was born about 1533. After having studied at Cracow and Padua, he entered the church, and was successively appointed bishop of Kaminietz and of Posen. Goslicki was an active man of business, was held in high estimation by his contemporaries and was frequently engaged in political affairs. It was chiefly through his influence, and through the letter he wrote to the pope against the Jesuits, that they were prevented from establishing their schools at Cracow. He was also a strenuous advocate of religious toleration in Poland. He died on the 31st of October 1607.

His principal work is *De Optimo senatore*, &c. (Venice, 1568). There are two English translations published respectively under the titles *A commonwealth of good counsaile*, &c. (1607), and *The Accomplished Senator, done into English by Mr Oldisworth* (1733).

GOSLIN, or Gauzlinus (d. *c.* 886), bishop of Paris and defender of the city against the Northmen (885), was, according to some authorities, the son of Roricon II., count of Maine, according to others the natural son of the emperor Louis I. In 848 he became a monk, and entered a monastery at Reims, later he became abbot of St Denis. Like most of the prelates of his time he took a prominent part in the struggle against the Northmen, by whom he and his brother Louis were taken prisoners (858), and he was released only after paying a heavy ransom (*Prudentii Trecensis episcopi Annales*, ann. 858). From 855 to 867 he held intermittently, and from 867 to 881 regularly, the office of chancellor to Charles the Bald and his successors. In 883 or 884 he was elected bishop of Paris, and foreseeing the dangers to which the city was to be exposed from the attacks of the Northmen, he planned and directed the strengthening of the defences, though he also relied for security on the merits of the relics of St Germain and St Geneviève. When the attack finally came (885), the defence of the city was entrusted to him and to Odo, count of Paris, and Hugh, abbot of St Germain l'Auxerrois. The city was attacked on the 26th of November, and the struggle for the possession of the bridge (now the Pont-au-Change) lasted for two days; but Goslin repaired the destruction of the wooden tower overnight, and the Normans were obliged to give up the attempt to take the city by storm. The siege lasted for about a year longer, while the emperor Charles the Fat was in Italy. Goslin died soon after the preliminaries of the peace had been agreed on, worn out by his exertions, or killed by a pestilence which raged in the city.

See Amaury Duval, *L'Évêque Gozlin ou le siège de Paris par les Normands, chronique du IX^{e} siècle* (2 vols., Paris, 1832, 3rd ed. *ib.* 1835).

GOSNOLD, BARTHOLOMEW (d. 1607), English navigator. Nothing is known of his birth, parentage or early life. In 1602, in command of the "Concord," chartered by Sir Walter Raleigh and others, he crossed the Atlantic; coasted from what is now Maine to Martha's Vineyard, landing at and naming Cape Cod and Elizabeth Island (now Cuttyhunk) and giving the name Martha's Vineyard to the island now called No Man's Land; and returned to England with a cargo of furs, sassafras and other commodities obtained in trade with the Indians about Buzzard's Bay. In London he actively promoted the colonization of the regions he had visited and, by arousing the interest of Sir Ferdinando Gorges and other influential persons, contributed toward securing the grants of the charters to the London and Plymouth Companies in 1606. In 1606-1607 he was associated with Christopher Newport in command of the three vessels by which the first Jamestown colonists were carried to Virginia. As a member of the council he took an active share in the affairs of the colony, ably seconding the efforts of John Smith to introduce order, industry and system among the motley array of adventurers and idle "gentlemen" of which the little band was composed. He died from swamp fever on the 22nd of August 1607.

See *The Works of John Smith* (Arber's Edition, London, 1884); and J. M. Brereton, *Brief and True Relation of the North Part of Virginia* (reprinted by B. F. Stevens, London, 1901), an account of Gosnold's voyage of 1602.

GOSPATRIC (fl. 1067), earl of Northumberland, belonged to a family which had connexions with the royal houses both of Wessex and Scotland. Before the Conquest he accompanied Tostig on a pilgrimage to Rome (1061); and at that time was a landholder in Cumberland. About 1067 he bought the earldom of Northumberland from William the Conqueror; but, repenting of his submission, fled with other Englishmen to the court of Scotland (1068). He joined the Danish army of invasion in the next year; but was afterwards able, from his possession of Bamburgh castle, to make terms with the conqueror, who left him undisturbed till 1072. The peace concluded in that year with Scotland left him at William's mercy. He lost his earldom and took refuge in Scotland, where Malcolm seems to have provided for him.

See E. A. Freeman, *Norman Conquest*, vol. i. (Oxford, 1877), and the *English Hist. Review*, vol. xix. (London, 1904).

GOSPEL (O. Eng. *godspel*, *i.e.* good news, a translation of Lat. *bona annuntiatio*, or *evangelium*, Gr. εὐαγγέλιον; cf. Goth. *iu spillon*, "to announce good news," Ulfilas' translation of the Greek, from *iu*, that which is good, and *spellon* to announce), primarily the "glad tidings" announced to the world by Jesus Christ. The word thus came to be applied to the whole body of doctrine taught by Christ and his disciples, and so to the Christian revelation generally (see Christianity); by analogy the term "gospel" is also used in other connexions as equivalent to "authoritative teaching." In a narrower sense each of the records of the life and teaching of Christ preserved in the writings of the four "evangelists" is described as a Gospel. The many more or less imaginative lives of Christ which are not accepted by the Christian Church as canonical are known as "apocryphal gospels" (see Apocryphal Literature). The present article is concerned solely with general considerations affecting the four canonical Gospels; see for details of each, the articles under Matthew, Mark, Luke and John.

The Four Gospels.—The disciples of Jesus proclaimed the Gospel that He was the Christ. Those to whom this message was first delivered in Jerusalem and Palestine had seen and heard Jesus, or had heard much about Him. They did not require to be told who He was. But more and more as the work of preaching and teaching extended to such as had not this

knowledge, it became necessary to include in the Gospel delivered some account of the ministry of Jesus. Moreover, alike those who had followed Him during His life on earth, and all who joined themselves to them, must have felt the need of dwelling on His precepts, so that these must have been often repeated, and also in all probability from an early time grouped together according to their subjects, and so taught. For some time, probably for upwards of thirty years, both the facts of the life of Jesus and His words were only related orally. This would be in accordance with the habits of mind of the early preachers of the Gospel. Moreover, they were so absorbed in the expectation of the speedy return of Christ that they did not feel called to make provision for the instruction of subsequent generations. The Epistles of the New Testament contain no indications of the existence of any written record of the life and teaching of Christ. Tradition indicates A.D. 60-70 as the period when written accounts of the life and teaching of Jesus began to be made (see MARK, GOSPEL OF, and MATTHEW, GOSPEL OF). This may be accepted as highly probable. We cannot but suppose that at a time when the number of the original band of disciples of Jesus who survived must have been becoming noticeably smaller, and all these were advanced in life, the importance of writing down that which had been orally delivered concerning the Gospel-history must have been realized. We also gather from Luke's preface (i. 1-4) that the work of writing was undertaken in these circumstances and under the influence of this feeling, and that various records had already in consequence been made.

But do our Gospels, or any of them, in the form in which we actually have them, belong to the number of those earliest records? Or, if not, what are the relations in which they severally stand to them? These are questions which in modern criticism have been greatly debated. With a view to obtaining answers to them, it is necessary to consider the reception of the Gospels in the early Church, and also to examine and compare the Gospels themselves. Some account of the evidence supplied in these two ways must be given in the present article, so far as it is common to all four Gospels, or to three or two of them, and in the articles on the several Gospels so far as it is especial to each.

1. *The Reception of the Gospels in the Early Church.*—The question of the use of the Gospels and of the manner in which they were regarded during the period extending from the latter years of the 1st century to the beginning of the last quarter of the 2nd is a difficult one. There is a lack of explicit references to the Gospels;[1] and many of the quotations which may be taken from them are not exact. At the same time these facts can be more or less satisfactorily accounted for by various circumstances. In the first place, it would be natural that the habits of thought of the period when the Gospel was delivered orally should have continued to exert influence even after the tradition had been committed to writing. Although documents might be known and used, they would not be regarded as the authorities for that which was independently remembered, and would not, therefore, necessarily be mentioned. Consequently, it is not strange that citations of sayings of Christ—and these are the only express citations in writings of the Subapostolic Age—should be made without the source whence they were derived being named, and (with a single exception) without any clear indication that the source was a document. The exception is in the little treatise commonly called the Epistle of Barnabas, probably composed about A.D. 130, where (c. iv. 14) the words "many are called but few chosen" are introduced by the formula "as it is written."

For the identification, therefore, of the source or sources used we have to rely upon the amount of correspondence with our Gospels in the quotations made, and in respect to other parallelisms of statement and of expression, in these early Christian writers. The correspondence is in the main full and true as regards spirit and substance, but it is rarely complete in form. The existence of some differences of language may, however, be too readily taken to disprove derivation. Various forms of the same saying occurring in different documents, or remembered from oral tradition and through catechetical instruction, would sometimes be purposely combined. Or, again, the memory might be confused by this variety, and the verification of quotations, especially of brief ones, was difficult, not only from the comparative scarcity of the copies of books, but also because ancient books were not provided with ready means of reference to particular passages. On the whole there is clearly a presumption that where we have striking expressions which are known to us besides only in one of our Gospel-records, that particular record has been the source of it. And where there are several such coincidences the ground for the supposition that the writing in question has been used may become very strong. There is evidence of this kind, more or less clear in the several cases, that all the four Gospels were known in the first two or three decades of the 2nd century. It is fullest as to our first Gospel and, next to this one, as to our third.

After this time it becomes manifest that, as we should expect, documents were the recognized authorities for the Gospel history; but there is still some uncertainty as to the documents upon which reliance was placed, and the precise estimation in which they were severally held. This is in part at least due to the circumstance that nearly all the writings which have remained of the Christian literature belonging to the period *circa* A.D. 130-180 are addressed to non-Christians, and that for the most part they give only summaries of the teaching of Christ and of the facts of the Gospel, while terms that would not be understood by, and names that would not carry weight with, others than Christians are to a large extent avoided. The most important of the writings now in question are two by Justin Martyr (*circa* A.D. 145-160), viz. his *Apology* and his *Dialogue with Trypho*. In the former of these works he shows plainly his intention of adapting his language and reasoning to Gentile, and in the latter to Jewish, readers. In both his name for the Gospel-records is "Memoirs of the Apostles." After a great deal of controversy there has come to be very wide agreement that he reckoned the first three Gospels among these Memoirs. In the case of the second and third there are indications, though slight ones, that he held the view of their composition and authorship which was common from the last quarter of the century onwards (see MARK, GOSPEL OF, and LUKE, GOSPEL OF), but he has made the largest use of our first Gospel. It is also generally allowed that he was acquainted with the fourth Gospel, though some think that he used it with a certain reserve. Evidence may, however, be adduced which goes far to show that he regarded it, also, as of apostolic authority. There is a good deal of difference of opinion still as to whether Justin reckoned other sources for the Gospel-history besides our Gospels among the Apostolic Memoirs. In this connexion, however, as well as on other grounds, it is a significant fact that within twenty years or so after the death of Justin, which probably occurred *circa* A.D. 160, Tatian, who had been a hearer of Justin, produced a continuous narrative of the Gospel-history which received the name *Diatessaron* ("through four"), in the main a compilation from our four Gospels.[2]

Before the close of the 2nd century the four Gospels had attained a position of unique authority throughout the greater part of the Church, not different from that which they have held since, as is evident from the treatise of Irenaeus *Against Heresies* (*c.* A.D. 180; see esp. iii. i. 1 f. and x., xi.) and from other evidence only a few years later. The struggle against Gnosticism, which had been going on during the middle part of the century, had compelled the Church both to define her creed and to draw a sharper line of demarcation than heretofore between those writings whose authority she regarded as absolute and all others. The effect of this was no doubt to enhance the sense generally entertained of the value of the four Gospels. At the same time in the formal statements now made it is plainly implied that the belief expressed is no new one. And it is, indeed, difficult to suppose that agreement on this subject between different portions of the Church could have manifested itself at this time in the spontaneous manner that it does, except as the consequence of traditional feelings and convictions, which went back to the early part of the century, and which could hardly have arisen without good foundation, with respect to the special value of these works as embodiments of apostolic testimony, although all that came to be supposed in regard to their actual authorship cannot be considered proved.

2. *The Internal Criticism of the Gospels.*—In the middle of the 19th century an able school of critics, known as the Tübingen school, sought to show from indications in the several Gospels that they were composed well on in the 2nd century in the interests of various strongly marked parties into which the Church was supposed to have been divided by differences in regard to the Judaic and Pauline forms of Christianity. These theories are now discredited. It may on the contrary be confidently asserted with regard to the first three Gospels that the local colouring in them is predominantly Palestinian, and that they show no signs of acquaintance with the questions and the circumstances of the 2nd century; and that the character even of the Fourth Gospel is not such as to justify its being placed, at furthest, much after the beginning of that century.

We turn to the literary criticism of the Gospels, where solid results have been obtained. The first three Gospels have in consequence of the large amount of similarity between them in contents, arrangement, and even in words and the forms of sentences and paragraphs, been called Synoptic Gospels. It has long been seen that, to account for this similarity, relations of interdependence between them, or of common derivation, must be supposed. And the question as to the true theory of these relations is known as the *Synoptic Problem*. Reference has already been made to the fact that during the greater part of the Apostolic age the Gospel history was taught orally. Now some have held that the form of this oral teaching was to a great extent a fixed one, and that it was the common source of our first three Gospels. This oral theory was for a long time the favourite one in England; it was never widely held in Germany, and in recent years the majority of English students of the Synoptic

Problem have come to feel that it does not satisfactorily explain the phenomena. Not only are the resemblances too close, and their character in part not of a kind, to be thus accounted for, but even many of the differences between parallel contexts are rather such as would arise through the revision of a document than through the freedom of oral delivery.

It is now and has for many years been widely held that a document which is most nearly represented by the Gospel of Mark, or which (as some would say) was virtually identical with it, has been used in the composition of our first and third Gospels. This source has supplied the Synoptic Outline, and in the main also the narratives common to all three. Questions connected with the history of this document are treated in the article on Mark, Gospel of.

There is also a considerable amount of matter common to Matthew and Luke, but not found in Mark. It is introduced into the Synoptic Outline very differently in those two Gospels, which clearly suggests that it existed in a separate form, and was independently combined by the first and third evangelists with their other document. This common matter has also a character of its own; it consists mainly of pieces of discourse. The form in which it is given in the two Gospels is in several passages so nearly identical that we must suppose these pieces at least to have been derived immediately or ultimately from the same Greek document. In other cases there is more divergence, but in some of them this is accounted for by the consideration that in Matthew passages from the source now in question have been interwoven with parallels in the other chief common source before mentioned. There are, however, instances in which no such explanation will serve, and it is possible that our first and third evangelists may have used two documents which were not in all respects identical, but which corresponded very closely on the whole. The ultimate source of the subject matter in question, or of the most distinctive and larger part of it, was in all probability an Aramaic one, and in some parts different translations may have been used.

This second source used in the composition of Matthew and Luke has frequently been called “The Logia” in order to signify that it was a collection of the sayings and discourses of Jesus. This name has been suggested by Schleiermacher’s interpretation of Papias’ fragment on Matthew (see Matthew, Gospel of). But some have maintained that the source in question also contained a good many narratives, and in order to avoid any premature assumption as to its contents and character several recent critics have named it “Q.” It may, however, fairly be called “the Logian document,” as a convenient way of indicating the character of the greater part of the matter which our first and third evangelists have taken from it, and this designation is used in the articles on the Gospels of Luke and Matthew. The reconstruction of this document has been attempted by several critics. The arrangement of its contents can, it seems, best be learned from Luke.

3. One or two remarks may here be added as to the bearing of the results of literary criticism upon the use of the Gospels. Their effect is to lead us, especially when engaged in historical inquiries, to look beyond our Gospels to their sources, instead of treating the testimony of the Gospels severally as independent and ultimate. Nevertheless it will still appear that each Gospel has its distinct value, both historically and in regard to the moral and spiritual instruction afforded. And the fruits of much of that older study of the Gospels, which was largely employed in pointing out the special characteristics of each, will still prove serviceable.

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4. Synopses.—W. G. Rushbrooke, *Synopticon, An Exposition of the Common Matter of the Synoptic Gospels* (1880); A. Wright, *The Synopsis of the Gospels in Greek* (2nd ed., 1903).

See also the articles on each Gospel, and the article BIBLE, section *New Testament*.

(V. H. S.)

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1 For the only two that can be held to be such in the first half of the 2nd century, and the doubts whether they refer to our present Gospels, see MARK, GOSPEL OF, and MATTHEW, GOSPEL OF.

2 The character of Tatian's *Diatessaron* has been much disputed in the past, but there can no longer be any reasonable doubt on the subject after recent discoveries and investigations. (An account of these may be seen most conveniently in *The Diatessaron of Tatian*, by S. Hemphill; see under TATIAN.)

GOSPORT, a seaport in the Fareham parliamentary division of Hampshire, England, facing Portsmouth across Portsmouth harbour, 81 m. S.W. from London by the London & Southwestern railway. Pop. of urban district of Gosport and Alverstoke (1901), 28,884. A ferry and a floating bridge connect it with Portsmouth. It is enclosed within a double line of fortifications, consisting of the old Gosport lines, and, about 3000 yds. to the east, a series of forts connected by strong lines with occasional batteries, forming part of the defence works of Portsmouth harbour. The principal buildings are the town hall and market hall, and the church of Holy Trinity, erected in the time of William III. To the south at Haslar there is a magnificent naval hospital, capable of containing 2000 patients, and adjoining it a gunboat slipway and large barracks. To the north is the Royal Clarence victualling yard, with brewery, cooperage, powder magazines, biscuit-making establishment, and storehouses for various kinds of provisions for the royal navy.

Gosport (Goseporte, Gozeport, Gosberg, Godsport) was originally included in Alverstoke manor, held in 1086 by the bishop and monks of Winchester under whom villeins farmed the land. In 1284 the monks agreed to give up Alverstoke with Gosport to the bishop, whose successors continued to hold them until the lands were taken over by the ecclesiastical commissioners. After the confiscation of the bishop's lands in 1641, however, the manor of Alverstoke with Gosport was granted to George Withers, but reverted to the bishop at the Restoration. In the 16th century Gosport was "a little village of fishermen." It was called a borough in 1461, when there are also traces of burgage tenure. From 1462 one bailiff was elected annually in the borough court, and government by a bailiff continued until 1682, when Gosport was included in Portsmouth borough under the charter of Charles II. to that 268
town. This was annulled in 1688, since which time there is no evidence of the election of bailiffs. With this exception no charter of incorporation is known, although by the 16th century the inhabitants held common property in the shape of tolls of the ferry. The importance of Gosport increased during the 16th and 17th centuries owing to its position at the mouth of Portsmouth harbour, and its convenience as a victualling station. For this reason also the town was particularly prosperous during the American and Peninsular Wars. About 1540 fortifications were built there for the defence of the harbour, and in the 17th century it was a garrison town under a lord-lieutenant.

GOSS, SIR JOHN (1800-1880), English composer, was born at Fareham, Hampshire, on the 27th of December 1800. He was elected a chorister of the Chapel Royal in 1811, and in 1816, on the breaking of his voice, became a pupil of Attwood. A few early compositions, some for the theatre, exist, and some glees were published before 1825. He was appointed organist of St Luke's, Chelsea, in 1824, and in 1838 became organist of St Paul's in

succession to Attwood; he kept the post until 1872, when he resigned and was knighted. His position in the London musical world of the time was an influential one, and he did much by his teaching and criticism to encourage the study and appreciation of good music. In 1876 he was given the degree of Mus.D. at Cambridge. Though his few orchestral works have very small importance, his church music includes some fine compositions, such as the anthems “O taste and see,” “O Saviour of the world” and others. He was the last of the great English school of church composers who devoted themselves almost exclusively to church music; and in the history of the glee his is an honoured name, if only on account of his finest work in that form, the five-part glee, Ossian’s “Hymn to the sun.” He died at Brixton, London, on the 10th of May 1880.

GOSSAMER, a fine, thread like and filmy substance spun by small spiders, which is seen covering stubble fields and gorse bushes, and floating in the air in clear weather; especially in the autumn. By transference anything light, unsubstantial or flimsy is known as “gossamer.” A thin gauzy material used for trimming and millinery, resembling the “chiffon” of to-day, was formerly known as gossamer; and in the early Victorian period it was a term used in the hat trade, for silk hats of very light weight.

The word is obscure in origin, it is found in numerous forms in English, and is apparently taken from *gose*, goose and *somere*, summer. The Germans have *Mädchensommer*, maidens’ summer, and *Altweibersommer*, old women’s summer, as well as *Sommerfäden*, summer-threads, as equivalent to the English gossamer, the connexion apparently being that gossamer is seen most frequently in the warm days of late autumn (St Martin’s summer) when geese are also in season. Another suggestion is that the word is a corruption of *gaze à Marie* (gauze of Mary) through the legend that gossamer was originally the threads which fell away from the Virgin’s shroud on her assumption.

GOSSE, EDMUND (1849-), English poet and critic, was born in London on the 21st of September 1849, son of the zoologist P. H. Gosse. In 1867 he became an assistant in the department of printed books in the British Museum, where he remained until he became in 1875 translator to the Board of Trade. In 1904 he was appointed librarian to the House of Lords. In 1884-1890 he was Clark Lecturer in English literature at Trinity College, Cambridge. Himself a writer of literary verse of much grace, and master of a prose style admirably expressive of a wide and appreciative culture, he was conspicuous for his valuable work in bringing foreign literature home to English readers. *Northern Studies* (1879), a collection of essays on the literature of Holland and Scandinavia, was the outcome of a prolonged visit to those countries, and was followed by later work in the same direction. He translated Ibsen’s *Hedda Gabler* (1891), and, with W. Archer, *The Master-Builder* (1893), and in 1907 he wrote a life of Ibsen for the “Literary Lives” series. He also edited the English translation of the works of Björnson. His services to Scandinavian letters were acknowledged in 1901, when he was made a knight of the Norwegian order of St Olaf of the first class. Mr Gosse’s published volumes of verse include *On Viol and Flute* (1873), *King Erik* (1876), *New Poems* (1879), *Firdausi in Exile* (1885), *In Russet and Silver* (1894), *Collected Poems* (1896). *Hypolympia, or the Gods on the Island* (1901), an “ironic phantasy,” the scene of which is laid in the 20th century, though the personages are Greek gods, is written in prose, with some blank verse. His *Seventeenth Century Studies* (1883), *Life of William Congreve* (1888), *The Jacobean Poets* (1894), *Life and Letters of Dr John Donne, Dean of St Paul’s* (1899), *Jeremy Taylor* (1904, “English Men of Letters”), and *Life of Sir Thomas Browne* (1905) form a very considerable body of critical work on the English 17th-century writers. He also wrote a life of Thomas Gray, whose works he edited (4 vols., 1884); *A History of Eighteenth Century Literature* (1889); a *History of Modern English Literature* (1897), and vols. iii. and iv. of an *Illustrated Record of English Literature* (1903-1904) undertaken in connexion with Dr Richard Garnett. Mr Gosse was always a sympathetic student of the younger school of French and Belgian writers, some of his papers on the subject being collected as *French Profiles* (1905). *Critical Kit-Kats* (1896) contains an

admirable criticism of J. M. de Heredia, reminiscences of Lord de Tabley and others. He edited Heinemann's series of "Literature of the World" and the same publisher's "International Library." To the 9th edition of the *Encyclopaedia Britannica* he contributed numerous articles, and his services as chief literary adviser in the preparation of the 10th and 11th editions incidentally testify to the high position held by him in the contemporary world of letters. In 1905 he was entertained in Paris by the leading *littérateurs* as a representative of English literary culture. In 1907 Mr Gosse published anonymously *Father and Son*, an intimate study of his own early family life. He married Ellen, daughter of Dr G. W. Epps, and had a son and two daughters.

GOSSE, PHILIP HENRY (1810-1888), English naturalist, was born at Worcester on the 6th of April 1810, his father, Thomas Gosse (1765-1844) being a miniature painter. In his youth the family settled at Poole, where Gosse's turn for natural history was noticed and encouraged by his aunt, Mrs Bell, the mother of the zoologist, Thomas Bell (1792-1880). He had, however, little opportunity for developing it until, in 1827, he found himself clerk in a whaler's office at Carbonear, in Newfoundland, where he beguiled the tedium of his life by observations, chiefly with the microscope. After a brief and unsuccessful interlude of farming in Canada, during which he wrote an unpublished work on the entomology of Newfoundland, he travelled in the United States, was received and noticed by men of science, was employed as a teacher for some time in Alabama, and returned to England in 1839. His *Canadian Naturalist* (1840), written on the voyage home, was followed in 1843 by his *Introduction to Zoology*. His first widely popular book was *The Ocean* (1844). In 1844 Gosse, who had meanwhile been teaching in London, was sent by the British Museum to collect specimens of natural history in Jamaica. He spent nearly two years on that island, and after his return published his *Birds of Jamaica* (1847) and his *Naturalist's Sojourn in Jamaica* (1851). He also wrote about this time several zoological works for the S.P.C.K., and laboured to such an extent as to impair his health. While recovering at Ilfracombe, he was attracted by the forms of marine life so abundant on that shore, and in 1853 published *A Naturalist's Rambles on the Devonshire Coast*, accompanied by a description of the marine aquarium invented by him, by means of which he succeeded in preserving zoophytes and other marine animals of the humbler grades alive and in good condition away from the sea. This arrangement was more fully set forth and illustrated in his *Aquarium* (1854), succeeded in 1855-1856 by *A Manual of Marine Zoology*, in two volumes, illustrated by nearly 700 wood engravings after the author's drawings. A volume on the marine fauna of Tenby succeeded in 1856. In June of the same year he was elected F.R.S. Gosse, who was a most careful observer, but who lacked the philosophical spirit, was now tempted to essay work of a more ambitious order, publishing in 1857 two books, *Life* and *Omphalos*, embodying his speculations on the appearance of life on the earth, which he considered to have been instantaneous, at least as regarded its higher forms. His views met with no favour from scientific men, and he returned to the field of observation, which he was better qualified to cultivate. Taking up his residence at St Marychurch, in South Devon, he produced from 1858 to 1860 his standard work on sea-anemones, the *Actinologia Britannica*. *The Romance of Natural History* and other popular works followed. In 1865 he abandoned authorship, and chiefly devoted himself to the cultivation of orchids. Study of the Rotifera, however, also engaged his attention, and his results were embodied in a monograph by Dr C. T. Hudson (1886). He died at St Marychurch on the 23rd of August 1888.

His life was written by his son, Edmund Gosse.

GOSSEC, FRANÇOIS JOSEPH (1734-1829), French musical composer, son of a small farmer, was born at the village of Vergnies, in Belgian Hainaut, and showing early a taste for music became a choir-boy at Antwerp. He went to Paris in 1751 and was taken up by Rameau. He became conductor of a private band kept by La Popelinière, a wealthy amateur, and gradually determined to do something to revive the study of instrumental music in France. He had his own first symphony performed in 1754, and as conductor to the Prince de

Condé's orchestra he produced several operas and other compositions of his own. He imposed his influence upon French music with remarkable success, founded the Concert des Amateurs in 1770, organized the École de Chant in 1784, was conductor of the band of the Garde Nationale at the Revolution, and was appointed (with Méhul and Cherubini) inspector of the Conservatoire de Musique when this institution was created in 1795. He was an original member of the Institute and a chevalier of the legion of honour. Outside France he was but little known, and his own numerous compositions, sacred and secular, were thrown into the shade by those of men of greater genius; but he has a place in history as the inspirer of others, and as having powerfully stimulated the revival of instrumental music. He died at Passy on the 16th of February 1829.

See the *Lives* by P. Hédouin (1852) and E. G. J. Gregoir (1878).

GOSSIP (from the O. E. *godsibb*, *i.e.* God, and *sib*, akin, standing in relation to), originally a god-parent, *i.e.* one who by taking a sponsor's vows at a baptism stands in a spiritual relationship to the child baptized. The common modern meaning is of light personal or social conversation, or, with an invidious sense, of idle tale-bearing. "Gossip" was early used with the sense of a friend or acquaintance, either of the parent of the child baptized or of the other god-parents, and thus came to be used, with little reference to the position of sponsor, for women friends of the mother present at a birth; the transition of meaning to an idle chatterer or talker for talking's sake is easy. The application to the idle talk of such persons does not appear to be an early one.

GOSSNER, JOHANNES EVANGELISTA (1773-1858), German divine and philanthropist, was born at Hausen near Augsburg on the 14th of December 1773, and educated at the university of Dillingen. Here like Martin Boos and others he came under the spell of the Evangelical movement promoted by Johann Michael Sailer, the professor of pastoral theology. After taking priest's orders, Gossner held livings at Dirlewang (1804-1811) and Munich (1811-1817), but his evangelical tendencies brought about his dismissal and in 1826 he formally left the Roman Catholic for the Protestant communion. As minister of the Bethlehem church in Berlin (1829-1846) he was conspicuous not only for practical and effective preaching, but for the founding of schools, asylums and missionary agencies. He died on the 20th of March 1858.

Lives by Bethmann-Hollweg (Berlin, 1858) and H. Dalton (Berlin, 1878).

GOSSON, STEPHEN (1554-1624), English satirist, was baptized at St George's, Canterbury, on the 17th of April 1554. He entered Corpus Christi College, Oxford, 1572, and on leaving the university in 1576 he went to London. In 1598 Francis Meres in his *Palladis Tamia* mentions him with Sidney, Spenser, Abraham Fraunce and others among the "best for pastorall," but no pastorals of his are extant. He is said to have been an actor, and by his own confession he wrote plays, for he speaks of *Catilines Conspiracies* as a "Pig of mine own Sowe." To this play and some others, on account of their moral intention, he extends indulgence in the general condemnation of stage plays contained in his *Schoole of Abuse, containing a pleasant invective against Poets, Pipers, Plaiers, Jesters and such like Caterpillars of the Commonwealth* (1579). The euphuistic style of this pamphlet and its ostentatious display of learning were in the taste of the time, and do not necessarily imply insincerity. Gosson justified his attack by considerations of the disorder which the love of melodrama and of vulgar comedy was introducing into the social life of London. It was not only by extremists like Gosson that these abuses were recognized. Spenser, in his *Teares of*

the Muses (1591), laments the same evils, although only in general terms. The tract was dedicated to Sir Philip Sidney, who seems not unnaturally to have resented being connected with a pamphlet which opened with a comprehensive denunciation of poets, for Spenser, writing to Gabriel Harvey (Oct. 16, 1579) of the dedication, says the author "was for hys labor scorned." He dedicated, however, a second tract, *The Ephemerides of Phialo ... and A Short Apologie of the Schoole of Abuse*, to Sidney on Oct. 28th, 1579. Gosson's abuse of poets seems to have had a large share in inducing Sidney to write his *Apologie for Poetrie*, which probably dates from 1581. After the publication of the *Schoole of Abuse* Gosson retired into the country, where he acted as tutor to the sons of a gentleman (*Plays Confuted*. "To the Reader," 1582). Anthony à Wood places this earlier and assigns the termination of his tutorship indirectly to his animosity against the stage, which apparently wearied his patron of his company. The publication of his polemic provoked many retorts, the most formidable of which was Thomas Lodge's *Defence of Playes* (1580). The players themselves retaliated by reviving Gosson's own plays. Gosson replied to his various opponents in 1582 by his *Playes Confuted in Five Actions*, dedicated to Sir Francis Walsingham. Meanwhile he had taken orders, was made lecturer of the parish church at Stepney (1585), and was presented by the queen to the rectory of Great Wigborough, Essex, which he exchanged in 1600 for St Botolph's, Bishopsgate. He died on the 13th of February 1624. *Pleasant Quippes for Upstart New-fangled Gentlewomen* (1595), a coarse satiric poem, is also ascribed to Gosson.

The *Schoole of Abuse and Apologie* were edited (1868) by Prof. E. Arber in his *English Reprints*. Two poems of Gosson's are included.

GOT, FRANÇOIS JULES EDMOND (1822-1901), French actor, was born at Lignerolles on the 1st of October 1822, and entered the Conservatoire in 1841, winning the second prize for comedy that year and the first in 1842. After a year of military service he made his début at the Comédie Française on the 17th of July 1844, as Alexis in *Les Héritiers* and Mascarelles in *Les Précieuses ridicules*. He was immediately admitted *pensionnaire*, and became *sociétaire* in 1850. By special permission of the emperor in 1866 he played at the Odéon in Emile Augier's *Contagion*. His golden jubilee at the Théâtre Français was celebrated in 1894, and he made his final appearance the year after. Got was a fine representative of the grand style of French acting, and was much admired in England as well as in Paris. He wrote the libretto of the opera *François Villon* (1857) and also of *L'Esclave* (1874). In 1881 he was decorated with the cross of the Legion of Honour.

GÖTA, a river of Sweden, draining the great Lake Vener. The name, however, is more familiar in its application to the canal which affords communication between Gothenburg and Stockholm. The river flows out of the southern extremity of the lake almost due south to the Cattegat, which it enters by two arms enclosing the island of Hisingen, the eastern forming the harbour and bearing the heavy sea-traffic of the port of Gothenburg. The Göta river is 50 m. in length, and is navigable for large vessels, a series of locks surmounting the famous falls of Trollhättan (*q.v.*). Passing the abrupt wooded Halleberg and Hunneberg (royal shooting preserves) Lake Vener is reached at Venersborg. Several important ports lie on the north, east and south shores (see VENER). From Sjötorp, midway on the eastern shore, the western Göta canal leads S.E. to Karlsborg. Its course necessitates over twenty locks to raise it from the Vener level (144 ft.) to its extreme height of 300 ft., and lower it over the subsequent fall through the small lakes Viken and Botten to Lake Vetter (*q.v.*; 289 ft.), which the route crosses to Motala. The eastern canal continues eastward from this point, and a descent is followed through five locks to Lake Boren, after which the canal, carried still at a considerable elevation, overlooks a rich and beautiful plain. The picturesque Lake Roxen with its ruined castle of Stjernarp is next traversed. At Norsholm a branch canal connects Lake Glan to the north, giving access to the important manufacturing centre of Norrköping. Passing Lake Asplången, the canal follows a cut through steep rocks, and then resumes an elevated course to the old town of Söderköping, after which the Baltic is reached at Mem.

Vessels plying to Stockholm run N.E. among the coastal island-fringe (*skärgård*), and then follow the Södertelge canal into Lake Mälar. The whole distance from Gothenburg to Stockholm is about 360 m., and the voyage takes about 2½ days. The length of artificial work on the Göta canal proper is 54 m., and there are 58 locks. The scenery is not such as will bear adverse weather conditions; that of the western canal is without any interest save in the remarkable engineering work. The idea of a canal dates from 1516, but the construction was organized by Baron von Platten and engineered by Thomas Telford in 1810-1832. The falls of Trollhättan had already been locked successfully in 1800.

GOTARZES, or GOTERZES, king of Parthia (*c.* A.D. 42-51). In an inscription at the foot of the rock of Behistun[1] he is called Γωτάρζης Γεόποθρος, *i.e.* "son of Gēw," and seems to be designated as "satrap of satrap." This inscription therefore probably dates from the reign of Artabanus II. (A.D. 10-40), to whose family Gotarzes must have belonged. From a very barbarous coin of Gotarzes with the inscription βασιλεως βασιλεων Αρσανοζ υος κεκαλουμενος Αρταβανου Γωτερζης (Wroth, *Catalogue of the Coins of Parthia*, p. 165; *Numism. Chron.*, 1900, p. 95; the earlier readings of this inscription are wrong), which must be translated "king of kings Arsakes, named son of Artabanos, Gotarzes," it appears that he was adopted by Artabanus. When the troublesome reign of Artabanus II. ended in A.D. 39 or 40, he was succeeded by Vardanes, probably his son; but against him in 41 rose Gotarzes (the dates are fixed by the coins). He soon made himself detested by his cruelty—among many other murders he even slew his brother Artabanus and his whole family (Tac. *Ann.* xi. 8)—and Vardanes regained the throne in 42; Gotarzes fled to Hyrcania and gathered an army from the Dahan nomads. The war between the two kings was at last ended by a treaty, as both were afraid of the conspiracies of their nobles. Gotarzes returned to Hyrcania. But when Vardanes was assassinated in 45, Gotarzes was acknowledged in the whole empire (Tac. *Ann.* xi. 9 ff.; Joseph. *Antiq.* xx. 3, 4, where Gotarzes is called Kotardes). He now takes on his coins the usual Parthian titles, "king of kings Arsaces the benefactor, the just, the illustrious (*Epiphanes*), the friend of the Greeks (*Philhellen*)," without mentioning his proper name. The discontent excited by his cruelty and luxury induced the hostile party to apply to the emperor Claudius and fetch from Rome an Arsacid prince Meherdates (*i.e.* Mithradates), who lived there as hostage. He crossed the Euphrates in 49, but was beaten and taken prisoner by Gotarzes, who cut off his ears (Tac. *Ann.* xii. 10 ff.). Soon after Gotarzes died, according to Tacitus, of an illness; Josephus says that he was murdered. His last coin is dated from June 51.

An earlier "Arsakes with the name Gotarzes," mentioned on some astronomical tablets from Babylon (Strassmaier in *Zeitschr. für Assyriologie*, vi. 216; Mahler in *Wiener Zeitschr. für Kunde des Morgenlands*, xv. 63 ff.), appears to have reigned for some time in Babylonia about 87 B.C.

(ED. M.)

1 Rawlinson, *Journ. Roy. Geog. Soc.* ix. 114; Flandin and Coste, *La Perse ancienne*, i. tab. 19; Dittenberger, *Orientis Graeci inscr.* 431.

GOTHA, a town of Germany, alternately with Coburg the residence of the dukes of Saxe-Coburg-Gotha, in a pleasant situation on the Leine canal, 6 m. N. of the slope of the Thuringian forest, 17 m. W. from Erfurt, on the railway to Bebra-Cassel. Pop. (1905) 36,906. It consists of an old inner town and encircling suburbs, and is dominated by the castle of Friedenstein, lying on the Schlossberg at an elevation of 1100 ft. With the exception of those in the older portion of the town, the streets are handsome and spacious, and the beautiful gardens and promenades between the suburbs and the castle add greatly to the town's attractiveness. To the south of the castle there is an extensive and finely adorned park. To the north-west of the town the Galberg—on which there is a public pleasure garden—and to the south-west the Seeberg rise to a height of over 1300 ft. and afford extensive views. The castle of Friedenstein, begun by Ernest the Pious, duke of Saxe-Coburg-Gotha, in 1643 and

completed in 1654, occupies the site of the old fortress of Grimmenstein. It is a huge square building flanked with two wings, having towers rising to the height of about 140 ft. It contains the ducal cabinet of coins and the ducal library of nearly 200,000 volumes, among which are several rare editions and about 6900 manuscripts. The picture gallery, the cabinet of engravings, the natural history museum, the Chinese museum, and the cabinet of art, which includes a collection of Egyptian, Etruscan, Roman and German antiquities, are now included in the new museum, completed in 1878, which stands on a terrace to the south of the castle. The principal other public buildings are the church of St Margaret with a beautiful portal and a lofty tower, founded in the 12th century, twice burnt down, and rebuilt in its present form in 1652; the church of the Augustinian convent, with an altar-piece by the painter Simon Jacobs; the theatre; the fire insurance bank and the life insurance bank; the ducal palace, in the Italian villa style, with a winter garden and picture gallery; the buildings of the ducal legislature; the hospital; the old town-hall, dating from the 11th century; the old residence of the painter Lucas Cranach, now used as a girls' school; the ducal stable; and the Friedrichsthal palace, now used as public offices. The educational establishments include a gymnasium (founded in 1524, one of the most famous in Germany), two training schools for teachers, conservatoires of music and several scientific institutions. Gotha is remarkable for its insurance societies and for the support it has given to cremation. The crematorium was long regarded as a model for such establishments.

Gotha is one of the most active commercial towns of Thuringia, its manufactures including sausages, for which it has a great reputation, porcelain, tobacco, sugar, machinery, mechanical and surgical instruments, musical instruments, shoes, lamps and toys. There are also a number of nurseries and market gardens. The book trade is represented by about a dozen firms, including that of the great geographical house of Justus Perthes, founded in 1785.

Gotha (in old chronicles called *Gotegewe* and later *Gotaha*) existed as a village in the time of Charlemagne. In 930 its lord Gothard abbot of Hersfeld surrounded it with walls. It was known as a town as early as 1200, about which time it came into the possession of the landgraves of Thuringia. On the extinction of that line Gotha came into the possession of the electors of Saxony, and it fell later to the Ernestine line of dukes. After the battle of Mühlberg in 1547 the castle of Grimmenstein was partly destroyed, but it was again restored in 1554. In 1567 the town was taken from Duke John Frederick by the elector Augustus of Saxony. After the death of John Frederick's sons, it came into the possession of Duke Ernest the Pious, the founder of the line of the dukes of Gotha; and on the extinction of this family it was united in 1825 along with the dukedom to Coburg.

See *Gotha und seine Umgebung* (Gotha, 1851); Kühne, *Beiträge zur Geschichte der Entwicklung der socialen Zustände der Stadt und des Herzogtums Gotha* (Gotha, 1862); Humbert, *Les Villes de la Thuringe* (Paris, 1869), and Beck, *Geschichte der Stadt Gotha* (Gotha, 1870).

GOTHAM, WISE MEN OF, the early name given to the people of the village of Gotham, Nottingham, in allusion to their reputed simplicity. But if tradition is to be believed the Gothamites were not so very simple. The story is that King John intended to live in the neighbourhood, but that the villagers, foreseeing ruin as the cost of supporting the court, feigned imbecility when the royal messengers arrived. Wherever the latter went they saw the rustics engaged in some absurd task. John, on this report, determined to have his hunting lodge elsewhere, and the "wise men" boasted, "we ween there are more fools pass through Gotham than remain in it." The "foles of Gotham" are mentioned as early as the 15th century in the *Towneley Mysteries*; and a collection of their "jests" was published in the 16th century under the title *Merrie Tales of the Mad Men of Gotham, gathered together by A.B., of Phisicke Doctour*. The "A.B." was supposed to represent Andrew Borde or Boorde (1490?-1549), famous among other things for his wit, but he probably had nothing to do with the compilation. As typical of the Gothamite folly is usually quoted the story of the villagers joining hands round a thornbush to shut in a cuckoo so that it would sing all the year. The localizing of fools is common to most countries, and there are many other reputed "imbecile" centres in England besides Gotham. Thus there are the people of Coggeshall, Essex, the "carles of Austwick," Yorkshire, "the gowks of Gordon," Berwickshire, and for many centuries the charge of folly has been made against "silly" Suffolk and Norfolk (*Descriptio*

Norfolciensium about 12th century, printed in Wright's *Early Mysteries and other Latin Poems*). In Germany there are the *Schildburgers*, in Holland the people of Kampen. Among the ancient Greeks Boeotia was the home of fools; among the Thracians, Abdera; among the ancient Jews, Nazareth.

See W. A. Clouston, *Book of Noodles* (London, 1888); R. H. Cunningham, *Amusing Prose Chap-books* (1889).

GOTHENBURG (Swed. *Göteborg*), a city and seaport of Sweden, on the river Göta, 5 m. above its mouth in the Cattegat, 285 m. S.W. of Stockholm by rail, and 360 by the Göta canal-route. Pop. (1900) 130,619. It is the chief town of the district (*län*) of Göteborg och Bohus, and the seat of a bishop. It lies on the east or left bank of the river, which is here lined with quays on both sides, those on the west belonging to the large island of Hisingen, contained between arms of the Göta. On this island are situated the considerable suburbs of Lindholmen and Lundby.

The city itself stretches east and south from the river, with extensive and pleasant residential suburbs, over a wooded plain enclosed by low hills. The inner city, including the business quarter, is contained almost entirely between the river and the Rosenlunds canal, continued in the Vallgraf, the moat of the old fortifications; and is crossed by the Storahamn, Östrahamn and Vestrahamn canals. The Storahamn is flanked by the handsome tree-planted quays, Norra and Södra Hamngatan. The first of these, starting from the Stora Bommenshamn, where the sea-going passenger-steamers lie, leads past the museum to the Gustaf-Adolfs-Torg. The museum, in the old East India Company's house, has fine collections in natural history, entomology, botany, anatomy, archaeology and ethnography, a picture and sculpture gallery, and exhibits of coins and industrial art. Gustaf-Adolfs-Torg is the business centre, and contains the town-hail (1670) and exchange (1849). Here are statues by B. E. Fogelberg of Gustavus Adolphus and of Odin, and of Oscar I. by J. P. Molin. Among several churches in this quarter of the city is the cathedral (*Gustavii Domkyrka*), a cruciform church founded in 1633 and rebuilt after fires in 1742 and 1815. Here are also the customs-house and residence of the governor of the *län*. On the north side, closely adjacent, are the Lilla Bommenshamn, where the Göta canal steamers lie, and the two principal railway stations, Statens and Bergslafs Bangård. Above the Rosenlunds canal rises a low, rocky eminence, Lilla Otterhälleberg. The inner city is girdled on the south and east by the Kungspark, which contains Molin's famous group of statuary, the Belt-bucklers (*Bältespännare*), and by the beautiful gardens of the Horticultural Society (*Trädgårdsforeningen*). These grounds are traversed by the broad Nya Allé, a favourite promenade, and beyond them lies the best residential quarter, the first houses facing Vasa Street, Vasa Park and Kungsport Avenue. At the north end of the last are the university and the New theatre. At the west end of Vasa Street is the city library, the most important in the country except the royal library at Stockholm and the university libraries at Upsala and Lund. The suburbs are extensive. To the south-west are Majorna and Masthugget, with numerous factories. Beyond these lie the fine Slottskog Park, planted with oaks, and picturesquely broken by rocky hills commanding views of the busy river and the city. The suburb of Annedal is the workmen's quarter; others are Landala, Garda and Stampen. All are connected with the city by electric tramways. Six railways leave the city from four stations. The principal lines, from the Statens and Bergslafs stations, run N. to Trollhättan, and into Norway (Christiania); N.E. between Lakes Vener and Vetter to Stockholm, Falun and the north; E. to Borås and beyond, and S. by the coast to Helsingborg, &c. From the Vestgöta station a narrow-gauge line runs N.E. to Skara and the southern shores of Vener, and from Sarö station near Slottskog Park a line serves Sarö, a seaside watering-place on an island 20 m. S. of Gothenburg.

The city has numerous important educational establishments. The university (*Högskola*) was a private foundation (1891), but is governed by a board, the members of which are nominated by the state, the town council, Royal Society of Science and Literature, directors of the museum, and the staffs of the various local colleges. There are several boys' schools, a college for girls, a scientific college, a commercial college (1826), a school of navigation, and Chalmers' Polytechnical College, founded by William Chalmers (1748-1811), a native of Gothenburg of English parentage. He bequeathed half his fortune to this institution, and the remainder to the Sahlgrenska hospital. A people's library was founded by members of the

family of Dickson, several of whom have taken a prominent part in philanthropical works in the city. The connexion of the family with Gothenburg dates from 1802, when Robert Dickson, a native of Montrose in Scotland, founded the business in which he was joined in 1807 by his brother James.

In respect of industry and commerce as a whole Gothenburg ranks as second to Stockholm in the kingdom; but it is actually the principal centre of export trade and port of register; and as a manufacturing town it is slightly inferior to Malmö. Its principal industrial establishments are mechanical works (both in the city and at Lundby), saw-mills, dealing with the timber which is brought down the Göta, flour-mills, margarine factories, breweries and distilleries, tobacco works, cotton mills, dyeing and bleaching works (at Levanten in the vicinity), furniture factories, paper and leather works, and shipbuilding yards. The vessels registered at the port in 1901 were 247 of 120,488 tons. There are about 3 m. of quays approachable by vessels drawing 20 ft., and slips for the accommodation of large vessels. Gothenburg is the principal port of embarkation of Swedish emigrants for America.

The city is governed by a council including two mayors, and returns nine members to the second chamber of the Riksdag (parliament).

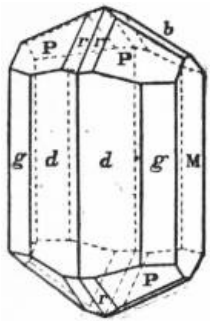
Founded by Gustavus Adolphus in 1619, Gothenburg was from the first designed to be fortified, a town of the same name founded on Hisingen in 1603 having been destroyed by the Danes during the Calmar war. From 1621, when it was first chartered, it steadily increased, though it suffered greatly in the Danish wars of the last half of the 17th and the beginning of the 18th centuries, and from several extensive conflagrations (the last in 1813), which have destroyed important records of its history. The great development of its herring fishery in the latter part of the 18th century gave a new impulse to the city's trade, which was kept up by the influence of the "Continental System," under which Gothenburg became a depot for the colonial merchandise of England. After the fall of Napoleon it began to decline, but after its closer connexion with the interior of the country by the Göta canal (opened 1832) and Western railway it rapidly advanced both in population and trade. Since the demolition of its fortifications in 1807, it has been defended only by some small forts. Gothenburg was the birthplace of the poet Bengt Lidner (1757-1793) and two of Sweden's greatest sculptors, Bengt Erland Fogelberg (1786-1854) and Johann Peter Molin (1814-1873). After the French Revolution Gothenburg was for a time the residence of the Bourbon family. The name of this city is associated with the municipal licensing system known as the Gothenburg System (see Liquor Laws).

See W. Berg, *Samlingar till Göteborgs historia* (Gothenburg, 1893); Lagerberg, *Göteborg i äldre och nyare tid* (Gothenburg, 1902); Fröding, *Det forna Göteborg* (Stockholm, 1903).

GOTHIC, the term generally applied to medieval architecture, and more especially to that in which the pointed arch appears. The style was at one time supposed to have originated with the warlike people known as the Goths, some of whom (the East Goths, or Ostrogoths) settled in the eastern portion of Europe, and others (the West Goths, or Visigoths) in the Asturias of Spain; but as no buildings or remains of any description have ever been found, in which there are any traces of an independent construction in either brick or stone, the title is misleading; since, however, it is now so generally accepted it would be difficult to change it. The term when first employed was one of reproach, as Evelyn (1702) when speaking of the faultless building (*i.e.* classic) says, "they were demolished by the Goths or Vandals, who introduced their own licentious style now called modern or Gothic." The employment of the pointed arch in Syria, Egypt and Sicily from the 8th century onwards by the Mahommedans for their mosques and gateways, some four centuries before it made its appearance in Europe, also makes it advisable to adhere to the old term Gothic in preference to Pointed Architecture. (See Architecture)

GÖTHITE, or Goethite, a mineral composed of an iron hydrate,

$Fe_2O_3 \cdot H_2O$, crystallizing in the orthorhombic system and isomorphous with diaspore and manganite (*q.v.*). It was first noticed in 1789, and in 1806 was named after the poet Goethe. Crystals are prismatic, acicular or scaly in habit; they have a perfect cleavage parallel to the brachypinacoid (M in the figure). Reniform and stalactitic masses with a radiated fibrous structure also occur. The colour varies from yellowish or reddish to blackish-brown, and by transmitted light it is often blood-red; the streak is brownish-yellow; hardness, 5; specific gravity, 4.3. The best crystals are the brilliant, blackish-brown prisms with terminal pyramidal planes (fig.) from the Restormel iron mines at Lostwithiel, and the Botallack mine at St Just in Cornwall. A variety occurring as thin red scales at Siegen in Westphalia is known as Rubinglimmer or pyrrhosiderite (from Gr. πυρρός, flame-coloured, and σίδηρος, iron): a scaly-fibrous variety from the same locality is called lepidocrocite (from λεπίς, scale, and κροκίς, fibre). Sammetblende or przibramite is a variety, from Przibram in Bohemia, consisting of delicate acicular or capillary crystals arranged in radiating groups with a velvety surface and yellow colour.



Göthite occurs with other iron oxides, especially limonite and hematite, and when found in sufficient quantity is mined with these as an ore of iron. It often occurs also as an enclosure in other minerals. Acicular crystals, resembling rutile in appearance, sometimes penetrate crystals of pale-coloured amethyst, for instance, at Wolf's Island in Lake Onega in Russia: this form of the mineral has long been known as onegite, and the crystals enclosing it are cut for ornamental purposes under the name of "Cupid's darts" (*flèches d'amour*). The metallic glitter of avanturine or sun-stone (*q.v.*) is due to the enclosed scales of göthite and certain other minerals.

(L. J. S.)

GOTHS (*Gotones*, later *Gothis*), a Teutonic people who in the 1st century of the Christian era appear to have inhabited the middle part of the basin of the Vistula. They were probably the easternmost of the Teutonic peoples. According to their own traditions as recorded by Jordanes, they had come originally from the island Scandza, *i.e.* Skåne or Sweden, under the leadership of a king named Berig, and landed first in a region called Gothiscandza. Thence they invaded the territories of the Ulmerugi (the Holmryge of Anglo-Saxon tradition), probably in the neighbourhood of Rügenwalde in eastern Pomerania, and conquered both them and the neighbouring Vandals. Under their sixth king Filimer they migrated into Scythia and settled in a district which they called Oium. The rest of their early history, as it is given by Jordanes following Cassiodorus, is due to an erroneous identification of the Goths with the Getae, and ancient Thracian people.

Early history.

The credibility of the story of the migration from Sweden has been much discussed by modern authors. The legend was not peculiar to the Goths, similar traditions being current among the Langobardi, the Burgundians, and apparently several other Teutonic nations. It has been observed with truth that so many populous nations can hardly have sprung from the Scandinavian peninsula; on the other hand, the existence of these traditions certainly requires some explanation. Possibly, however, many of the royal families may have contained an element of Scandinavian blood, a hypothesis which would well accord with the social conditions of the migration period, as illustrated, *e.g.*, in *Völsunga Saga* and in *Hervarar Saga ok Heiðreks Konungs*. In the case of the Goths a connexion with Gotland is not unlikely, since it is clear from archaeological evidence that this island had an extensive trade with the coasts about the mouth of the Vistula in early times. If, however, there was any migration at all, one would rather have expected it to have taken place in the reverse direction. For the origin of the Goths can hardly be separated from that of the Vandals, whom according to Procopius they resembled in language and in all other respects. Moreover the Gepidae, another Teutonic people, who are said to have formerly inhabited the delta of the Vistula, also appear to have been closely connected with the Goths. According to Jordanes they participated in the migration from Scandza.

Apart from a doubtful reference by Pliny to a statement of the early traveller Pytheas, the first notices we have of the Goths go back to the first years of the Christian era, at which

time they seem to have been subject to the Marcomannic king Maroboduus. They do not enter into Roman history, however, until after the beginning of the 3rd century, at which time they appear to have come in conflict with the emperor Caracalla. During this century their frontier seems to have been advanced considerably farther south, and the whole country as far as the lower Danube was frequently ravaged by them. The emperor Gordianus is called “victor Gothorum” by Capitolinus, though we have no record of the ground for the claim, and further conflicts are recorded with his successors, one of whom, Decius, was slain by the Goths in Moesia. According to Jordanes the kings of the Goths during these campaigns were Ostrogotha and afterwards Cniva, the former of whom is praised also in the Anglo-Saxon poem *Widsith*. The emperor Gallus was forced to pay tribute to the Goths. By this time they had reached the coasts of the Black Sea, and during the next twenty years they frequently ravaged the maritime regions of Asia Minor and Greece. Aurelian is said to have won a victory over them, but the province of Dacia had to be given up. In the time of Constantine the Great Thrace and Moesia were again plundered by the Goths, A.D. 321. Constantine drove them back and concluded peace with their king Ariaric in 336. From the end of the 3rd century we hear of subdivisions of the nation called Greutungi, Teruingi, Austrogothi (Ostrogothi), Visigothi, Taifali, though it is not clear whether these were all distinct.

Though by this time the Goths had extended their territories far to the south and east, it must not be assumed that they had evacuated their old lands on the Vistula. Jordanes records several traditions of their conflicts with other Teutonic tribes, in particular a victory won by Ostrogotha over Fastida, king of the Gepidae, and another by Geberic over Visimar, king of the Vandals, about the end of Constantine’s reign, in consequence of which the Vandals sought and obtained permission to settle in Pannonia. Geberic was succeeded by the most famous of the Gothic kings, Hermanaric (Eormenric, Iörmunrekr), whose deeds are recorded in the traditions of all Teutonic nations. According to Jordanes he conquered the Heruli, the Aestii, the Venedi, and a number of other tribes who seem to have been settled in the southern part of Russia. From Anglo-Saxon sources it seems probable that his supremacy reached westwards as far as Holstein. He was of a cruel disposition, and is said to have killed his nephews Embrica (Emerca) and Fritla (Fridla) in order to obtain the great treasure which they possessed. Still more famous is the story of Suanihilda (Svanhildr), who according to Northern tradition was his wife and was cruelly put to death on a false charge of unfaithfulness. An attempt to avenge her death was made by her brothers Ammius (Hamðir) and Sarus (Sörli) by whom Hermanaric was severely wounded. To his time belong a number of other heroes whose exploits are recorded in English and Northern tradition, amongst whom we may mention Wudga (Vidigoia), Hama and several others, who in *Widsith* are represented as defending their country against the Huns in the forest of the Vistula. Hermanaric committed suicide in his distress at an invasion of the Huns about A.D. 370, and the portion of the nation called Ostrogoths then came under Hunnish supremacy. The Visigoths obtained permission to cross the Danube and settle in Moesia. A large part of the nation became Christian about this time (see BELOW). The exactions of the Roman governors, however, soon led to a quarrel, which ended in the total defeat and death of Valens at Adrianople in the year 378.

(F. G. M. B.)

Later history.

From about 370 the history of the East and West Goths parts asunder, to be joined together again only incidentally and for a season. The great mass of the East Goths stayed north of the Danube, and passed under the overlordship of the Hun. They do not for the present play any important part in the affairs of the Empire. The great mass of the West Goths crossed the Danube into the Roman provinces, and there played a most important part in various characters of alliance and enmity. The great migration was in 376, when they were allowed to pass as peaceful settlers under their chief Frithigern. His rival Athanaric seems to have tried to maintain his party for a while north of the Danube in defiance of the Huns; but he had presently to follow the example of the great mass of the nation. The peaceful designs of Frithigern were meanwhile thwarted by the ill-treatment which the Goths suffered from the Roman officials, which led first to disputes and then to open war. In 378 the Goths won the great battle of Adrianople, and after this Theodosius the Great, the successor of Valens, made terms with them in 381, and the mass of the Gothic warriors entered the Roman service as *foederati*. Many of their chiefs were in high favour; but it seems that the orthodox Theodosius showed more favour to the still remaining heathen party among the Goths than to the larger part of them who had embraced Arian Christianity. Athanaric himself came to Constantinople in 381; he was received with high honours, and had a solemn funeral when he died. His saying is worth recording, as an example of the effect which Roman civilization had on the Teutonic mind. “The emperor,” he said, “was a god upon earth, and he who resisted him would have his

blood on his own head."

The death of Theodosius in 395 broke up the union between the West Goths and the Empire. Dissensions arose between them and the ministers of Arcadius; the Goths threw off their allegiance, and chose Alaric as their king. This was a restoration alike of national unity and of national independence. The royal title had not been borne by their leaders in the Roman service. Alaric's position is quite different from that of several Goths in the Roman service, who appear as simple rebels. He was of the great West Gothic house of the Balthi, or Bold-men, a house second in nobility only to that of the Amali. His whole career was taken up with marchings to and fro within the lands, first of the Eastern, then of the Western empire. The Goths are under him an independent people under a national king; their independence is in no way interfered with if the Gothic king, in a moment of peace, accepts the office and titles of a Roman general. But under Alaric the Goths make no lasting settlement. In the long tale of intrigue and warfare between the Goths and the two imperial courts which fills up this whole time, cessions of territory are offered to the Goths, provinces are occupied by them, but as yet they do not take root anywhere; no Western land as yet becomes *Gothia*. Alaric's designs of settlement seem in his first stage to have still kept east of the Adriatic, in Illyricum, possibly in Greece. Towards the end of his career his eyes seem fixed on Africa.

Greece was the scene of his great campaign in 395-96, the second Gothic invasion of that country. In this campaign the religious position of the Goths is strongly marked. The Arian appeared as an enemy alike to the pagan majority and the Catholic minority; but he came surrounded by monks, and his chief wrath was directed against the heathen temples (*vide* G. F. Hertzberg, *Geschichte Griechenlands*, iii. 391). His Italian campaigns fall into two great divisions, that of 402-3, when he was driven back by Stilicho, and that of 408-10, after Stilicho's death. In this second war he thrice besieged Rome (408, 409, 410). The second time it suited a momentary policy to set up a puppet emperor of his own, and even to accept a military commission from him. The third time he sacked the city, the first time since Brennus that Rome had been taken by an army of utter foreigners. The intricate political and military details of these campaigns are of less importance in the history of the Gothic nation than the stage which Alaric's reign marks in the history of that nation. It stands between two periods of settlement within the Empire and of service under the Empire. Under Alaric there is no settlement, and service is quite secondary and precarious; after his death in 410 the two begin again in new shapes.

Contemporary with the campaigns of Alaric was a barbarian invasion of Italy, which, according to one view, again brings the East and West Goths together. The great mass of the East Goths, as has been already said, became one of the many nations which were under vassalage to the Huns; but their relation was one merely of vassalage. They remained a distinct people under kings of their own, kings of the house of the Amali and of the kindred of Ermanaric (Jordanes, 48). They had to follow the lead of the Huns in war, but they were also able to carry on wars of their own; and it has been held that among these separate East Gothic enterprises we are to place the invasion of Italy in 405 by Radagaisus (whom R. Pallmann[1] writes Ratiger, and takes him for the chief of the heathen part of the East Goths). One chronicler, Prosper, makes this invasion preceded by another in 400, in which Alaric and Radagaisus appear as partners. The paganism of Radagaisus is certain. The presence of Goths in his army is certain, but it seems dangerous to infer that his invasion was a national Gothic enterprise.

Under Ataulphus, the brother-in-law and successor of Alaric, another era opens, the beginning of enterprises which did in the end lead to the establishment of a settled Gothic monarchy in the West. The position of Ataulphus is well marked by the speech put into his mouth by Orosius. He had at one time dreamed of destroying the Roman power, of turning *Romania* into *Gothia*, and putting Ataulphus in the stead of Augustus; but he had learned that the world could be governed only by the laws of Rome and he had determined to use the Gothic arms for the support of the Roman power. And in the confused and contradictory accounts of his actions (for the story in Jordanes cannot be reconciled with the accounts in Olympiodorus and the chroniclers), we can see something of this principle at work throughout. Gaul and Spain were overrun both by barbarian invaders and by rival emperors. The sword of the Goth was to win back the last lands for Rome. And, amid many shiftings of allegiance, Ataulphus seems never to have wholly given up the position of an ally of the Empire. His marriage with Placidia, the daughter of the great Theodosius, was taken as the seal of the union between Goth and Roman, and, had their son Theodosius lived, a dynasty might have arisen uniting both claims. But the career of Ataulphus was cut short at Barcelona in 415, by his murder at the hands of another faction of the Goths. The reign of

Sigeric was momentary. Under Wallia in 418 a more settled state of things was established. The Empire received again, as the prize of Gothic victories, the Tarraconensis in Spain, and Novempopulana and the Narbonensis in Gaul. The “second Aquitaine,” with the sea-coast from the mouth of the Garonne to the mouth of the Loire, became the West Gothic kingdom of Toulouse. The dominion of the Goths was now strictly Gaulish; their lasting Spanish dominion does not yet begin.

The reign of the first West Gothic Theodoric (419-451) shows a shifting state of relations between the Roman and Gothic powers; but, after defeats and successes both ways, the older relation of alliance against common enemies was again established. At last Goth and Roman had to join together against the common enemy of Europe and Christendom, Attila the Hun. But they met Gothic warriors in his army. By the terms of their subjection to the Huns, the East Goths came to fight for Attila against Christendom at Châlons, just as the Servians came to fight for Bajazet against Christendom at Nicopolis. Theodoric fell in the battle (451). After this momentary meeting, the history of the East and West Goths again separates for a while. The kingdom of Toulouse grew within Gaul at the expense of the Empire, and in Spain at the expense of the Suevi. Under Euric (466-485) the West Gothic power again became largely a Spanish power. The kingdom of Toulouse took in nearly all Gaul south of the Loire and west of the Rhône, with all Spain, except the north-west corner, which was still held by the Suevi. Provence alone remained to the Empire. The West Gothic kings largely adopted Roman manners and culture; but, as they still kept to their original Arian creed, their rule never became thoroughly acceptable to their Catholic subjects. They stood, therefore, at a great disadvantage when a new and aggressive Catholic power appeared in Gaul through the conversion of the Frank Clovis or Chlodwig. Toulouse was, as in days long after, the seat of an heretical power, against which the forces of northern Gaul marched as on a crusade. In 507 the West Gothic king Alaric II. fell before the Frankish arms at Campus Vogladensis, near Poitiers, and his kingdom, as a great power north of the Alps, fell with him. That Spain and a fragment of Gaul still remained to form a West Gothic kingdom was owing to the intervention of the East Goths under the rule of the greatest man in Gothic history.

When the Hunnish power broke in pieces on the death of Attila, the East Goths recovered their full independence. They now entered into relations with the Empire, and were settled on lands in Pannonia. During the greater part of the latter half of the 5th century, the East Goths play in south-eastern Europe nearly the same part which the West Goths played in the century before. They are seen going to and fro, in every conceivable relation of friendship and enmity with the Eastern Roman power, till, just as the West Goths had done before them, they pass from the East to the West. They are still ruled by kings of the house of the Amali, and from that house there now steps forward a great figure, famous alike in history and in romance, in the person of Theodoric, son of Theodemir. Born about 454, his childhood was spent at Constantinople as a hostage, where he was carefully educated. The early part of his life is taken up with various disputes, intrigues and wars within the Eastern empire, in which he has as his rival another Theodoric, son of Triarius, and surnamed Strabo. This older but lesser Theodoric seems to have been the chief, not the king, of that branch of the East Goths which had settled within the Empire at an earlier time. Theodoric the Great, as he is sometimes distinguished, is sometimes the friend, sometimes the enemy, of the Empire. In the former case he is clothed with various Roman titles and offices, as patrician and consul; but in all cases alike he remains the national East Gothic king. It was in both characters together that he set out in 488, by commission from the emperor Zeno, to recover Italy from Odoacer. By 493 Ravenna was taken; Odoacer was killed by Theodoric’s own hand; and the East Gothic power was fully established over Italy, Sicily, Dalmatia and the lands to the north of Italy. In this war the history of the East and West Goths begins again to unite, if we may accept the witness of one writer that Theodoric was helped by West Gothic auxiliaries. The two branches of the nation were soon brought much more closely together, when, through the overthrow of the West Gothic kingdom of Toulouse, the power of Theodoric was practically extended over a large part of Gaul and over nearly the whole of Spain. A time of confusion followed the fall of Alaric II., and, as that prince was the son-in-law of Theodoric, the East Gothic king stepped in as the guardian of his grandson Amalaric, and preserved for him all his Spanish and a fragment of his Gaulish dominion. Toulouse passed away to the Frank; but the Goth kept Narbonne and its district, the land of Septimania—the land which, as the last part of Gaul held by the Goths, kept the name of *Gothia* for many ages. While Theodoric lived, the West Gothic kingdom was practically united to his own dominion. He seems also to have claimed a kind of protectorate over the Teutonic powers generally, and indeed to have practically exercised it, except in the case of the Franks.

The East Gothic dominion was now again as great in extent and far more splendid than it

could have been in the time of Ermanaric. But it was now of a wholly different character. The dominion of Theodoric was not a barbarian but a civilized power. His twofold position ran through everything. He was at once national king of the Goths, and successor, though without any imperial titles, of the Roman emperors of the West. The two nations, differing in manners, language and religion, lived side by side on the soil of Italy; each was ruled according to its own law, by the prince who was, in his two separate characters, the common sovereign of both. The picture of Theodoric's rule is drawn for us in the state papers drawn up in his name and in the names of his successors by his Roman minister Cassiodorus. The Goths seem to have been thick on the ground in northern Italy; in the south they formed little more than garrisons. In Theodoric's theory the Goth was the armed protector of the peaceful Roman; the Gothic king had the toil of government, while the Roman consul had the honour. All the forms of the Roman administration went on, and the Roman polity and Roman culture had great influence on the Goths themselves. The rule of the prince over two distinct nations in the same land was necessarily despotic; the old Teutonic freedom was necessarily lost. Such a system as that which Theodoric established needed a Theodoric to carry it on. It broke in pieces after his death.

On the death of Theodoric (526) the East and West Goths were again separated. The few instances in which they are found acting together after this time are as scattered and incidental as they were before. Amalaric succeeded to the West Gothic kingdom in Spain and Septimania. Provence was added to the dominion of the new East Gothic king Athalaric, the grandson of Theodoric through his daughter Amalasuntha. The weakness of the East Gothic position in Italy now showed itself. The long wars of Justinian's reign (535-555) recovered Italy for the Empire, and the Gothic name died out on Italian soil. The chance of forming a national state in Italy by the union of Roman and Teutonic elements, such as those which arose in Gaul, in Spain, and in parts of Italy under Lombard rule, was thus lost. The East Gothic kingdom was destroyed before Goths and Italians had at all mingled together. The war of course made the distinction stronger; under the kings who were chosen for the purposes of the war national Gothic feeling had revived. The Goths were now again, if not a wandering people, yet an armed host, no longer the protectors but the enemies of the Roman people of Italy. The East Gothic dominion and the East Gothic name wholly passed away. The nation had followed Theodoric. It is only once or twice after his expedition that we hear of Goths, or even of Gothic leaders, m the eastern provinces. From the soil of Italy the nation passed away almost without a trace, while the next Teutonic conquerors stamped their name on the two ends of the land, one of which keeps it to this day.

The West Gothic kingdom lasted much longer, and came much nearer to establishing itself as a national power in the lands which it took in. But the difference of race and faith between the Arian Goths and the Catholic Romans of Gaul and Spain influenced the history of the West Gothic kingdom for a long time. The Arian Goths ruled over Catholic subjects, and were surrounded by Catholic neighbours. The Franks were Catholics from their first conversion; the Suevi became Catholics much earlier than the Goths. The African conquests of Belisarius gave the Goths of Spain, instead of the Arian Vandals, another Catholic neighbour in the form of the restored Roman power. The Catholics everywhere preferred either Roman, Suevian or Frankish rule to that of the heretical Goths; even the unconquerable mountaineers of Cantabria seem for a while to have received a Frankish governor. In some other mountain districts the Roman inhabitants long maintained their independence, and in 534 a large part of the south of Spain, including the great cities of Cadiz, Cordova, Seville and New Carthage, was, with the good will of its Roman inhabitants, reunited to the Empire, which kept some points on the coast as late as 624. That is to say, the same work which the Empire was carrying on in Italy against the East Goths was at the same moment carried on in Spain against the West Goths. But in Italy the whole land was for a while won back, and the Gothic power passed away for ever. In Spain the Gothic power outlived the Roman power, but it outlived it only by itself becoming in some measure Roman. The greatest period of the Gothic power as such was in the reign of Leovigild (568-586). He reunited the Gaulish and Spanish parts of the kingdom which had been parted for a moment; he united the Suevian dominion to his own; he overcame some of the independent districts, and won back part of the recovered Roman province in southern Spain. He further established the power of the crown over the Gothic nobles, who were beginning to grow into territorial lords. The next reign, that of his son Recared (586-601), was marked by a change which took away the great hindrance which had thus far stood in the way of any national union between Goths and Romans. The king and the greater part of the Gothic people embraced the Catholic faith. A vast degree of influence now fell into the hands of the Catholic bishops; the two nations began to unite; the Goths were gradually romanized and the Gothic language began to go out of use. In short, the Romance nation and the Romance

speech of Spain began to be formed. The Goths supplied the Teutonic infusion into the Roman mass. The kingdom, however, still remained a Gothic kingdom. “Gothic,” not “Roman” or “Spanish,” is its formal title; only a single late instance of the use of the formula “regnum Hispaniae” is known. In the first half of the 7th century that name became for the first time geographically applicable by the conquest of the still Roman coast of southern Spain. The Empire was then engaged in the great struggle with the Avars and Persians, and, now that the Gothic kings were Catholic, the great objection to their rule on the part of the Roman inhabitants was taken away. The Gothic nobility still remained a distinct class, and held, along with the Catholic prelacy, the right of choosing the king. Union with the Catholic Church was accompanied by the introduction of the ecclesiastical ceremony of anointing, a change decidedly favourable to elective rule. The growth of those later ideas which tended again to favour the hereditary doctrine had not time to grow up in Spain before the Mahommedan conquest (711). The West Gothic crown therefore remained elective till the end. The modern Spanish nation is the growth of the long struggle with the Mussulmans; but it has a direct connexion with the West Gothic kingdom. We see at once that the Goths hold altogether a different place in Spanish memory from that which they hold in Italian memory. In Italy the Goth was but a momentary invader and ruler; the Teutonic element in Italy comes from other sources. In Spain the Goth supplies an important element in the modern nation. And that element has been neither forgotten nor despised. Part of the unconquered region of northern Spain, the land of Asturia, kept for a while the name of Gothia, as did the Gothic possessions in Gaul and in Crim. The name of the people who played so great a part in all southern Europe, and who actually ruled over so large a part of it has now wholly passed away; but it is in Spain that its historical impress is to be looked for.

Of Gothic literature in the Gothic language we have the Bible of Ulfilas, and some other religious writings and fragments (see Gothic Language below). Of Gothic legislation in Latin we have the edict of Theodoric of the year 500, edited by F. Bluhme in the *Monumenta Germaniae historica*; and the books of *Variae* of Cassiodorus may pass as a collection of the state papers of Theodoric and his immediate successors. Among the West Goths written laws had already been put forth by Euric. The second Alaric (484-507) put forth a *Breviarium* of Roman law for his Roman subjects; but the great collection of West Gothic laws dates from the later days of the monarchy, being put forth by King Recceswinth about 654. This code gave occasion to some well-known comments by Montesquieu and Gibbon, and has been discussed by Savigny (*Geschichte des römischen Rechts*, ii. 65) and various other writers. They are printed in the *Monumenta Germaniae, leges*, tome i. (1902). Of special Gothic histories, besides that of Jordanes, already so often quoted, there is the Gothic history of Isidore, archbishop of Seville, a special source of the history of the West Gothic kings down to Svinthala (621-631). But all the Latin and Greek writers contemporary with the days of Gothic predominance make their constant contributions. Not for special facts, but for a general estimate, no writer is more instructive than Salvian of Marseilles in the 5th century, whose work *De Gubernatione Dei* is full of passages contrasting the vices of the Romans with the virtues of the barbarians, especially of the Goths. In all such pictures we must allow a good deal for exaggeration both ways, but there must be a ground-work of truth. The chief virtues which the Catholic presbyter praises in the Arian Goths are their chastity, their piety according to their own creed, their tolerance towards the Catholics under their rule, and their general good treatment of their Roman subjects. He even ventures to hope that such good people may be saved, notwithstanding their heresy. All this must have had some groundwork of truth in the 5th century, but it is not very wonderful if the later West Goths of Spain had a good deal fallen away from the doubtless somewhat ideal picture of Salvian.

(E. A. F.)

There is now an extensive literature on the Goths, and among the principal works may be mentioned: T. Hodgkin, *Italy and her Invaders* (Oxford, 1880-1899); J. Aschbach, *Geschichte der Westgoten* (Frankfort, 1827); F. Dahn, *Die Könige der Germanen* (1861-1899); E. von Wietersheim, *Geschichte der Völkerwanderung* (1880-1881); R. Pallmann, *Die Geschichte der Völkerwanderung* (Gotha, 1863-1864); B. Rappaport, *Die Einfälle der Goten in das römische Reich* (Leipzig, 1899), and K. Zeuss, *Die Deutschen und die Nachbarstämme* (Munich, 1837). Other works which may be consulted are: E. Gibbon, *Decline and Fall of the Roman Empire*, edited by J. B. Bury (1896-1900); H. H. Milman, *History of Latin Christianity* (1867); J. B. Bury, *History of the Later Roman Empire* (1889); P. Villari, *Le Invasioni barbariche in Italia* (Milan, 1901); and F. Martroye, *L’Occident à l’époque byzantine: Goths et Vandales* (Paris, 1903). There is a popular history of the Goths by H. Bradley in the “Story of the Nations” series (London, 1888). For the laws see the *Leges* in Band I. of the *Monumenta Germaniae historica, leges* (1902). A. Helfferich, *Entstehung und Geschichte des Westgotenrechts* (Berlin, 1858); F. Bluhme, *Zur Textkritik des Westgotenrechts* (1872); F. Dahn, *Lex Visigothorum. Westgotische Studien* (Würzburg, 1874); C. Rinaudo, *Leggi dei Visigote, studio* (Turin, 1878); and K. Zeumer, “Geschichte der westgotischen Gesetzgebung”

in the *Neues Archiv der Gesellschaft für ältere deutsche Geschichtskunde*. See also the article on THEODORIC.

Gothic Language.—Our knowledge of the Gothic language is derived almost entirely from the fragments of a translation of the Bible which is believed to have been made by the Arian bishop Wulfila or Ulfilas (d. 383) for the Goths who dwelt on the lower Danube. The MSS. which have come down to us and which date from the period of Ostrogothic rule in Italy (489-555) contain the Second Epistle to the Corinthians complete, together with more or less considerable fragments of the four Gospels and of all the other Pauline Epistles. The only remains of the Old Testament are three short fragments of Ezra and Nehemiah. There is also an incomplete commentary (*skeireins*) on St John's Gospel, a fragment of a calendar, and two charters (from Naples and Arezzo, the latter now lost) which contain some Gothic sentences. All these texts are written in a special character, which is said to have been invented by Wulfila. It is based chiefly on the uncial Greek alphabet, from which indeed most of the letters are obviously derived, and several orthographical peculiarities, *e.g.* the use of *ai* for *e* and *ei* for *ī* reflect the Greek pronunciation of the period. Other letters, however, have been taken over from the Runic and Latin alphabets. Apart from the texts mentioned above, the only remains of the Gothic language are the proper names and occasional words which occur in Greek and Latin writings, together with some notes, including the Gothic alphabet, in a Salzburg MS. of the 10th century, and two short inscriptions on a torque and a spear-head, discovered at Buzeo (Walachia) and Kovel (Volhynia) respectively. The language itself, as might be expected from the date of Wulfila's translation, is of a much more archaic type than that of any other Teutonic writings which we possess, except a few of the earliest Northern inscriptions. This may be seen, *e.g.* in the better preservation of final and unaccented syllables and in the retention of the dual and the middle (passive) voice in verbs. It would be quite erroneous, however, to regard the Gothic fragments as representing a type of language common to all Teutonic nations in the 4th century. Indeed the distinctive characteristics of the language are very marked, and there is good reason for believing that it differed considerably from the various northern and western languages, whereas the differences among the latter at this time were probably comparatively slight (see TEUTONIC LANGUAGES). On the other hand, it must not be supposed that the language of the Goths stood quite isolated. Procopius (*Vand.* i. 2) states distinctly that the Gothic language was spoken not only by the Ostrogoths and Visigoths but also by the Vandals and the Gepidae; and in the former case there is sufficient evidence, chiefly from proper names, to prove that his statement is not far from the truth. With regard to the Gepidae we have less information; but since the Goths, according to Jordanes (cap. 17), believed them to have been originally a branch of their own nation, it is highly probable that the two languages were at least closely related. Procopius elsewhere (*Vand.* i. 3; *Goth.* i. 1, iii. 2) speaks of the Rugii, Sciri and Alani as Gothic nations. The fact that the two former were sprung from the north-east of Germany renders it probable that they had Gothic affinities, while the Alani, though non-Teutonic in origin, may have become gothicized in the course of the migration period. Some modern writers have included in the same class the Burgundians, a nation which had apparently come from the basin of the Oder, but the evidence at our disposal on the whole hardly justifies the supposition that their language retained a close affinity with Gothic.

In the 4th and 5th centuries the Gothic language—using the term in its widest sense—must have spread over the greater part of Europe together with the north coast of Africa. It disappeared, however, with surprising rapidity. There is no evidence for its survival in Italy or Africa after the fall of the Ostrogothic and Vandal kingdoms, while in Spain it is doubtful whether the Visigoths retained their language until the Arabic conquest. In central Europe it may have lingered somewhat longer in view of the evidence of the Salzburg MS. mentioned above. Possibly the information there given was derived from southern Hungary or Transylvania where remains of the Gepidae were to be found shortly before the Magyar invasion (889). According to Walafridus Strabo (*de Reb. Eccles.* cap. 7) also Gothic was still used in his time (the 9th century) in some churches in the region of the lower Danube. Thenceforth the language seems to have survived only among the Goths (*Goti Tetraxitae*) of the Crimea, who are mentioned for the last time by Ogier Ghislain de Busbecq, an imperial envoy at Constantinople about the middle of the 16th century. He collected a number of words and phrases in use among them which show clearly that their language, though not unaffected by Iranian influence, was still essentially a form of Gothic.

See H. C. von der Gabelentz and J. Loebe, *Ulfilas* (Altenburg and Leipzig, 1836-1846); E. Bernhardt, *Vulfila oder die gotische Bibel* (Halle, 1875). For other works on the Gothic language see J. Wright, *A Primer of the Gothic Language* (Oxford, 1892), p. 143 f. To the references there given should be added: C. C. Uhlenbeck, *Etymologisches Wörterbuch d. got. Sprache* (Amsterdam, 2nd ed. 1901); F. Kluge, "Geschichte d. got. Sprache" in H. Paul's

Grundriss d. germ. Philologie (2nd ed., vol. i., Strassburg, 1897); W. Streitberg, *Gotisches Elementarbuch* (Heidelberg, 1897); Th. von Grienberger, *Beiträge zur Geschichte d. deutschen Sprache u. Literatur*, xxi. 185 ff.; L. F. A. Wimmer, *Die Runenschrift* (Berlin, 1887), p. 61 ff.; G. Stephens, *Handbook to the Runic Monuments* (London, 1884), p. 203; F. Wrede, *Über die Sprache der Wandalen* (Strassburg, 1886). For further references see K. Zeuss, *Die Deutschen*, p. 432 f. (where earlier references to the Crimean Goths are also given); F. Kluge, *op. cit.*, p. 515 ff.; and O. Bremer, *ib.* vol. iii., p. 822.

(H. M. C.)

1 *Geschichte der Völkerwanderung* (Gotha, 1863-1864).

GOTLAND, an island in the Baltic Sea belonging to Sweden, lying between 57° and 58° N., and having a length from S.S.W. to N.N.E. of 75 m., a breadth not exceeding 30 m., and an area of 1142 sq. m. The nearest point on the mainland is 50 m. from the westernmost point of the island. With the island Fårö, off the northern extremity, the Karlsöe, off the west coast, and Götska Sandö, 25 m. N. by E., Gotland forms the administrative district (*län*) of Gotland. The island is a level plateau of Silurian limestone, rising gently eastward, of an average height of 80 to 100 ft., with steep coasts fringed with tapering, free-standing columns of limestone (*raukar*). A few low isolated hills rise inland. The climate is temperate, and the soil, although in parts dry and sterile, is mostly fertile. Former marshy moors have been largely drained and cultivated. There are extensive sand-dunes in the north. As usual in a limestone formation, some of the streams have their courses partly below the surface, and caverns are not infrequent. Less than half the total area is under forest, the extent of which was formerly much greater. Barley, rye, wheat and oats are grown, especially the first, which is exported to the breweries on the mainland. The sugar-beet is also produced and exported, and there are beet-sugar works on the island. Sheep and cattle are kept; there is a government sheep farm at Roma, and the cattle may be noted as belonging principally to an old native breed, yellow and horned. Some lime-burning, cement-making and sea-fishing are carried on. The capital of the island is Visby, on the west coast. There are over 80 m. of railways. Lines run from Visby N.E. to Tingstäde and S. to Hofdhem, with branches from Roma to Klintehamn, a small watering-place on the west coast, and to Slitehamn on the east. Excepting along the coast the island has no scenic attraction, but it is of the highest archaeological interest. Nearly every village has its ruined church, and others occur where no villages remain. The shrunken walled town of Visby was one of the richest commercial centres of the Baltic from the 11th to the 14th century, and its prosperity was shared by the whole island. It retains ten churches besides the cathedral. The massive towers of the village churches are often detached, and doubtless served purposes of defence. The churches of Roma, Hemse, with remarkable mural paintings, Othen and Lärbo may be specially noted. Some contain fine stained glass, as at Dalhem near Visby. The natives of Gotland speak a dialect distinguished from that of any part of the Swedish mainland. Pop. of *län* (1900) 52,781.

Gotland was subject to Sweden before 890, and in 1030 was christianized by St Olaf, king of Norway, when returning from his exile at Kiev. He dedicated the first church in the island to St Peter at Visby. At that time Visby had long been one of the most important trading towns in the Baltic, and the chief distributing centre of the oriental commerce which came to Europe along the rivers of Russia. In the early years of the Hanseatic League, or about the middle of the 13th century, it became the chief depôt for the produce of the eastern Baltic countries, including, in a commercial sense, its daughter colony (11th century or earlier) of Novgorod the Great. Although Visby was an independent member of the Hanseatic League, the influence of Lübeck was paramount in the city, and half its governing body were men of German descent. Indeed, Björkander endeavours to prove that the city was a German (Hanseatic) foundation, dating principally from the middle of the 12th century. However that may be, the importance of Visby in the sea trade of the North is conclusively attested by the famous code of maritime law which bears its name. This *Waterrecht dat de Kooplüde en de Schippers gemakt hebben to Visby* ("sea-law which the merchants and seamen have made at Visby") was a compilation based upon the Lübeck code, the Oléron code and the Amsterdam code, and was first printed in Low German in 1505, but in all probability had its origin about 1240, or not much later (see Sea Laws). By the middle of the the city was so great that, according to an old ballad, "the Gotlanders weighed out gold with stone weights and played

with the choicest jewels. The swine ate out of silver troughs, and the women spun with distaffs of gold." This fabled wealth was too strong a temptation for the energetic Valdemar Atterdag of Denmark. In 1361 he invaded the island, routed the defenders of Visby under the city walls (a monolithic cross marks the burial-place of the islanders who fell) and plundered the city. From this blow it never recovered, its decay being, however, materially helped by the fact that for the greater part of the next 150 years it was the stronghold of successive freebooters or sea-rovers—first, of the Hanseatic privateers called Vitalienbrödre or Viktualienbrüder, who made it their stronghold during the last eight years of the 14th century; then of the Teutonic Knights, whose Grand Master drove out the "Victuals Brothers," and kept the island until it was redeemed by Queen Margaret. There too Erik XIII. (the Pomeranian), after being driven out of Denmark by his own subjects, established himself in 1437, and for a dozen years waged piracy upon Danes and Swedes alike. After him came Olaf and Ivar Thott, two Danish lords, who down to the year 1487 terrorized the seas from their pirates' stronghold of Visby. Lastly, the Danish admiral Sören Norrby, the last supporter of Christian I. of Denmark, when his master's cause was lost, waged a guerrilla war upon the Danish merchant ships and others from the same convenient base. But this led to an expedition by the men of Lübeck, who partly destroyed Visby in 1525. By the peace of Stettin (1570) Gotland was confirmed to the Danish crown, to which it had been given by Queen Margaret. But at the peace of Brömsebro in 1645 it was at length restored to Sweden, to which it has since belonged, except for the three years 1676-1679, when it was forcibly occupied by the Danes, and a few weeks in 1808, when the Russians landed a force.

The extreme wealth of the Gotlanders naturally fostered a spirit of independence, and their relations with Sweden were curious. The island at one period paid an annual tribute of 60 marks of silver to Sweden, but it was clearly recognized that it was paid by the desire of the Gotlanders, and not enforced by Sweden. The pope recognized their independence, and it was by their own free will that they came under the spiritual charge of the bishop of Linköping. Their local government was republican in form, and a popular assembly is indicated in the written *Gotland Law*, which dates not later than the middle of the 13th century. Sweden had no rights of objection to the measures adopted by this body, and there was no Swedish judge or other official in the island. Visby had a system of government and rights independent of, and in some measure opposed to, that of the rest of the island. It seems clear that there were at one time two separate corporations, for the native Gotlanders and the foreign traders respectively, and that these were subsequently fused. The rights and status of native Gotlanders were not enjoyed by foreigners as a whole—even intermarriage was illegal—but Germans, on account of their commercial pre-eminence in the island, were excepted.

See C. H. Bergman, *Gotland's geografi och historia* (Stockholm, 1898) and *Gotländska skildringar och minnen* (Visby, 1902); A. T. Snöbohm, *Gotlands land och folk* (Visby, 1897 et seq.); W. Moler, *Bidrag till en Gotländsk bibliografi* (Stockholm, 1890); Hans Hildebrand, *Visby och dess Minnesmärken* (Stockholm, 1892 et seq.); A. Björkander, *Till Visby Stads Aeldsta Historia* (1898), where most of the literature dealing with the subject is mentioned; but some of the author's arguments require criticism. For local government and rights see K. Hegel, *Städter und Gilden im Mittelalter* (book iii. ch. iii., Leipzig, 1891).

GOTO ISLANDS [Goto Retto, Gotto], a group of islands belonging to Japan, lying west of Kiushiu, in 33° N., 129° E. The southern of the two principal islands, Fukae-shima, measures 17 m. by 13½; the northern, Nakaori-shima, measures 23 m. by 7½. These islands lie almost in the direct route of steamers plying between Nagasaki and Shanghai, and are distant some 50 m. from Nagasaki. Some dome-shaped hills command the old castle-town of Fukae. The islands are highly cultivated; deer and other game abound, and trout are plentiful in the mountain streams. A majority of the inhabitants are Christians.

GOTTER, FRIEDRICH WILHELM (1746-1797), German poet and dramatist, was born on the 3rd of September 1746, at Gotha. After the completion of his university career at

Göttingen, he was appointed second director of the Archive of his native town, and subsequently went to Wetzlar, the seat of the imperial law courts, as secretary to the Saxe-Coburg-Gotha legation. In 1768 he returned to Gotha as tutor to two young noblemen, and here, together with H. C. Boie, he founded the famous *Göttinger Musenalmanach*. In 1770 he was once more in Wetzlar, where he belonged to Goethe's circle of acquaintances. Four years later he took up his permanent abode in Gotha, where he died on the 18th of March 1797. Gotter was the chief representative of French taste in the German literary life of his time. His own poetry is elegant and polished, and in great measure free from the trivialities of the Anacreontic lyric of the earlier generation of imitators of French literature; but he was lacking in the imaginative depth that characterizes the German poetic temperament. His plays, of which *Merope* (1774), an adaptation in admirable blank verse of the tragedies of Maffei and Voltaire, and *Medea* (1775), a *melodrame*, are best known, were mostly based on French originals and had considerable influence in counteracting the formlessness and irregularity of the *Sturm und Drang* drama.

Gutter's collected *Gedichte* appeared in 2 vols. in 1787 and 1788; a third volume (1802) contains his *Literarischer Nachlass*. See B. Litzmann, *Schröder und Gotter* (1887), and R. Schlösser, *F. W. Gotter, sein Leben und seine Werke* (1894).

GOTTFRIED VON STRASSBURG, one of the chief German poets of the middle ages. The dates of his birth and death are alike unknown, but he was the contemporary of Hartmann von Aue, Wolfram von Eschenbach and Walther von der Vogelweide, and his epic *Tristan* was written about the year 1210. In all probability he did not belong to the nobility, as he is entitled *Meister*, never *Herr*, by his contemporaries; his poem—the only work that can with any certainty be attributed to him—bears witness to a learned education. The story of *Tristan* had been evolved from its shadowy Celtic origins by the French *trouvères* of the early 12th century, and had already found its way into Germany before the close of that century, in the crude, unpolished version of Eilhart von Oberge. It was Gottfried, however, who gave it its final form. His version is based not on that of Chrétien de Troyes, but on that of a *trouvère* Thomas, who seems to have been more popular with contemporaries. A comparison of the German epic with the French original is, however, impossible, as Chrétien's *Tristan* is entirely lost, and of Thomas's only a few fragments have come down to us. The story centres in the fatal voyage which Tristan, a vassal to the court of his uncle King Marke of Kurnewal (Cornwall), makes to Ireland to bring back Isolde as the king's bride. On the return voyage Tristan and Isolde drink by mistake a love potion, which binds them irrevocably to each other. The epic resolves itself into a series of love intrigues in which the two lovers ingeniously outwit the trusting king. They are ultimately discovered, and Tristan flees to Normandy where he marries another Isolde—"Isolde with the white hands"—without being able to forget the blond Isolde of Ireland. At this point Gottfried's narrative breaks off and to learn the close of the story we have to turn to two minor poets of the time, Ulrich von Türheim and Heinrich von Freiberg—the latter much the superior—who have supplied the conclusion. After further love adventures Tristan is fatally wounded by a poisoned spear in Normandy; the "blond Isolde," as the only person who has power to cure him, is summoned from Cornwall. The ship that brings her is to bear a white sail if she is on board, a black one if not. Tristan's wife, however, deceives him, announcing that the sail is black, and when Isolde arrives, she finds her lover dead. Marke at last learns the truth concerning the love potion, and has the two lovers buried side by side in Kurnewal.

It is difficult to form an estimate of Gottfried's independence of his French source; but it seems clear that he followed closely the narrative of events he found in Thomas. He has, however, introduced into the story an astounding fineness of psychological motive, which, to judge from a general comparison of the Arthurian epic in both lands, is German rather than French; he has spiritualized and deepened the narrative; he has, above all, depicted with a variety and insight, unusual in medieval literature, the effects of an overpowering passion. Yet, glowing and seductive as Gottfried's love-scenes are, they are never for a moment disfigured by frivolous hints or innuendo; the tragedy is unrolled with an earnestness that admits of no touch of humour, and also, it may be added, with a freedom from moralizing which was easier to attain in the 13th than in later centuries. The mastery of style is no less conspicuous. Gottfried had learned his best lessons from Hartmann von Aue, but he was a more original and daring artificer of rhymes and rhythms than that master; he delighted in the sheer music of words, and indulged in antitheses and allegorical conceits to an extent

that proved fatal to his imitators. As far as beauty of expression is concerned, Gottfried's *Tristan* is the masterpiece of the German court epic.

Gottfried's *Tristan* has been frequently edited: by H. F. Massman (Leipzig, 1843); by R. Bechstein (2 vols., 3rd ed., Leipzig,1890-1891); by W. Golther (2 vols., Stuttgart, 1889); by K. Marold (1906). Translations into modern German have been made by H. Kurz (Stuttgart, 1844); by K. Simrock (Leipzig, 1855); and, best of all, by W. Hertz (Stuttgart, 1877). There is also an abbreviated English translation by Jessie L. Weston (London, 1899). The continuation of Ulrich von Türheim will be found in Massman's edition; that by Heinrich von Freiberg has been separately edited by R. Bechstein (Leipzig, 1877). See also R. Heinzel, "Gottfrieds von Strassburg Tristan und seine Quelle" in the *Zeit. für deut. Alt.* xiv. (1869), pp. 272 ff.; W. Golther, *Die Sage von Tristan und Isolde* (Munich, 1887); F. Piquet, *L'Originalité de Gottfried de Strasbourg dans son poème de Tristan et Isolde* (Lille, 1905). K. Immermann (*q.v.*) has written an epic of *Tristan und Isolde* (1840), R. Wagner (*q.v.*) a musical drama (1865). Cp. R. Bechstein, *Tristan und Isolde in der deutschen Dichtung der Neuzeit* (Leipzig, 1877).

GÖTTINGEN, a town of Germany, in the Prussian province of Hanover, pleasantly situated at the west foot of the Hainberg (1200 ft.), in the broad and fertile valley of the Leine, 67 m. S. from Hanover, on the railway to Cassel. Pop. (1875) 17,057, (1905) 34,030. It is traversed by the Leine canal, which separates the Altstadt from the Neustadt and from Masch, and is surrounded by ramparts, which are planted with lime-trees and form an agreeable promenade. The streets in the older part of the town are for the most part crooked and narrow, but the newer portions are spaciously and regularly built. Apart from the Protestant churches of St John, with twin towers, and of St James, with a high tower (290 ft.), the medieval town hall, built in the 14th century and restored in 1880, and the numerous university buildings, Göttingen possesses few structures of any public importance. There are several thriving industries, including, besides the various branches of the publishing trade, the manufacture of cloth and woollens and of mathematical and other scientific instruments.

The university, the famous Georgia Augusta, founded by George II. in 1734 and opened in 1737, rapidly attained a leading position, and in 1823 its students numbered 1547. Political disturbances, in which both professors and students were implicated, lowered the attendance to 860 in 1834. The expulsion in 1837 of the famous seven professors—*Die Göttinger Sieben*—viz. the Germanist, Wilhelm Eduard Albrecht (1800-1876); the historian, Friedrich Christoph Dahlmann (1785-1860); the orientalist, Georg Heinrich August Ewald (1803-1875); the historian, Georg Gottfried Gervinus (1805-1875); the physicist, Wilhelm Eduard Weber (1804-1891); and the philologists, the brothers Jacob Ludwig Karl Grimm (1785-1863), and Wilhelm Karl Grimm (1786-1859),—for protesting against the revocation by King Ernest Augustus of Hanover of the liberal constitution of 1833, further reduced the prosperity of the university. The events of 1848, on the other hand, told somewhat in its favour; and, since the annexation of Hanover in 1866, it has been carefully fostered by the Prussian government. In 1903 its teaching staff numbered 121 and its students 1529. The main university building lies on the Wilhelmsplatz, and, adjoining, is the famous library of 500,000 vols, and 5300 MSS., the richest collection of modern literature in Germany. There is a good chemical laboratory as well as adequate zoological, ethnographical and mineralogical collections, the most remarkable being Blumenbach's famous collection of skulls in the anatomical institute. There are also a celebrated observatory, long under the direction of Wilhelm Klinkerfues (1827-1884), a botanical garden, an agricultural institute and various hospitals, all connected with the university. Of the scientific societies the most noted is the Royal Society of Sciences (*Königliche Sozietät der Wissenschaften*) founded by Albrecht von Haller, which is divided into three classes, the physical, the mathematical and the historical-philological. It numbers about 80 members and publishes the well-known *Göttingische gelehrte Anzeigen*. There are monuments in the town to the mathematicians K. F. Gauss and W. E. Weber, and also to the poet G. A. Bürger.

The earliest mention of a village of Goding or Gutingi occurs in documents of about 950 A.D. The place received municipal rights from the German king Otto IV. about 1210, and from 1286 to 1463 it was the seat of the princely house of Brunswick-Göttingen. During the 14th century it held a high place among the towns of the Hanseatic League. In 1531 it joined the Reformation movement, and in the following century it suffered considerably in the Thirty Years' War, being taken by Tilly in 1626, after a siege of 25 days, and recaptured by the

Saxons in 1632. After a century of decay, it was anew brought into importance by the establishment of its university; and a marked increase in its industrial and commercial prosperity has again taken place in recent years. Towards the end of the 18th century Göttingen was the centre of a society of young poets of the *Sturm und Drang* period of German literature, known as the *Göttingen Dichterbund* or *Hainbund* (see GERMANY: *Literature*).

See Freusdorff, *Göttingen in Vergangenheit und Gegenwart* (Göttingen, 1887); the *Urkundenbuch der Stadt Göttingen*, edited by G. Schmidt, A. Hasselblatt and G. Kästner; Unger, *Göttingen und die Georgia Augusta* (1861); and *Göttinger Professoren* (Gotha, 1872); and O. Mejer, *Kulturgeschichtliche Bilder aus Göttingen* (1889).

GÖTTLING, CARL WILHELM (1793-1869), German classical scholar, was born at Jena on the 19th of January 1793. He studied at the universities of Jena and Berlin, took part in the war against France in 1814, and finally settled down in 1822 as professor at the university of his native town, where he continued to reside till his death on the 20th of January 1869. In his early years Göttling devoted himself to German literature, and published two works on the Nibelungen: *Über das Geschichtliche im Nibelungenliede* (1814) and *Nibelungen und Gibelinen* (1817). The greater part of his life, however, was devoted to the study of classical literature, especially the elucidation of Greek authors. The contents of his *Gesammelte Abhandlungen aus dem klassischen Altertum* (1851-1863) and *Opuscula Academica* (published in 1869 after his death) sufficiently indicate the varied nature of his studies. He edited the Τέχνη (grammatical manual) of Theodosius of Alexandria (1822), Aristotle's *Politics* (1824), and *Economics* (1830) and Hesiod (1831; 3rd ed. by J. Flach, 1878). Mention may also be made of his *Allgemeine Lehre vom Accent der griechischen Sprache* (1835), enlarged from a smaller work, which was translated into English (1831) as the *Elements of Greek Accentuation*; and of his *Correspondence with Goethe* (published 1880).

See memoirs by C. Nipperdey, his colleague at Jena (1869), G. Lothholz (Stargard, 1876), K. Fischer (preface to the *Opuscula Academica*), and C. Bursian in *Allgemeine deutsche Biographie*, ix.

GOTTSCHALK [GODESCALUS, GOTTESCALE], (*c.* 808-867 ?), German theologian, was born near Mainz, and was devoted (*oblatus*) from infancy by his parents,—his father was a Saxon, Count Bern,—to the monastic life. He was trained at the monastery of Fulda, then under the abbot Hrabanus Maurus, and became the friend of Walafrid Strabo and Loup of Ferrières. In June 829, at the synod of Mainz, on the pretext that he had been unduly constrained by his abbot, he sought and obtained his liberty, withdrew first to Corbie, where he met Ratramnus, and then to the monastery of Orbais in the diocese of Soissons. There he studied St Augustine, with the result that he became an enthusiastic believer in the doctrine of absolute predestination, in one point going beyond his master—Gottschalk believing in a predestination to condemnation as well as in a predestination to salvation, while Augustine had contented himself with the doctrine of preterition as complementary to the doctrine of election. Between 835 and 840 Gottschalk was ordained priest, without the knowledge of his bishop, by Rigbold, *chorepiscopus* of Reims. Before 840, deserting his monastery, he went to Italy, preached there his doctrine of double predestination, and entered into relations with Notting, bishop of Verona, and Eberhard, count of Friuli. Driven from Italy through the influence of Hrabanus Maurus, now archbishop of Mainz, who wrote two violent letters to Notting and Eberhard, he travelled through Dalmatia, Pannonia and Norica, but continued preaching and writing. In October 848 he presented to the synod at Mainz a profession of faith and a refutation of the ideas expressed by Hrabanus Maurus in his letter to Notting. He was convicted, however, of heresy, beaten, obliged to swear that he would never again enter the territory of Louis the German, and handed over to Hincmar, archbishop of Reims, who sent him back to his monastery at Orbais. The next year at a provincial council at Quierzy, presided over by Charles the Bald, he attempted to justify his ideas, but was again

condemned as a heretic and disturber of the public peace, was degraded from the priesthood, whipped, obliged to burn his declaration of faith, and shut up in the monastery of Hautvilliers. There Hincmar tried again to induce him to retract. Gottschalk however continued to defend his doctrine, writing to his friends and to the most eminent theologians of France and Germany. A great controversy resulted. Prudentius, bishop of Troyes, Wenilo of Sens, Ratramnus of Corbie, Loup of Ferrières and Florus of Lyons wrote in his favour. Hincmar wrote *De praedestinatione* and *De una non trina deitate* against his views, but gained little aid from Johannes Scotus Erigena, whom he had called in as an authority. The question was discussed at the councils of Kiersy (853), of Valence (855) and of Savonnières (859). Finally the pope Nicolas I. took up the case, and summoned Hincmar to the council of Metz (863). Hincmar either could not or would not appear, but declared that Gottschalk might go to defend himself before the pope. Nothing came of this, however, and when Hincmar learned that Gottschalk had fallen ill, he forbade him the sacraments or burial in consecrated ground unless he would recant. This Gottschalk refused to do. He died on the 30th of October between 866 and 870.

Gottschalk was a vigorous and original thinker, but also of a violent temperament, incapable of discipline or moderation in his ideas as in his conduct. He was less an innovator than a reactionary. Of his many works we have only the two professions of faith (cf. Migne, *Patrologia Latina*, cxxi. c. 347 et seq.), and some poems, edited by L. Traube in *Monumenta Germaniae historica: Poëtae Latini aevi Carolini* (t. iii. 707-738). Some fragments of his theological treatises have been preserved in the writings of Hincmar, Erigena, Ratramnus and Loup of Ferrières.

From the 17th century, when the Jansenists exalted Gottschalk, much has been written on him. Mention may be made of two recent studies, F. Picavet, “Les Discussions sur la liberté au temps de Gottschalk, de Raban Maur, d’Hincmar, et de Jean Scot,” in *Comptes rendus de l’acad. des sciences morales et politiques* (Paris, 1896); and A. Freystedt, “Studien zu Gottschalks Leben und Lehre,” in *Zeitschrift für Kirchengeschichte* (1897), vol. xviii.

GOTTSCHALL, RUDOLF VON (1823-1909), German man of letters, was born at Breslau on the 30th of September 1823, the son of a Prussian artillery officer. He received his early education at the gymnasia in Mainz and Coburg, and subsequently at Rastenburg in East Prussia. In 1841 he entered the university of Königsberg as a student of law, but, in consequence of his pronounced liberal opinions, was expelled. The academic authorities at Breslau and Leipzig were not more tolerant towards the young fire-eater, and it was only in Berlin that he eventually found himself free to prosecute his studies. During this period of unrest he issued *Lieder der Gegenwart* (1842) and *Zensurflüchtlinge* (1843)—the poetical fruits of his political enthusiasm. He completed his studies in Berlin, took the degree of *doctor juris* in Königsberg, and endeavoured to obtain there the *venia legendi*. His political views again stood in the way, and forsaking the legal career, Gottschall now devoted himself entirely to literature. He met with immediate success, and beginning as dramaturge in Königsberg with *Der Blinde von Alcala* (1846) and *Lord Byron in Italien* (1847) proceeded to Hamburg where he occupied a similar position. In 1852 he married Marie, baroness von Seherr-Thoss, and for the next few years lived in Silesia. In 1862 he took over the editorship of a Posen newspaper, but in 1864 removed to Leipzig. Gottschall was raised, in 1877, by the king of Prussia to the hereditary nobility with the prefix “von,” having been previously made a *Geheimer Hofrat* by the grand duke of Weimar. Down to 1887 Gottschall edited the *Brockhaus’sche Blätter für litterarische Unterhaltung* and the monthly periodical *Unsere Zeit*. He died at Leipzig on the 21st of March 1909.

Gottschall’s prolific literary productions cover the fields of poetry, novel-writing and literary criticism. Among his volumes of lyric poetry are *Sebastopol* (1856), *Janus* (1873), *Bunte Blüten* (1891). Among his epics, *Carlo Zeno* (1854), *Maja* (1864), dealing with an episode in the Indian Mutiny, and *Merlins Wanderungen* (1887). The comedy *Pitt und Fox* (1854), first produced on the stage in Breslau, was never surpassed by the other lighter pieces of the author, among which may be mentioned *Die Welt des Schwindels* and *Der Spion von Rheinsberg*. The tragedies, *Mazeppa*, *Catharine Howard*, *Amy Robsart* and *Der Götze von Venedig*, were very successful; and the historical novels, *Im Banne des schwarzen Adlers* (1875; 4th ed., 1884), *Die Erbschaft des Blutes* (1881), *Die Tochter Rübezahls* (1889), and *Verkümmerte Existenzen* (1892), enjoyed a high degree of popularity. As a critic and

historian of literature Gottschall has also done excellent work. His *Die deutsche Nationalliteratur des 19. Jahrhunderts* (1855; 7th ed., 1901-1902), and *Poetik* (1858; 6th ed., 1903) command the respect of all students of literature.

Gottschall's collected *Dramatische Werke* appeared in 12 vols. in 1880 (2nd ed., 1884); he has also, in recent years, published many volumes of collected essays and criticisms. See his autobiography, *Aus meiner Jugend* (1898).

GOTTSCHED, JOHANN CHRISTOPH (1700-1766), German author and critic, was born on the 2nd of February 1700, at Judithenkirch near Königsberg, the son of a Lutheran clergyman. He studied philosophy and history at the university of his native town, but immediately on taking the degree of *Magister* in 1723, fled to Leipzig in order to evade impressment in the Prussian military service. Here he enjoyed the protection of J. B. Mencke (1674-1732), who, under the name of "Philander von der Linde," was a well-known poet and also president of the *Deutschübende poetische Gesellschaft* in Leipzig. Of this society Gottsched was elected "Senior" in 1726, and in the next year reorganized it under the title of the *Deutsche Gesellschaft*. In 1730 he was appointed extraordinary professor of poetry, and, in 1734, ordinary professor of logic and metaphysics in the university. He died at Leipzig on the 12th of December 1766.

Gottsched's chief work was his *Versuch einer kritischen Dichtkunst für die Deutschen* (1730), the first systematic treatise in German on the art of poetry from the standpoint of Boileau. His *Ausführliche Redekunst* (1728) and his *Grundlegung einer deutschen Sprachkunst* (1748) were of importance for the development of German style and the purification of the language. He wrote several plays, of which *Der sterbende Cato* (1732), an adaptation of Addison's tragedy and a French play on the same theme, was long popular on the stage. In his *Deutsche Schaubühne* (6 vols., 1740-1745), which contained mainly translations from the French, he provided the German stage with a classical repertory, and his bibliography of the German drama, *Nötiger Vorrat zur Geschichte der deutschen dramatischen Dichtkunst* (1757-1765), is still valuable. He was also the editor of several journals devoted to literary criticism. As a critic, Gottsched insisted on German literature being subordinated to the laws of French classicism; he enunciated rules by which the playwright must be bound, and abolished bombast and buffoonery from the serious stage. While such reforms obviously afforded a healthy corrective to the extravagance and want of taste which were rampant in the German literature of the time, Gottsched went too far. In 1740 he came into conflict with the Swiss writers Johann Jakob Bodmer (*q.v.*) and Johann Jakob Breitinger (1701-1776), who, under the influence of Addison and contemporary Italian critics, demanded that the poetic imagination should not be hampered by artificial rules; they pointed to the great English poets, and especially to Milton. Gottsched, although not blind to the beauties of the English writers, clung the more tenaciously to his principle that poetry must be the product of rules, and, in the fierce controversy which for a time raged between Leipzig and Zürich, he was inevitably defeated. His influence speedily declined, and before his death his name became proverbial for pedantic folly.

His wife, Luise Adelgunde Victorie, née Kulmus (1713-1762), in some respects her husband's intellectual superior, was an author of some reputation. She wrote several popular comedies, of which *Das Testament* is the best, and translated the *Spectator* (9 vols., 1730-1743), Pope's *Rape of the Lock* (1744) and other English and French works. After her death her husband edited her *Sämtliche kleinere Gedichte* with a memoir (1763).

See T. W. Danzel, *Gottsched und seine Zeit* (Leipzig, 1848); J. Crüger, Gottsched, *Bodmer, und Breitinger* (with selections from their writings) (Stuttgart, 1884); F. Servaes, *Die Poetik Gottscheds und der Schweizer* (Strassburg, 1887); E. Wolff, *Gottscheds Stellung im deutschen Bildungsleben* (2 vols., Kiel, 1895-1897), and G. Waniek, *Gottsched und die deutsche Literatur seiner Zeit* (Leipzig, 1897). On Frau Gottsched, see P. Schlenther, *Frau Gottsched und die bürgerliche Komödie* (Berlin, 1886).

GÖTZ, JOHANN NIKOLAUS (1721-1781), German poet, was born at Worms on the 9th of July 1721. He studied theology at Halle (1739-1742), where he became intimate with the poets Johann W. L. Gleim and Johann Peter Uz, acted for some years as military chaplain, and afterwards filled various other ecclesiastical offices. He died at Winterburg on the 4th of November 1781. The writings of Götz consist of a number of short lyrics and several translations, of which the best is a rendering of Anacreon. His original compositions are light, lively and sparkling, and are animated rather by French wit than by German depth of sentiment. The best known of his poems is *Die Mädcheninsel*, an elegy which met with the warm approval of Frederick the Great.

Götz's *Vermischte Gedichte* were published with biography by K. W. Ramler (Mannheim, 1785; new ed., 1807), and a collection of his poems, dating from the years 1745-1765, has been edited by C. Schüddekopf in the *Deutsche Literaturdenkmale des 18. und 19. Jahrhunderts* (1893). See also *Briefe von und an J. N. Götz*, edited by C. Schüddekopf (1893).

GOUACHE, a French word adapted from the Ital. *guazzo* (probably in origin connected with "wash"), meaning literally a "ford," but used also for a method of painting in opaque water-colour. The colours are mixed with or painted in a vehicle of gum or honey, and whereas in true water-colours the high lights are obtained by leaving blank the surface of the paper or other material used, or by allowing it to show through a translucent wash in "gouache," these are obtained by white or other light colour. "Gouache" is frequently used in miniature painting.

GOUDA (or TER GOUWE), a town of Holland, in the province of South Holland, on the north side of the Gouwe at its confluence with the Ysel, and a junction station 12½ m. by rail N.E. of Rotterdam. Pop. (1900) 22,303. Tramways connect it with Bodegraven (5½m. N.) on the old Rhine and with Oudewater (8 m. E.) on the Ysel; and there is a regular steamboat service in various directions, Amsterdam being reached by the canalized Gouwe; Aar, Drecht and Amstel. The town of Gouda is laid out in a fine open manner and, like other Dutch towns, is intersected by numerous canals. On its outskirts pleasant walks and fine trees have replaced the old fortifications. The Groote Markt is the largest market-square in Holland. Among the numerous churches belonging to various denominations, the first place must be given to the Groote Kerk of St John. It was founded in 1485, but rebuilt after a fire in 1552, and is remarkable for its dimensions (345 ft. long and 150 ft. broad), for a large and celebrated organ, and a splendid series of over forty stained-glass windows presented by cities and princes and executed by various well-known artists, including the brothers Dirk (d. *c.* 1577) and Wouter (d. *c.* 1590) Crabeth, between the years 1555 and 1603 (see *Explanation of the Famous and Renowned Glass Works, &c.*, Gouda, 1876, reprinted from an older volume, 1718). Other noteworthy buildings are the Gothic town hall, founded in 1449 and rebuilt in 1690, and the weigh-house, built by Pieter Post of Haarlem (1608-1669) and adorned with a fine relief by Barth. Eggers (d. *c.* 1690). The museum of antiquities (1874) contains an exquisite chalice of the year 1425 and some pictures and portraits by Wouter Crabeth the younger, Corn. Ketel (a native of Gouda, 1548-1616) and Ferdinand Bol (1616-1680). Other buildings are the orphanage, the hospital, a house of correction for women and a music hall.

In the time of the counts the wealth of Gouda was mainly derived from brewing and cloth-weaving; but at a later date the making of clay tobacco pipes became the staple trade, and, although this industry has somewhat declined, the churchwarden pipes of Gouda are still well known and largely manufactured. In winter-time it is considered a feat to skate hither from Rotterdam and elsewhere to buy such a pipe and return with it in one's mouth without its being broken. The mud from the Ysel furnishes the material for large brick-works and potteries; there are also a celebrated manufactory of stearine candles, a yarn factory, an oil refinery and cigar factories. The transit and shipping trade is considerable, and as one of the principal markets of South Holland, the round, white Gouda cheeses are known throughout Europe. Boskoop, 5 m. N. by W. of Gouda on the Gouwe, is famous for its nursery gardens;

and the little old-world town of Oudewater as the birthplace of the famous theologian Arminius in 1560. The town hall (1588) of Oudewater contains a picture by Dirk Stoop (d. 1686), commemorating the capture of the town by the Spaniards in 1575 and the subsequent sack and massacre.

GOUDIMEL, CLAUDE, musical composer of the 16th century, was born about 1510. The French and the Belgians claim him as their countryman. In all probability he was born at Besançon, for in his edition of the songs of Arcadelt, as well as in the mass of 1554, he calls himself “natif de Besançon” and “Claudius Godimellus Vescontinus.” This discountenances the theory of Ambros that he was born at Vaison near Avignon. As to his early education we know little or nothing, but the excellent Latin in which some of his letters were written proves that, in addition to his musical knowledge, he also acquired a good classical training. It is supposed that he was in Rome in 1540 at the head of a music-school, and that besides many other celebrated musicians, Palestrina was amongst his pupils. About the middle of the century he seems to have left Rome for Paris, where, in conjunction with Jean Duchemin, he published, in 1555, a musical setting of Horace’s Odes. Infinitely more important is another collection of vocal pieces, a setting of the celebrated French version of the Psalms by Marot and Beza published in 1565. It is written in four parts, the melody being assigned to the tenor. The invention of the melodies was long ascribed to Goudimel, but they have now definitely been proved to have originated in popular tunes found in the collections of this period. Some of these tunes are still used by the French Protestant Church. Others were adopted by the German Lutherans, a German imitation of the French versions of the Psalms in the same metres having been published at an early date. Although the French version of the Psalms was at first used by Catholics as well as Protestants, there is little doubt that Goudimel had embraced the new faith. In Michel Brenet’s Biographie (*Annales franc-cuntoises*, Besançon, 1898, P. Jacquin) it is established that in Metz, where he was living in 1565, Goudimel moved in Huguenot circles, and even figured as godfather to the daughter of the president of Senneton. Seven years later he fell a victim to religious fanaticism during the St Bartholomew massacres at Lyons from the 27th to the 28th of August 1572, his death, it is stated, being due to “les ennemis de la gloire de Dieu et quelques méchants envieux de l’honneur qu’il avait acquis.” Masses and motets belonging to his Roman period are found in the Vatican library, and in the archives of various churches in Rome; others were published. Thus the work entitled *Missae tres a Claudio Goudimel praestantissimo musico auctore, nunc primum in lucem editae*, contains one mass by the learned editor himself, the other two being by Claudius Sermisy and Jean Maillard respectively. Another collection, *La Fleur des chansons des deux plus excellens musiciens de nostre temps*, consists of part songs by Goudimel and Orlando di Lasso. Burney gives in his history a motet of Goudimel’s *Domine quid multiplicati sunt*.

GOUFFIER, the name of a great French family, which owned the estate of Bonnivet in Poitou from the 14th century. *Guillaume Gouffier*, chamberlain to Charles VII., was an inveterate enemy of Jacques Cœur, obtaining his condemnation and afterwards receiving his property (1491). He had a great number of children, several of whom played a part in history. Artus, seigneur de Boisy (*c.* 1475-1520) was entrusted with the education of the young count of Angoulême (Francis I.), and on the accession of this prince to the throne as Francis I. became grand master of the royal household, playing an important part in the government; to him was given the task of negotiating the treaty of Noyon in 1516; and shortly before his death the king raised the estates of Roanne and Boisy to the rank of a duchy, that of Roannais, in his favour. Adrien Gouffier (d. 1523) was bishop of Coutances and Albi, and grand almoner of France. Guillaume Gouffier, seigneur de Bonnivet, became admiral. of France (see Bonnivet). Claude Gouffier, son of Artus, was created comte de Maulevrier (1542) and marquis de Boisy (1564).

There were many branches of this family, the chief of them being the dukes of Roannais, the counts of Caravas, the lords of Crèvecœur and of Bonnivet, the marquises of Thois, of

Brazeux, and of Espagny. The name of Gouffier was adopted in the 18th century by a branch of the house of Choiseul.

(M. P.*)

GOUGE, MARTIN (*c.* 1360-1444), surnamed DE CHARPAIGNE, French chancellor, was born at Bourges about 1360. A canon of Bourges, in 1402 he became treasurer to John, duke of Berri, and in 1406 bishop of Chartres. He was arrested by John the Fearless, duke of Burgundy, with the hapless Jean de Montaigu (1349-1409) in 1409, but was soon released and then banished. Attaching himself to the dauphin Louis, duke of Guienne, he became his chancellor, the king's ambassador in Brittany, and a member of the grand council; and on the 13th of May 1415, he was transferred from the see of Chartres to that of Clermont-Ferrand. In May 1418, when the Burgundians re-entered Paris, he only escaped death at their hands by taking refuge in the Bastille. He then left Paris, but only to fall into the hands of his enemy, the duke de la Trémoille, who imprisoned him in the castle of Sully. Rescued by the dauphin Charles, he was appointed chancellor of France on the 3rd of February 1422. He endeavoured to reconcile Burgundy and France, was a party to the selection of Arthur, earl of Richmond, as constable, but had to resign his chancellorship in favour of Regnault of Chartres; first from March 25th to August 6th 1425, and again when La Trémoille had supplanted Richmond. After the fall of La Trémoille in 1433 he returned to court, and exercised a powerful influence over affairs of state almost till his death, which took place at the castle of Beaulieu (Puy-de-Dôme) on the 25th or 26th of November 1444.

See Hiver's account in the *Mémoires de la Société des Antiquaires du Centre*, p. 267 (1869); and the *Nouvelle Biographie générale*, vol. xxi.

GOUGE (adopted from the Fr. *gouge*, derived from the Late Lat. *gubia* or *gulbia*, in Ducange *gulbium*, an implement *ad hortum excolendum*, and also *instrumentum ferreum in usu fabrorum*; according to the *New English Dictionary* the word is probably of Celtic origin, *gylf*, a beak, appearing in Welsh, and *gilb*, a boring tool, in Cornish), a tool of the chisel type with a curved blade, used for scooping a groove or channel in wood, stone, &c. (see Tool). A similar instrument is used in surgery for operations involving the excision of portions of bone. "Gouge" is also used as the name of a bookbinder's tool, for impressing a curved line on the leather, and for the line so impressed. In mining, a "gouge" is the layer of soft rock or earth sometimes found in each side of a vein of coal or ore, which the miner can scoop out with his pick, and thus attack the vein more easily from the side. The verb "to gouge" is used in the sense of scooping or forcing out.

GOUGH, HUGH GOUGH, VISCOUNT (1779-1869), British field-marshal, a descendant of Francis Gough who was made bishop of Limerick in 1626, was born at Woodstown, Limerick, on the 3rd of November 1779. Having obtained a commission in the army in August 1794, he served with the 78th Highlanders at the Cape of Good Hope, taking part in the capture of Cape Town and of the Dutch fleet in Saldanha Bay in 1796. His next service was in the West Indies, where, with the 87th (Royal Irish Fusiliers), he shared in the attack on Porto Rico, the capture of Surinam, and the brigand war in St Lucia. In 1809 he was called to take part in the Peninsular War, and, joining the army under Wellington, commanded his regiment as major in the operations before Oporto, by which the town was taken from the French. At Talavera he was severely wounded, and had his horse shot under him. For his conduct on this occasion he was afterwards promoted lieutenant-colonel, his commission, on the recommendation of Wellington, being antedated from the day of the duke's despatch. He was thus the first officer who ever received brevet rank for services performed in the field at

the head of a regiment. He was next engaged at the battle of Barrosa, at which his regiment captured a French eagle. At the defence of Tarifa the post of danger was assigned to him, and he compelled the enemy to raise the siege. At Vitoria, where Gough again distinguished himself, his regiment captured the baton of Marshal Jourdan. He was again severely wounded at Nivelle, and was soon after created a knight of St Charles by the king of Spain. At the close of the war he returned home and enjoyed a respite of some years from active service. He next took command of a regiment stationed in the south of Ireland, discharging at the same time the duties of a magistrate during a period of agitation. Gough was promoted major-general in 1830. Seven years later he was sent to India to take command of the Mysore division of the army. But not long after his arrival in India the difficulties which led to the first Chinese war made the presence of an energetic general on the scene indispensable, and Gough was appointed commander-in-chief of the British forces in China. This post he held during all the operations of the war; and by his great achievements and numerous victories in the face of immense difficulties, he at length enabled the English plenipotentiary, Sir H. Pottinger, to dictate peace on his own terms. After the conclusion of the treaty of Nanking in August 1842 the British forces were withdrawn; and before the close of the year Gough, who had been made a G.C.B, in the previous year for his services in the capture of the Canton forts, was created a baronet. In August 1843 he was appointed commander-in-chief of the British forces in India, and in December he took the command in person against the Mahrattas, and defeated them at Maharajpur, capturing more than fifty guns. In 1845 occurred the rupture with the Sikhs, who crossed the Sutlej in large numbers, and Sir Hugh Gough conducted the operations against them, being well supported by Lord Hardinge, the governor-general, who volunteered to serve under him. Successes in the hard-fought battles of Mudki and Ferozeshah were succeeded by the victory of Sobraon, and shortly afterwards the Sikhs sued for peace at Lahore. The services of Sir Hugh Gough were rewarded by his elevation to the peerage of the United Kingdom as Baron Gough (April 1846). The war broke out again in 1848, and again Lord Gough took the field; but the result of the battle of Chillianwalla being equivocal, he was superseded by the home authorities in favour of Sir Charles Napier; before the news of the supersession arrived Lord Gough had finally crushed the Sikhs in the battle of Gujarat (February 1849). His tactics during the Sikh wars were the subject of an embittered controversy (see Sikh Wars). Lord Gough now returned to England, was raised to a viscountcy, and for the third time received the thanks of both Houses of Parliament. A pension of £2000 per annum was granted to him by parliament, and an equal pension by the East India Company. He did not again see active service. In 1854 he was appointed colonel of the Royal Horse Guards, and two years later he was sent to the Crimea to invest Marshal Pélissier and other officers with the insignia of the Bath. Honours were multiplied upon him during his latter years. He was made a knight of St Patrick, being the first knight of the order who did not hold an Irish peerage, was sworn a privy councillor, was named a G.C.S.I., and in November 1862 was made field-marshal. He was twice married, and left children by both his wives. He died on the 2nd of March 1869.

See R. S. Rait, *Lord Gough* (1903); and Sir W. Lee Warner, *Lord Dalhousie* (1904).

GOUGH, JOHN BARTHOLOMEW (1817-1886), American temperance orator, was born at Sandgate, Kent, England, on the 22nd of August 1817. He was educated by his mother, a schoolmistress, and at the age of twelve was sent to the United States to seek his fortune. He lived for two years with family friends on a farm in western New York, and then entered a book-bindery in New York City to learn the trade. There in 1833 his mother joined him, but after her death in 1835 he fell in with dissolute companions, and became a confirmed drunkard. He lost his position, and for several years supported himself as a ballad singer and story-teller in the cheap theatres and concert-halls of New York and other eastern cities. Even this means of livelihood was being closed to him, when in Worcester, Massachusetts, in 1842 he was induced to sign a temperance pledge. After several lapses and a terrific struggle, he determined to devote his life to lecturing in behalf of temperance reform. Gifted with remarkable powers of pathos and of description, he was successful from the start, and was soon known and sought after throughout the entire country, his appeals, which were directly personal and emotional, being attended with extraordinary responses. He continued his work until the end of his life, made several tours of England, where his American success was repeated, and died at his work, being stricken with apoplexy on the lecture platform at Frankford, Pennsylvania, where he passed away two days later, on the 18th of February

1886. He published an *Autobiography* (1846); *Orations* (1854); *Temperance Addresses* (1870); *Temperance Lectures* (1879); and *Sunlight and Shadow, or Gleanings from My Life Work* (1880).

GOUGH, RICHARD (1735-1809), English antiquary, was born in London on the 21st of October 1735. His father was a wealthy M.P. and director of the East India Company. Gough was a precocious child, and at twelve had translated from the French a history of the Bible, which his mother printed for private circulation. When fifteen he translated Abbé Fleury's work on the Israelites; and at sixteen he published an elaborate work entitled *Atlas Renovatus, or Geography modernized*. In 1752 he entered Corpus Christi College, Cambridge, where he began his work on British topography, published in 1768. Leaving Cambridge in 1756, he began a series of antiquarian excursions in various parts of Great Britain. In 1773 he began an edition in English of Camden's *Britannia*, which appeared in 1789. Meantime he published, in 1786, the first volume of his splendid work, the *Sepulchral Monuments of Great Britain, applied to illustrate the history of families, manners, habits, and arts at the different periods from the Norman Conquest to the Seventeenth Century*. This volume, which contained the first four centuries, was followed in 1796 by a second volume containing the 15th century, and an introduction to the second volume appeared in 1799. Gough was chosen a fellow of the Society of Antiquaries of London in 1767, and from 1771 to 1791 he was its director. He was elected F.R.S. in 1775. He died at Enfield on the 20th of February 1809. His books and manuscripts relating to Anglo-Saxon and northern literature, all his collections in the department of British topography, and a large number of his drawings and engravings of other archaeological remains, were bequeathed to the university of Oxford.

Among the minor works of Gough are *An Account of the Bedford Missal* (in MS.); *A Catalogue of the Coins of Canute, King of Denmark* (1777); *History of Pleshy in Essex* (1803); *An Account of the Coins of the Seleucidae, Kings of Syria* (1804); and "History of the Society of Antiquaries of London," prefixed to their *Archaeologia*.

GOUJET, CLAUDE PIERRE (1697-1767), French abbé and littérateur, was born in Paris on the 19th of October 1697. He studied at the College of the Jesuits, and at the Collège Mazarin, but he nevertheless became a strong Jansenist. In 1705 he assumed the ecclesiastical habit, in 1719 entered the order of Oratorians, and soon afterwards was named canon of St Jacques l'Hôpital. On account of his extreme Jansenist opinions he suffered considerable persecution from the Jesuits, and several of his works were suppressed at their instigation. In his latter years his health began to fail, and he lost his eyesight. Poverty compelled him to sell his library, a sacrifice which hastened his death, which took place at Paris on the 1st of February 1767.

He is the author of *Supplément au dictionnaire de Moréri* (1735), and a *Nouveau Supplément* to a subsequent edition of the work; he collaborated in *Bibliothèque française, ou histoire littéraire de la France* (18 vols., Paris, 1740-1759); and in the *Vies des saints* (7 vols., 1730); he also wrote *Mémoires historiques et littéraires sur le collège royal de France* (1758); *Histoire des Inquisitions* (Paris, 1752); and supervised an edition of Richelet's *Dictionnaire*, of which he has also given an abridgment. He helped the abbé Fabre in his continuation of Fleury's *Histoire ecclésiastique*.

See *Mémoires hist. et litt. de l'abbé Goujet* (1767).

GOUJON, JEAN (*c.* 1520-*c.* 1566), French sculptor of the 16th century. Although some

evidence has been offered in favour of the date 1520 (*Archives de l'art français*, iii. 350), the time and place of his birth are still uncertain. The first mention of his name occurs in the accounts of the church of St Maclou at Rouen in the year 1540, and in the following year he was employed at the cathedral of the same town, where he added to the tomb of Cardinal d'Amboise a statue of his nephew Georges, afterwards removed, and possibly carved portions of the tomb of Louis de Brezé, executed some time after 1545. On leaving Rouen, Goujon was employed by Pierre Lescot, the celebrated architect of the Louvre, on the restorations of St-Germain l'Auxerrois; the building accounts—some of which for the years 1542-1544 were discovered by M. de Laborde on a piece of parchment binding—specify as his work, not only the carvings of the pulpit (Louvre), but also a Notre Dame de Piété, now lost. In 1547 appeared Martin's French translation of Vitruvius, the illustrations of which were due, the translator tells us in his "Dedication to the King," to Goujon, "naguères architecte de Monseigneur le Connétable, et maintenant un des vôtres." We learn from this statement not only that Goujon had been taken into the royal service on the accession of Henry II., but also that he had been previously employed under Bullant on the château of Écouen. Between 1547 and 1549 he was employed in the decoration of the Loggia ordered from Lescot for the entry of Henry II. into Paris, which took place on the 16th of June 1549. Lescot's edifice was reconstructed at the end of the 18th century by Bernard Poyet into the Fontaine des Innocents, this being a considerable variation of the original design. At the Louvre, Goujon, under the direction of Lescot, executed the carvings of the south-west angle of the court, the reliefs of the Escalier Henri II., and the Tribune des Cariatides, for which he received 737 livres on the 5th of September 1550. Between 1548 and 1554 rose the château d'Anet, in the embellishment of which Goujon was associated with Philibert Delorme in the service of Diana of Poitiers. Unfortunately the building accounts of Anet have disappeared, but Goujon executed a vast number of other works of equal importance, destroyed or lost in the great Revolution. In 1555 his name appears again in the Louvre accounts, and continues to do so every succeeding year up to 1562, when all trace of him is lost. In the course of this year an attempt was made to turn out of the royal employment all those who were suspected of Huguenot tendencies. Goujon has always been claimed as a Reformer; it is consequently possible that he was one of the victims of this attack. We should therefore probably ascribe the work attributed to him in the Hôtel Carnavalet (*in situ*), together with much else executed in various parts of Paris—but now dispersed or destroyed—to a period intervening between the date of his dismissal from the Louvre and his death, which is computed to have taken place between 1564 and 1568, probably at Bologna. The researches of M. Tomaso Sandonnini (see *Gazette des Beaux Arts*, 2^{e} période, vol. xxxi.) have finally disposed of the supposition, long entertained, that Goujon died during the St Bartholomew massacre in 1572.

List of authentic works of Jean Goujon: Two marble columns supporting the organ of the church of St Maclou (Rouen) on right and left of porch on entering; left-hand gate of the church of St Maclou; bas-reliefs for decoration of screen of St Germain l'Auxerrois (now in Louvre); "Victory" over chimney-piece of Salle des Gardes at Écouen; altar at Chantilly; illustrations for Jean Martin's translation of Vitruvius; bas-reliefs and sculptural decoration of Fontaine des Innocents; bas-reliefs adorning entrance of Hôtel Carnavalet, also series of satyrs' heads on keystones of arcade of courtyard; fountain of Diana from Anet (now in Louvre); internal decoration of chapel at Anet; portico of Anet (now in courtyard of École des Beaux Arts); bust of Diane de Poiçtiers (now at Versailles); Tribune of Caryatides in the Louvre; decoration of "Escalier Henri II.," Louvre; œils de bœuf and decoration of Henri II. façade, Louvre; groups for pediments of façade now placed over entrance to Egyptian and Assyrian collections, Louvre.

See A. A. Pottier, *Œuvres de Goujon* (1844); Reginald Lister, *Jean Goujon* (London, 1903).

GOUJON, JEAN MARIE CLAUDE ALEXANDRE (1766-1795), French publicist and statesman, was born at Bourg on the 13th of April 1766, the son of a postmaster. The boy went early to sea, and saw fighting when he was twelve years old; in 1790 he settled at Meudon, and began to make good his lack of education. As procureur-général-syndic of the department of Seine-et-Oise, in August, 1792, he had to supply the inhabitants with food, and fulfilled his difficult functions with energy and tact. In the Convention, which he entered on the death of Hérault de Séchelles, he took his seat on the benches of the Mountain. He

conducted a mission to the armies of the Rhine and the Moselle with creditable moderation, and was a consistent advocate of peace within the republic. Nevertheless, he was a determined opponent of the counter-revolution, which he denounced in the Jacobin Club and from the Mountain after his recall to Paris, following on the revolution of the 9th Thermidor (July 27, 1794). He was one of those who protested against the readmission of Louvet and other survivors of the Girondin party to the Convention in March 1795; and, when the populace invaded the legislature on the 1st Prairial (May 20, 1795) and compelled the deputies to legislate in accordance with their desires, he proposed the immediate establishment of a special commission which should assure the execution of the proposed changes and assume the functions of the various committees. The failure of the insurrection involved the fall of those deputies who had supported the demands of the populace. Before the close of the sitting, Goujon, with Romme, Duroi, Duquesnoy, Bourbotte, Soubrany and others were put under arrest by their colleagues, and on their way to the château of Taureau in Brittany had a narrow escape from a mob at Avranches. They were brought back to Paris for trial before a military commission on the 17th of June, and, though no proof of their complicity in organizing the insurrection could be found—they were, in fact, with the exception of Goujon and Bourbotte, strangers to one another—they were condemned. In accordance with a pre-arranged plan, they attempted suicide on the staircase leading from the court-room with a knife which Goujon had successfully concealed. Romme, Goujon and Duquesnoy succeeded, but the other three merely inflicted wounds which did not prevent their being taken immediately to the guillotine. With their deaths the Mountain ceased to exist as a party.

See J. Claretie, *Les Derniers Montagnards, histoire de l'insurrection de Prairial an III d'après les documents* (1867); *Défense du représentant du peuple Goujon* (Paris, no date), with the letters and a hymn written by Goujon during his imprisonment. For other documents see Maurice Tourneux (Paris, 1890, vol. i., pp. 422-425).

GOULBURN, EDWARD MEYRICK (1818-1897), English churchman, son of Mr Serjeant Goulburn, M.P., recorder of Leicester, and nephew of the Right Hon. Henry Goulburn, chancellor of the exchequer in the ministries of Sir Robert Peel and the duke of Wellington, was born in London on the 11th of February 1818, and was educated at Eton and at Balliol College, Oxford. In 1839 he became fellow and tutor of Merton, and in 1841 and 1843 was ordained deacon and priest respectively. For some years he held the living of Holywell, Oxford, and was chaplain to Samuel Wilberforce, bishop of the diocese. In 1849 he succeeded Tait as headmaster of Rugby, but in 1857 he resigned, and accepted the charge of Quebec Chapel, Marylebone. In 1858 he became a prebendary of St Paul's, and in 1859 vicar of St John's, Paddington. In 1866 he was made dean of Norwich, and in that office exercised a long and marked influence on church life. A strong Conservative and a churchman of traditional orthodoxy, he was a keen antagonist of "higher criticism" and of all forms of rationalism. His *Thoughts on Personal Religion* (1862) and *The Pursuit of Holiness* were well received; and he wrote the *Life* (1892) of his friend Dean Burgon, with whose doctrinal views he was substantially in agreement. He resigned the deanery in 1889, and died at Tunbridge Wells on the 3rd of May 1897.

See *Life* by B. Compton (1899).

GOULBURN, HENRY (1784-1856), English statesman, was born in London on the 19th of March 1784 and was educated at Trinity College, Cambridge. In 1808 he became member of parliament for Horsham; in 1810 he was appointed under-secretary for home affairs and two and a half years later he was made under-secretary for war and the colonies. Still retaining office in the Tory government he became a privy councillor in 1821, and just afterwards was appointed chief secretary to the lord-lieutenant of Ireland, a position which he held until April 1827. Here although frequently denounced as an Orangeman, his period of office was on the whole a successful one, and in 1823 he managed to pass the Irish Tithe Composition Bill. In January 1828 he was made chancellor of the exchequer under the duke of Wellington;

like his leader he disliked Roman Catholic emancipation, which he voted against in 1828. In the domain of finance Goulburn's chief achievements were to reduce the rate of interest on part of the national debt, and to allow any one to sell beer upon payment of a small annual fee, a complete change of policy with regard to the drink traffic. Leaving office with Wellington in November 1830, Goulburn was home secretary under Sir Robert Peel for four months in 1835, and when this statesman returned to office in September 1841 he became chancellor of the exchequer for the second time. Although Peel himself did some of the chancellor's work, Goulburn was responsible for a further reduction in the rate of interest on the national debt, and he aided his chief in the struggle which ended in the repeal of the corn laws. With his colleagues he left office in June 1846. After representing Horsham in the House of Commons for over four years Goulburn was successively member for St Germans, for West Looe, and for the city of Armagh. In May 1831 he was elected for Cambridge University, and he retained this seat until his death on the 12th of January 1856 at Betchworth House, Dorking. Goulburn was one of Peel's firmest supporters and most intimate friends. His eldest son, Henry (1813-1843), was senior classic and second wrangler at Cambridge in 1835.

See S. Walpole, *History of England* (1878-1886).

GOULBURN, a city of Argyle county, New South Wales, Australia, 134 m. S.W. of Sydney by the Great Southern railway. Pop. (1901) 10,618. It lies in a productive agricultural district, at an altitude of 2129 ft., and is a place of great importance, being the chief depot of the inland trade of the southern part of the state. There are Anglican and Roman Catholic cathedrals. Manufactures of boots and shoes, flour and beer, and tanning are important. The municipality was created in 1859; and Goulburn became a city in 1864.

GOULD, AUGUSTUS ADDISON (1805-1866), American conchologist, was born at New Ipswich, New Hampshire, on the 23rd of April 1805, graduated at Harvard College in 1825, and took his degree of doctor of medicine in 1830. Thrown from boyhood on his own exertions, it was only by industry, perseverance and self-denial that he obtained the means to pursue his studies. Establishing himself in Boston, he devoted himself to the practice of medicine, and finally rose to high professional rank and social position. He became president of the Massachusetts Medical Society, and was employed in editing the vital statistics of the state. As a conchologist his reputation is world-wide, and he was one of the pioneers of the science in America. His writings fill many pages of the publications of the Boston Society of Natural History (see vol. xi. p. 197 for a list) and other periodicals. He published with L. Agassiz the *Principles of Zoology* (2nd ed. 1851); he edited the *Terrestrial and Air-breathing Mollusks* (1851-1855) of Amos Binney (1803-1847); he translated Lamarck's *Genera of Shells*. The two most important monuments to his scientific work, however, are *Mollusca and Shells* (vol. xii., 1852) of the United States exploring expedition (1838-1842) under Lieutenant Charles Wilkes (1833), published by the government, and the *Report on the Invertebrata* published by order of the legislature of Massachusetts in 1841. A second edition of the latter work was authorized in 1865, and published in 1870 after the author's death, which took place at Boston on the 15th of September 1866. Gould was a corresponding member of all the prominent American scientific societies, and of many of those of Europe, including the London Royal Society.

GOULD, BENJAMIN APTHORP (1824-1896), American astronomer, a son of Benjamin Apthorp Gould (1787-1859), principal of the Boston Latin school, was born at Boston, Massachusetts, on the 27th of September 1824. Having graduated at Harvard College in

1844, he studied mathematics and astronomy under C. F. Gauss at Göttingen, and returned to America in 1848. From 1852 to 1867 he was in charge of the longitude department of the United States coast survey; he developed and organized the service, was one of the first to determine longitudes by telegraphic means, and employed the Atlantic cable in 1866 to establish longitude-relations between Europe and America. The *Astronomical Journal* was founded by Gould in 1849; and its publication, suspended in 1861, was resumed by him in 1885. From 1855 to 1859 he acted as director of the Dudley observatory at Albany, New York; and published in 1859 a discussion of the places and proper motions of circumpolar stars to be used as standards by the United States coast survey. Appointed in 1862 actuary to the United States sanitary commission, he issued in 1869 an important volume of *Military and Anthropological Statistics*. He fitted up in 1864 a private observatory at Cambridge, Mass.; but undertook in 1868, on behalf of the Argentine republic, to organize a national observatory at Cordoba; began to observe there with four assistants in 1870, and completed in 1874 his *Uranometria Argentina* (published 1879) for which he received in 1883 the gold medal of the Royal Astronomical Society. This was followed by a zone-catalogue of 73,160 stars (1884), and a general catalogue (1885) compiled from meridian observations of 32,448 stars. Gould's measurements of L. M. Rutherfurd's photographs of the Pleiades in 1866 entitle him to rank as a pioneer in the use of the camera as an instrument of precision; and he secured at Cordoba 1400 negatives of southern star-clusters, the reduction of which occupied the closing years of his life. He returned in 1885 to his home at Cambridge, where he died on the 26th of November 1896.

See *Astronomical Journal*, No. 389; *Observatory*, xx. 70 (same notice abridged); *Science* (Dec. 18, 1896, S. C. Chandler); *Astrophysical Journal*, v. 50; *Monthly Notices Roy. Astr. Society*, lvii. 218.

GOULD, SIR FRANCIS CARRUTHERS (1844-), English caricaturist and politician, was born in Barnstaple on the 2nd of December 1844. Although in early youth he showed great love of drawing, he began life in a bank and then joined the London Stock Exchange, where he constantly sketched the members and illustrated important events in the financial world; many of these drawings were reproduced by lithography and published for private circulation. In 1879 he began the regular illustration of the Christmas numbers of *Truth*, and in 1887 he became a contributor to the *Pall Mall Gazette*, transferring his allegiance to the *Westminster Gazette* on its foundation and subsequently acting as assistant editor. Among his independent publications are *Who killed Cock Robin?* (1897), *Tales told in the Zoo* (1900), two volumes of *Froissart's Modern Chronicles, told and pictured by F. C. Gould* (1902 and 1903), and *Picture Politics*—a periodical reprint of his *Westminster Gazette* cartoons, one of the most noteworthy implements of political warfare in the armoury of the Liberal party. Frequently grafting his ideas on to subjects taken freely from *Uncle Remus*, *Alice in Wonderland*, and the works of Dickens and Shakespeare, Sir F. C. Gould used these literary vehicles with extraordinary dexterity and point, but with a satire that was not unkind and with a vigour from which bitterness, virulence and cynicism were notably absent. He was knighted in 1906.

GOULD, JAY (1836-1892), American financier, was born in Roxbury, Delaware county, New York, on the 27th of May 1836. He was brought up on his father's farm, studied at Hobart Academy, and though he left school in his sixteenth year, devoted himself assiduously thereafter to private study, chiefly of mathematics and surveying, at the same time keeping books for a blacksmith for his board. For a short time he worked for his father in the hardware business; in 1852-1856 he worked as a surveyor in preparing maps of Ulster, Albany and Delaware counties in New York, of Lake and Geauga counties in Ohio, and of Oakland county in Michigan, and of a projected railway line between Newburgh and Syracuse, N.Y. An ardent anti-renter in his boyhood and youth, he wrote *A History of Delaware County and the Border Wars of New York, containing a Sketch of the Early Settlements in the County, and A History of the Late Anti-Rent Difficulties in Delaware*

(Roxbury, 1856). He then engaged in the lumber and tanning business in western New York, and in banking at Stroudsburg, Pennsylvania. In 1863 he married Miss Helen Day Miller, and through her father, Daniel S. Miller, he was appointed manager of the Rensselaer & Saratoga railway, which he bought up when it was in a very bad condition, and skilfully reorganized; in the same way he bought and reorganized the Rutland & Washington railway, from which he ultimately realized a large profit. In 1859 he removed to New York City, where he became a broker in railway stocks, and in 1868 he was elected president of the Erie railway, of which by shrewd strategy he and James Fisk, Jr. (*q.v.*), had gained control in July of that year. The management of the road under his control, and especially the sale of $5,000,000 of fraudulent stock in 1868-1870, led to litigation begun by English bondholders, and Gould was forced out of the company in March 1872 and compelled to restore securities valued at about $7,500,000. It was during his control of the Erie that he and Fisk entered into a league with the Tweed Ring, they admitted Tweed to the directorate of the Erie, and Tweed in turn arranged favourable legislation for them at Albany. With Tweed, Gould was cartooned by Nast in 1869. In October 1871 Gould was the chief bondsman of Tweed when the latter was held in $1,000,000 bail. With Fisk in August 1869 he began to buy gold in a daring attempt to “corner” the market, his hope being that, with the advance in price of gold, wheat would advance to such a price that western farmers would sell, and there would be a consequent great movement of breadstuffs from West to East, which would result in increased freight business for the Erie road. His speculations in gold, during which he attempted through President Grant’s brother-in-law, A. H. Corbin, to influence the president and his secretary General Horace Porter, culminated in the panic of “Black Friday,” on the 24th of September 1869, when the price of gold fell from 162 to 135.

Gould gained control of the Union Pacific, from which in 1883 he withdrew after realizing a large profit. Buying up the stock of the Missouri Pacific he built up, by means of consolidations, reorganizations, and the construction of branch lines, the “Gould System” of railways in the south-western states. In 1880 he was in virtual control of 10,000 miles of railway, about one-ninth of the railway mileage of the United States at that time. Besides, he obtained a controlling interest in the Western Union Telegraph Company, and after 1881 in the elevated railways in New York City, and was intimately connected with many of the largest railway financial operations in the United States for the twenty years following 1868. He died of consumption and of mental strain on the 2nd of December 1892, his fortune at that time being estimated at $72,000,000; all of this he left to his own family.

His eldest son, George Jay Gould (b. 1864), was prominent also as an owner and manager of railways, and became president of the Little Rock & Fort Smith railway (1888), the St Louis, Iron Mountain & Southern railway (1893), the International & Great Northern railway (1893), the Missouri Pacific railway (1893), the Texas & Pacific railway (1893), and the Manhattan Railway Company (1892); he was also vice-president and director of the Western Union Telegraph Company. It was under his control that the Wabash system became transcontinental and secured an Atlantic port at Baltimore; and it was he who brought about a friendly alliance between the Gould and the Rockefeller interests.

The eldest daughter, Helen Miller Gould (b. 1868), became widely known as a philanthropist, and particularly for her generous gifts to American army hospitals in the war with Spain in 1898 and for her many contributions to New York University, to which she gave $250,000 for a library in 1895 and $100,000 for a Hall of Fame in 1900.

GOUNOD, CHARLES FRANÇOIS (1818-1893), French composer, was born in Paris on the 17th of June 1818, the son of F. L. Gounod, a talented painter. He entered the Paris Conservatoire in 1836, studied under Reicha, Halévy and Lesueur, and won the “Grand Prix de Rome” in 1839. While residing in the Eternal City he devoted much of his time to the study of sacred music, notably to the works of Palestrina and Bach. In 1843 he went to Vienna, where a “requiem” of his composition was performed. On his return to Paris he tried in vain to find a publisher for some songs he had written in Rome. Having become organist to the chapel of the “Missions Étrangères,” he turned his thoughts and mind to religious music. At that time he even contemplated the idea of entering into holy orders. His thoughts were, however, turned to more mundane matters when, through the intervention of Madame Viardot, the celebrated singer, he received a commission to compose an opera on a text by Émile Augier for the Académie Nationale de Musique. *Sapho*, the work in question, was

produced in 1851, and if its success was not very great, it at least sufficed to bring the composer's name to the fore. Some critics appeared to consider this work as evidence of a fresh departure in the style of dramatic music, and Adolphe Adam, the composer, who was also a musical critic, attributed to Gounod the wish to revive the system of musical declamation invented by Gluck. The fact was that *Sapho* differed in some respects from the operatic works of the period, and was to a certain extent in advance of the times. When it was revived at the Paris Opéra in 1884, several additions were made by the composer to the original score, not altogether to its advantage, and *Sapho* once more failed to attract the public. Gounod's second dramatic attempt was again in connexion with a classical subject, and consisted in some choruses written for *Ulysse*, a tragedy by Ponsard, played at the Théâtre Français in 1852, when the orchestra was conducted by Offenbach. The composer's next opera, *La Nonne sanglante*, given at the Paris Opéra in 1854, was a failure.

Goethe's *Faust* had for years exercised a strong fascination over Gounod, and he at last determined to turn it to operatic account. The performance at a Paris theatre of a drama on the same subject delayed the production of his opera for a time. In the meanwhile he wrote in a few months the music for an operatic version of Molière's comedy, *Le Médecin malgré lui*, which was produced at the Théâtre Lyrique in 1858. Berlioz well described this charming little work when he wrote of it, "Everything is pretty, piquant, fluent, in this 'opéra comique'; there is nothing superfluous and nothing wanting." The first performance of *Faust* took place at the Théâtre Lyrique on the 19th of March 1859. Goethe's masterpiece had already been utilized for operatic purposes by various composers, the most celebrated of whom was Spohr. The subject had also inspired Schumann, Berlioz, Liszt, Wagner, to mention only a few, and the enormous success of Gounod's opera did not deter Boito from writing his *Mefistofele*. *Faust* is without doubt the most popular French opera of the second half of the 19th century. Its success has been universal, and nowhere has it achieved greater vogue than in the land of Goethe. For years it remained the recognized type of modern French opera. At the time of its production in Paris it was scarcely appreciated according to its merits. Its style was too novel, and its luscious harmonies did not altogether suit the palates of those dilettanti who still looked upon Rossini as the incarnation of music. Times have indeed changed, and French composers have followed the road opened by Gounod, and have further developed the form of the lyrical drama, adopting the theories of Wagner in a manner suitable to their national temperament. Although in its original version *Faust* contained spoken dialogue, and was divided into set pieces according to custom, yet it differed greatly from the operas of the past. Gounod had not studied the works of German masters such as Mendelssohn and Schumann in vain, and although his own style is eminently Gallic, yet it cannot be denied that much of its charm emanates from a certain poetic sentimentality which seems to have a Teutonic origin. Certainly no music such as his had previously been produced by any French composer. Auber was a gay trifler, scattering his bright effusions with absolute *insouciance*, teeming with melodious ideas, but lacking depth. Berlioz, a musical Titan, wrestled against fate with a superhuman energy, and, Jove-like, subjugated his hearers with his thunderbolts. It was, however, reserved for Gounod to introduce *la note tendre*, to sing the tender passion in accents soft and languorous. The musical language employed in *Faust* was new and fascinating, and it was soon to be adopted by many other French composers, certain of its idioms thereby becoming hackneyed. Gounod's opera was given in London in 1863, when its success, at first doubtful, became enormous, and it was heard concurrently at Covent Garden and Her Majesty's theatres. Since then it has never lost its popularity.

Although the success of *Faust* in Paris was at first not so great as might have been expected, yet it gradually increased and set the seal on Gounod's fame. The fortunate composer now experienced no difficulty in finding an outlet for his works, and the succeeding decade is a specially important one in his career. The opera from his pen which came after Faust was *Philémon et Baucis*, a setting of the mythological tale in which the composer followed the traditions of the Opéra Comique, employing spoken dialogue, while not abdicating the individuality of his own style. This work was produced at the Théâtre Lyrique in 1860. It has repeatedly been heard in London. *La Reine de Saba*, a four-act opera, produced at the Grand Opéra on the 28th of February 1862, was altogether a far more ambitious work. For some reason it did not meet with success, although the score contains some of Gounod's choicest inspirations, notably the well-known air, "Lend me your aid." *La Reine de Saba* was adapted for the English stage under the name of *Irene*. The non-success of this work proved a great disappointment to Gounod, who, however, set to work again, and this time with better results, *Mireille*, the fruit of his labours, being given for the first time at the Théâtre Lyrique on the 19th of March 1864. Founded upon the *Mireio* of the Provençal poet Mistral, *Mireille* contains much charming and characteristic music. The libretto seems

to have militated against its success, and although several revivals have taken place and various modifications and alterations have been made in the score, yet *Mireille* has never enjoyed a very great vogue. Certain portions of this opera have, however, been popularized in the concert-room. *La Colombe*, a little opera in two acts without pretension, deserves mention here. It was originally heard at Baden in 1860, and subsequently at the Opéra Comique. A suavely melodious *entr'acte* from this little work has survived and been repeatedly performed.

Animated with the desire to give a pendant to his *Faust*, Gounod now sought for inspiration from Shakespeare, and turned his attention to *Romeo and Juliet*. Here, indeed, was a subject particularly well calculated to appeal to a composer who had so eminently qualified himself to be considered the musician of the tender passion. The operatic version of the Shakespearean tragedy was produced at the Théâtre Lyrique on the 27th of April 1867. It is generally considered as being the composer's second best opera. Some people have even placed it on the same level as *Faust*, but this verdict has not found general acceptance. Gounod himself is stated to have expressed his opinion of the relative value of the two operas enigmatically by saying, "*Faust* is the oldest, but I was younger; *Roméo* is the youngest, but I was older." The luscious strains wedded to the love scenes, if at times somewhat cloying, are generally in accord with the situations, often irresistibly fascinating, while always absolutely individual. The success of *Roméo* in Paris was great from the outset, and eventually this work was transferred to the Grand Opéra, after having for some time formed part of the répertoire of the Opéra Comique. In London it was not until the part of Romeo was sung by Jean de Reszke that this opera obtained any real hold upon the English public.

After having so successfully sought for inspiration from Molière, Goethe and Shakespeare, Gounod now turned to another famous dramatist, and selected Pierre Corneille's *Polyeucte* as the subject of his next opera. Some years were, however, to elapse before this work was given to the public. The Franco-German War had broken out, and Gounod was compelled to take refuge in London, where he composed the "biblical elegy" *Gallia* for the inauguration of the Royal Albert Hall. During his stay in London Gounod composed a great deal and wrote a number of songs to English words, many of which have attained an enduring popularity, such as "Maid of Athens," "There is a green hill far away," "Oh that we two were maying," "The fountain mingles with the river." His sojourn in London was not altogether pleasant, as he was embroiled in lawsuits with publishers. On Gounod's return to Paris he hurriedly set to music an operatic version of Alfred de Vigny's *Cinq-Mars*, which was given at the Opéra Comique on the 5th of April 1877 (and in London in 1900), without obtaining much success. *Polyeucte*, his much-cherished work, appeared at the Grand Opéra the following year on the 7th of October, and did not meet with a better fate. Neither was Gounod more fortunate with *Le Tribut de Zamora*, his last opera, which, given on the same stage in 1881, speedily vanished, never to reappear. In his later dramatic works he had, unfortunately, made no attempt to keep up with the times, preferring to revert to old-fashioned methods.

The genius of the great composer was, however, destined to assert itself in another field—that of sacred music. His friend Camille Saint-Saëns, in a volume entitled *Portraits et Souvenirs*, writes:

> Gounod did not cease all his life to write for the church, to accumulate masses and motetts; but it was at the commencement of his career, in the *Messe de Sainte Cécile*, and at the end, in the oratorios *The Redemption and Mors et vita*, that he rose highest.

Saint-Saëns, indeed, has formulated the opinion that the three above-mentioned works will survive all the master's operas. Among the many masses composed by Gounod at the outset of his career, the best is the *Messe de Sainte Cécile*, written in 1855. He also wrote the *Messe du Sacré Cœur* (1876) and the *Messe à la mémoire de Jeanne d'Arc* (1887). This last work offers certain peculiarities, being written for solos, chorus, organ, eight trumpets, three trombones, and harps. In style it has a certain affinity with Palestrina. *The Redemption*, which seems to have acquired a permanent footing in Great Britain, was produced at the Birmingham Festival of 1882. It was styled a sacred trilogy, and was dedicated to Queen Victoria. The score is prefixed by a commentary written by the composer, in which the scope of the oratorio is explained. It cannot be said that Gounod has altogether risen to the magnitude of his task. The music of *The Redemption* bears the unmistakable imprint of the composer's hand, and contains many beautiful thoughts, but the work in its entirety is not exempt from monotony. *Mors et vita*, a sacred trilogy dedicated to Pope Leo XIII., was also produced for the first time in Birmingham at the Festival of 1885. This work is divided into three parts, "Mors," "Judicium," "Vita." The first consists of a Requiem, the second depicts the Judgment, the third Eternal Life. Although quite equal, if

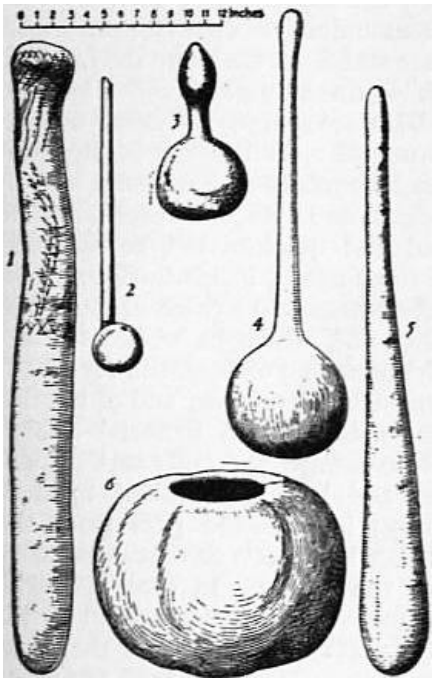
not superior to *The Redemption*, *Mors et vita* has not obtained similar success.

Gounod was a great worker, an indefatigable writer, and it would occupy too much space to attempt even an incomplete catalogue of his compositions. Besides the works already mentioned may be named two symphonies which were played during the 'fifties, but have long since fallen into neglect. Symphonic music was not Gounod's forte, and the French master evidently recognized the fact, for he made no further attempts in this style. The incidental music he wrote to the dramas *Les Deux Reines* and *Jeanne d'Arc* must not be forgotten. He also attempted to set Molière's comedy, *Georges Dandin*, to music, keeping to the original prose. This work has never been brought out. Gounod composed a large number of songs, many of which are very beautiful. One of the vocal pieces that have contributed most to his popularity is the celebrated *Meditation on the First Prelude of Bach*, more widely known as the *Ave Maria*. The idea of fitting a melody to the Prelude of Bach was original, and it must be admitted that in this case the experiment was successful.

Gounod died at St Cloud on the 18th of October 1893. His influence on French music was immense, though during the last years of the 19th century it was rather counterbalanced by that of Wagner. Whatever may be the verdict of posterity, it is unlikely that the quality of individuality will be denied to Gounod. To be the composer of *Faust* is alone a sufficient title to lasting fame.

(A. He.)

GOURD, a name given to various plants of the order *Cucurbitaceae*, especially those belonging to the genus *Cucurbita*, monoecious trailing herbs of annual duration, with long succulent stems furnished with tendrils, and large, rough, palmately-lobed leaves; the flowers are generally large and of a bright yellow or orange colour, the barren ones with the stamens united; the fertile are followed by the large succulent fruit that gives the gourds their chief economic value. Many varieties of *Cucurbita* are under cultivation in tropical and temperate climates, especially in southern Asia; but it is extremely difficult to refer them to definite specific groups, on account of the facility with which they hybridize; while it is very doubtful whether any of the original forms now exist in the wild state. Charles Naudin, who made a careful and interesting series of observations upon this genus, came to the conclusion that all varieties known in European gardens might be referred to six original species; probably three, or at most four, have furnished the edible kinds in ordinary cultivation. Adopting the specific names usually given to the more familiar forms, the most important of the gourds, from an economic point of view, is perhaps *C. maxima*, the *Potiron Jaune* of the French, the red and yellow gourd of British gardeners (fig. 6), the spheroidal fruit of which is remarkable for its enormous size: the colour of the somewhat rough rind varies from white to bright yellow, while in some kinds it remains green; the fleshy interior is of a deep yellow or orange tint. This valuable gourd is grown extensively in southern Asia and Europe. In Turkey and Asia Minor it yields, at some periods of the year, an important article of diet to the people; immense quantities are sold in the markets of Constantinople, where in the winter the heaps of one variety with a white rind are described as resembling mounds of snowballs. The yellow kind attains occasionally a weight of upwards of 240 lb. It grows well in Central Europe and the United States, while in the south of England it will produce its gigantic fruit in perfection in hot summers. The yellow flesh of this gourd and its numerous varieties yields a considerable amount of nutriment, and is the more valuable as the fruit can be kept, even in warm climates, for a long time. In France and in the East it is much used in



Photographed from specimens in the British Museum.

Group of Gourds.

1-5. Various forms of bottle gourd, *Lagenaria vulgaris*.
6. Giant gourd, *Cucurbita maxima*.

soups and ragouts, while simply boiled it forms a substitute for other table vegetables; the taste has been compared to that of a young carrot. In some countries the larger kinds are employed as cattle food. The seeds yield by expression a large quantity of a bland oil, which is used for the same purposes as that of the poppy and olive. The “mammoth” gourds of English and American gardeners (known in America as squashes) belong to this species. The pumpkin (summer squash of America) is *Cucurbita Pepo*. Some of the varieties of *C. maxima* and Pepo contain a considerable quantity of sugar, amounting in the sweetest kinds to 4 or 5%, and in the hot plains of Hungary efforts have been made to make use of them as a commercial source of sugar. The young shoots of both these large gourds may be given to cattle, and admit of being eaten as a green vegetable when boiled. The vegetable marrow is a variety (*ovifera*) of *C. Pepo*. Many smaller gourds are cultivated in India and other hot climates, and some have been introduced into English gardens, rather for the beauty of their fruit and foliage than for their esculent qualities. Among these is *C. Pepo* var. *aurantia*, the orange gourd, bearing a spheroidal fruit, like a large orange in form and colour; in Britain it is generally too bitter to be palatable, though applied to culinary purposes in Turkey and the Levant. *C. Pepo* var. *pyriformis* and var. *verrucosa*, the warted gourds, are likewise occasionally eaten, especially in the immature state; and *C. moschata* (musk melon) is very extensively cultivated throughout India by the natives, the yellow flesh being cooked and eaten.

The bottle-gourds are placed in a separate genus, *Lagenaria*, chiefly differing from *Cucurbita* in the anthers being free instead of adherent. The bottle-gourd properly so-called, *L. vulgaris*, is a climbing plant with downy, heart-shaped leaves and beautiful white flowers: the remarkable fruit (figs. 1-5) first begins to grow in the form of an elongated cylinder, but gradually widens towards the extremity, until, when ripe, it resembles a flask with a narrow neck and large rounded bulb; it sometimes attains a length of 7 ft. When ripe, the pulp is removed from the neck, and the interior cleared by leaving water standing in it; the woody rind that remains is used as a bottle: or the lower part is cut off and cleared out, forming a basin-like vessel applied to the same domestic purposes as the calabash (*Crescentia*) of the West Indies: the smaller varieties, divided lengthwise, form spoons. The ripe fruit is apt to be bitter and cathartic, but while immature it is eaten by the Arabs and Turks. When about the size of a small cucumber, it is stuffed with rice and minced meat, flavoured with pepper, onions, &c., and then boiled, forming a favourite dish with Eastern epicures. The elongated snake-gourds of India and China (*Trichosanthes*) are used in curries and stews.

All the true gourds have a tendency to secrete the cathartic principle *colocynthin*, and in many varieties of *Cucurbita* and the allied genera it is often elaborated to such an extent as to render them unwholesome, or even poisonous. The seeds of several species therefore possess some anthelmintic properties; those of the common pumpkin are frequently administered in America as a vermifuge.

The cultivation of gourds began far beyond the dawn of history, and the esculent species have become so modified by culture that the original plants from which they have descended can no longer be traced. The abundance of varieties in India would seem to indicate that part of Asia as the birthplace of the present edible forms; but some appear to have been cultivated in all the hotter regions of that continent, and in North Africa, from the earliest ages, while the Romans were familiar with at least certain kinds of *Cucurbita*, and with the bottle-gourd. *Cucurbita Pepo*, the source of many of the American forms, is probably a native of that continent.

> Most of the annual gourds may be grown successfully in Britain. They are usually raised in hotbeds or under frames, and planted out in rich soil in the early summer as soon as the nights become warm. The more ornamental kinds may be trained over trellis-work, a favourite mode of displaying them in the East; but the situation must be sheltered and sunny. Even *Lagenaria* will sometimes produce fine fruit when so treated in the southern counties.
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> For an account of these cultivations in England see paper by Mr J. W. Odell, “Gourds and Cucurbits,” in *Journ. Royal Hort. Soc.* xxix. 450 (1904).

GOURGAUD, GASPAR, Baron (1783-1852), French soldier, was born at Versailles on the 14th of September 1783; his father was a musician of the royal chapel. At school he showed talent in mathematical studies and accordingly entered the artillery. In 1802 he became

junior lieutenant, and thereafter served with credit in the campaigns of 1803-1805, being wounded at Austerlitz. He was present at the siege of Saragossa in 1808, but returned to service in Central Europe and took part in nearly all the battles of the Danubian campaign of 1809. In 1811 he was chosen to inspect and report on the fortifications of Danzig. Thereafter he became one of the ordnance officers attached to the emperor, whom he followed closely through the Russian campaign of 1812; he was one of the first to enter the Kremlin and discovered there a quantity of gunpowder which might have been used for the destruction of Napoleon. For his services in this campaign he received the title of baron, and became first ordnance officer. In the campaign of 1813 in Saxony he further evinced his courage and prowess, especially at Leipzig and Hanau; but it was in the first battle of 1814, near to Brienne, that he rendered the most signal service by killing the leader of a small band of Cossacks who were riding furiously towards Napoleon's tent. Wounded at the battle of Montmirail, he yet recovered in time to share in several of the conflicts which followed, distinguishing himself especially at Laon and Reims. Though enrolled among the royal guards of Louis XVIII. in the summer of 1814, he yet embraced the cause of Napoleon during the Hundred Days (1815), was named general and aide-de-camp by the emperor, and fought at Waterloo.

After the second abdication of the emperor (June 22nd, 1815) Gourgaud retired with him and a few other companions to Rochefort. It was to him that Napoleon entrusted the letter of appeal to the prince regent for an asylum in England. Gourgaud set off in H.M.S. "Slaney," but was not allowed to land in England. He determined to share Napoleon's exile and sailed with him on H.M.S. "Northumberland" to St Helena. The ship's secretary, John R. Glover, has left an entertaining account of some of Gourgaud's gasconnades at table. His extreme sensitiveness and vanity soon brought him into collision with Las Cases and Montholon at Longwood. The former he styles in his journal a "Jesuit" and a scribbler who went thither in order to become famous. With Montholon, his senior in rank, the friction became so acute that he challenged him to a duel, for which he suffered a sharp rebuke from Napoleon. Tiring of the life at Longwood and the many slights which he suffered from Napoleon, he desired to depart, but before he could sail he spent two months with Colonel Basil Jackson, whose account of him throws much light on his character, as also on the "policy" adopted by the exiles at Longwood. In England he was gained over by members of the Opposition and thereafter made common cause with O'Meara and other detractors of Sir Hudson Lowe, for whose character he had expressed high esteem to Basil Jackson. He soon published his *Campagne de 1815*, in the preparation of which he had had some help from Napoleon; but Gourgaud's *Journal de Ste-Hélène* was not destined to be published till the year 1899. Entering the arena of letters, he wrote, or collaborated in, two well-known critiques. The first was a censure of Count P. de Ségur's work on the campaign of 1812, with the result that he fought a duel with that officer and wounded him. He also sharply criticized Sir Walter Scott's *Life of Napoleon*. He returned to active service in the army in 1830; and in 1840 proceeded with others to St Helena to bring back the remains of Napoleon to France. He became a deputy to the Legislative Assembly in 1849; he died in 1852.

Gourgaud's works are *La Campagne de 1815* (London and Paris, 1818); *Napoléon et la Grande Armée en Russie; examen critique de l'ouvrage de M. le comte P. de Ségur* (Paris, 1824); *Réfutation de la vie de Napoléon par Sir Walter Scott* (Paris, 1827). He collaborated with Montholon in the work entitled *Mémoires pour servir à l'histoire de France sous Napoléon* (Paris, 1822-1823), and with Belliard and others in the work entitled *Bourrienne et ses erreurs* (2 vols., Paris, 1830); but his most important work is the *Journal inédit de Ste-Hélène* (2 vols., Paris, 1899), which is a remarkably naïf and life-like record of the life at Longwood. See, too, *Notes and Reminiscences of a Staff Officer*, by Basil Jackson (London, 1904), and the bibliography to the article Lowe, Sir Hudson.

(J. Hl. R.)

GOURKO, JOSEPH VLADIMIROVICH, Count (1828-1901), Russian general, was born, of Lithuanian extraction, on the 15th of November 1828. He was educated in the imperial corps of pages, entered the hussars of the imperial bodyguard as sub-lieutenant in 1846, became captain in 1857, adjutant to the emperor in 1860, colonel in 1861, commander of the 4th Hussar regiment of Mariupol in 1866, and major-general of the emperor's suite in 1867. He subsequently commanded the grenadier regiment, and in 1873 the 1st brigade, 2nd division, of the cavalry of the guard. Although he took part in the Crimean War, being stationed at

Belbek, his claim to distinction is due to his services in the Turkish war of 1877. He led the van of the Russian invasion, took Trnovo on the 7th July, crossed the Balkans by the Hain Bogaz pass, debouching near Hainkioi, and, notwithstanding considerable resistance, captured Uflani, Maglish and Kazanlyk; on the 18th of July he attacked Shipka, which was evacuated by the Turks on the following day. Thus within sixteen days of crossing the Danube Gourko had secured three Balkan passes and created a panic at Constantinople. He then made a series of successful reconnaissances of the Tunja valley, cut the railway in two places, occupied Stara Zagora (Turkish, Eski Zagra) and Nova Zagora (Yeni Zagra), checked the advance of Suleiman's army, and returned again over the Balkans. In October he was appointed commander of the allied cavalry, and attacked the Plevna line of communication to Orkhanie with a large mixed force, captured Gorni-Dubnik, Telische and Vratza, and, in the middle of November, Orkhanie itself. Plevna was isolated, and after its fall in December Gourko led the way amidst snow and ice over the Balkans to the fertile valley beyond, totally defeated Suleiman, and occupied Sophia, Philippopolis and Adrianople, the armistice at the end of January 1878 stopping further operations (see Russo-Turkish Wars). Gourko was made a count, and decorated with the 2nd class of St George and other orders. In 1879-1880 he was governor of St Petersburg, and from 1883 to 1894 governor-general of Poland. He died on the 29th of January 1901.

GOURMET, a French term for one who takes a refined and critical, or even merely theoretical pleasure in good cooking and the delights of the table. The word has not the disparaging sense attached to the Fr. *gourmand*, to whom the practical pleasure of good eating is the chief end. The O. Fr. *groumet* or *gromet* meant a servant, or shop-boy, especially one employed in a wine-seller's shop, hence an expert taster of wines, from which the modern usage has developed. The etymology of gourmet is obscure; it may be ultimately connected with the English "groom" (*q.v.*). The origin of *gourmand* is unknown. In English, in the form "grummet," the word was early applied to a cabin or ship's boy. Ships of the Cinque Ports were obliged to carry one "grummet"; thus in a charter of 1229 (quoted in the *New English Dictionary*) it is laid down *servitia inde debita Domino Regi, xxi. naves, et in qualibet nave xxi. homines, cum uno gartione qui dicitur gromet*.

GOUROCK, a police burgh and watering-place of Renfrewshire, Scotland, on the southern shore of the Firth of Clyde, 3¼ m. W. by N. of Greenock by the Caledonian railway. Pop. (1901) 5261. It is partly situated on a fine bay affording good anchorage, for which it is largely resorted to by the numerous yacht clubs of the Clyde. The extension of the railway from Greenock (in 1889) to the commodious pier, with a tunnel 1⅓ m. long, the longest in Scotland, affords great facilities for travel to the ports of the Firth, the sea lochs on the southern Highland coast and the Crinan Canal. The eminence called Barrhill (480 ft. high) divides the town into two parts, the eastern known as Kempoch, the western as Ashton. Near Kempoch point is a monolith of mica-schist, 6 ft. high, called "Granny Kempoch," which the superstitious of other days regarded as possessing influence over the winds, and which was the scene, in 1662, of certain rites that led to the celebrants being burned as witches. Gamble Institute (named after the founder) contains halls, recreation rooms, a public library and baths. It is said that Gourock was the first place on the Clyde where herrings were cured. There is tramway communication with Greenock and Ashton. About 3 m. S.W. there stands on the shore the familiar beacon of the Cloch. Gourock became a burgh of barony in 1694.

GOURVILLE, JEAN HERAULD (1625-1703), French adventurer, was born at La

Rochefoucauld. At the age of eighteen he entered the house of La Rochefoucauld as a servant, and in 1646 became secretary to François de la Rochefoucauld, author of the *Maximes*. Resourceful and quick-witted, he rendered services to his master during the Fronde, in his intrigues with the parliament, the court or the princes. In these negotiations he made the acquaintance of Condé, whom he wished to help to escape from the château of Vincennes; of Mazarin, for whom he negotiated the reconciliation with the princes; and of Nicolas Fouquet. After the Fronde he engaged in financial affairs, thanks to Fouquet. In 1658 he farmed the *taille* in Guienne. He bought depreciated *rentes* and had them raised to their nominal value by the treasury; he extorted gifts from the financiers for his protection, being Fouquet's confidant in many operations of which he shared the profits. In three years he accumulated an enormous fortune, still further increased by his unfailing good fortune at cards, playing even with the king. He was involved in the trial of Fouquet, and in April 1663 was condemned to death for peculation and embezzlement of public funds; but escaping, was executed in effigy. He sent a valet one night to take the effigy down from the gallows in the court of the Palais de Justice, and then fled the country. He remained five years abroad, being excepted in 1665 from the amnesty accorded by Louis XIV. to the condemned financiers. Having returned secretly to France, he entered the service of Condé, who, unable to meet his creditors, had need of a clever manager to put his affairs in order. In this way he was able to reappear at court, to assist at the campaigns of the war with Holland, and to offer himself for all the delicate negotiations for his master or the king. He received 289
diplomatic missions in Germany, in Holland, and especially in Spain, though it was only in 1694, that he was freed from the condemnation pronounced against him by the chamber of justice. From 1696 he fell ill and withdrew to his estate, where he dictated to his secretary, in four months and a half, his *Mémoires*, an important source for the history of his time. In spite of several errors, introduced purposely, they give a clear idea of the life and morals of a financier of the age of Fouquet, and throw light on certain points of the diplomatic history. They were first published in 1724.

There is a modern edition, with notes, an introduction and appendix, by Lecestre (Paris, 1894-1895, 2 vols.).

GOUT, the name rather vaguely given, in medicine, to a constitutional disorder which manifests itself by inflammation of the joints, with sometimes deposition of urates of soda, and also by morbid changes in various important organs. The term gout, which was first used about the end of the 13th century, is derived through the Fr. *goutte* from the Lat. *gutta*, a drop, in allusion to the old pathological doctrine of the dropping of a morbid material from the blood within the joints. The disease was known and described by the ancient Greek physicians under various terms, which, however, appear to have been applied by them alike to rheumatism and gout. The general term *arthritis* (ἄρθρον, a joint) was employed when many joints were the seat of inflammation; while in those instances where the disease was limited to one part the terms used bore reference to such locality; hence *podagra* (ποδάγρα, from πούς, the foot, and ἄγρα, a seizure), *chiragra* (χείρ, the hand), *gonagra* (γόνυ, the knee), &c.

Hippocrates in his *Aphorisms* speaks of gout as occurring most commonly in spring and autumn, and mentions the fact that women are less liable to it than men. He also gives directions as to treatment. Celsus gives a similar account of the disease. Galen regarded gout as an unnatural accumulation of humours in a part, and the chalk-stones as the concretions of these, and he attributed the disease to over-indulgence and luxury. Gout is alluded to in the works of Ovid and Pliny, and Seneca, in his 95th epistle, mentions the prevalence of gout among the Roman ladies of his day as one of the results of their high living and debauchery. Lucian, in his *Tragopodagra*, gives an amusing account of the remedies employed for the cure of gout.

In all times this disease has engaged a large share of the attention of physicians, from its wide prevalence and from the amount of suffering which it entails. Sydenham, the famous English physician of the 17th century, wrote an important treatise on the subject, and his description of the gouty paroxysm, all the more vivid from his having himself been afflicted with the disease for thirty-four years, is still quoted by writers as the most graphic and exhaustive account of the symptomatology of gout. Subsequently Cullen, recognizing gout as capable of manifesting itself in various ways, divided the disease into *regular gout*, which

affects the joints only, and *irregular gout*, where the gouty disposition exhibits itself in other forms; and the latter variety he subdivided into *atonic gout*, where the most prominent symptoms are throughout referable to the stomach and alimentary canal; *retrocedent gout*, where the inflammatory attack suddenly disappears from an affected joint and serious disturbance takes place in some internal organ, generally the stomach or heart; and *misplaced gout*, where from the first the disease does not appear externally, but reveals itself by an inflammatory attack of some internal part. Dr Garrod, one of the most eminent authorities on gout, adopted a division somewhat similar to, though simpler than that of Cullen, namely, *regular gout*, which affects the joints alone, and is either acute or chronic, and *irregular gout*, affecting non-articular tissues, or disturbing the functions of various organs.

It is often stated that the attack of gout comes on without any previous warning; but, while this is true in many instances, the reverse is probably as frequently the case, and the premonitory symptoms, especially in those who have previously suffered from the disease, may be sufficiently precise to indicate the impending seizure. Among the more common of these may be mentioned marked disorders of the digestive organs, with a feeble and capricious appetite, flatulence and pain after eating, and uneasiness in the right side in the region of the liver. A remarkable tendency to gnashing of the teeth is sometimes observed. This symptom was first noticed by Dr Graves, who connected it with irritation in the urinary organs, which also is present as one of the premonitory indications of the gouty attack. Various forms of nervous disturbance also present themselves in the form of general discomfort, extreme irritability of temper, and various perverted sensations, such as that of numbness and coldness in the limbs. These symptoms may persist for many days and then undergo amelioration immediately before the impending paroxysm. On the night of the attack the patient retires to rest apparently well, but about two or three o’clock in the morning awakes with a painful feeling in the foot, most commonly in the ball of the great toe, but it may be in the instep or heel, or in the thumb. With the pain there often occurs a distinct shivering followed by feverishness. The pain soon becomes of the most agonizing character: in the words of Sydenham, “now it is a violent stretching and tearing of the ligaments, now it is a gnawing pain, and now a pressure and tightening; so exquisite and lively meanwhile is the part affected that it cannot bear the weight of the bedclothes, nor the jar of a person walking in the room.”

When the affected part is examined it is found to be swollen and of a deep red hue. The superjacent skin is tense and glistening, and the surrounding veins are more or less distended. After a few hours there is a remission of the pain, slight perspiration takes place, and the patient may fall asleep. The pain may continue moderate during the day but returns as night advances, and the patient goes through a similar experience of suffering to that of the previous night, followed with a like abatement towards morning. These nocturnal exacerbations occur with greater or less severity during the continuance of the attack, which generally lasts for a week or ten days. As the symptoms decline the swelling and tenderness of the affected joint abate, but the skin over it pits on pressure for a time, and with this there is often associated slight desquamation of the cuticle. During the attacks there is much constitutional disturbance. The patient is restless and extremely irritable, and suffers from cramp in the limbs and from dyspepsia, thirst and constipation. The urine is scanty and high-coloured, with a copious deposit, consisting chiefly of urates. During the continuance of the symptoms the inflammation may leave the one foot and affect the other, or both may suffer at the same time. After the attack is over the patient feels quite well and fancies himself better than he had been for a long time before; hence the once popular notion that a fit of the gout was capable of removing all other ailments. Any such idea, however, is sadly belied in the experience of most sufferers from this disease. It is rare that the first is the only attack of gout, and another is apt to occur within a year, although by care and treatment it may be warded off. The disease, however, undoubtedly tends to take a firmer hold on the constitution and to return. In the earlier recurrences the same joints as were formerly the seat of the gouty inflammation suffer again, but in course of time others become implicated, until in advanced cases scarcely any articulation escapes, and the disease thus becomes chronic. It is to be noticed that when gout assumes this form the frequently recurring attacks are usually attended with less pain than the earlier ones, but their disastrous effects are evidenced alike by the disturbance of various important organs, especially the stomach, liver, kidneys and heart, and by the remarkable changes which take place in the joints from the formation of the so-called chalk-stones or tophi. These deposits, which are highly characteristic of gout, appear at first to take place in the form of a semifluid material, consisting for the most part of urate of soda, which gradually becomes more dense, and ultimately quite hard. When any quantity of this is deposited in the structures of a joint the

effect is to produce stiffening, and, as deposits appear to take place to a greater or less amount in connexion with every attack, permanent thickening and deformity of the parts is apt to be the consequence. The extent of this depends, of course, on the amount of the deposits, which, however, would seem to be in no necessary relation to the severity of the attack, being in some cases even of chronic gout so slight as to be barely appreciable externally, but on the other hand occasionally causing great enlargement of the joints, and fixing them in a flexed or extended position which renders them entirely useless. Dr Garrod describes the appearance of a hand in an extreme case of this kind, and likens its shape to a bundle of French carrots with their heads forward, the nails corresponding to the stalks. Any of the joints may be thus affected, but most commonly those of the hands and feet. The deposits take place in other structures besides those of joints, such as along the course of tendons, underneath the skin and periosteum, in the sclerotic coat of the eye, and especially on the cartilages of the external ear. When largely deposited in joints an abscess sometimes forms, the skin gives way, and the concretion is exposed. Sir Thomas Watson quotes a case of this kind where the patient when playing at cards was accustomed to chalk the score of the game upon the table with his gouty knuckles.

The recognition of what is termed irregular gout is less easy than that form above described, where the disease gives abundant external evidence of its presence; but that other parts than joints suffer from gouty attacks is beyond question. The diagnosis may often be made in cases where in an attack of ordinary gout the disease suddenly leaves the affected joints and some new series of symptoms arises. It has been often observed when cold has been applied to an inflamed joint that the pain and inflammation in the part ceased, but that some sudden and alarming seizure referable to the stomach, brain, heart or lungs supervened. Such attacks, which correspond to what is termed by Cullen retrocedent gout, often terminate favourably, more especially if the disease again returns to the joints. Further, the gouty nature of some long-continued internal or cutaneous disorder may be rendered apparent by its disappearance on the outbreak of the paroxysm in the joints. Gout, when of long standing, is often found associated with degenerative changes in the heart and large arteries, the liver, and especially the kidneys, which are apt to assume the contracted granular condition characteristic of one of the forms of Bright’s disease. A variety of urinary calculus—the uric acid—formed by concretions of this substance in the kidneys is a not unfrequent occurrence in connexion with gout; hence the well-known association of this disease and gravel.

The pathology of gout is discussed in the article on Metabolic Diseases. Many points, however, still remain unexplained. As remarked by Trousseau, “the production in excess of uric acid and urates is a pathological phenomenon inherent like all others in the disease; and like all the others it is dominated by a specific cause, which we know only by its effects, and which we term the gouty diathesis.” This subject of diathesis (habit, or organic predisposition of individuals), which is regarded as an essential element in the pathology of gout, naturally suggests the question as to whether, besides being inherited, such a peculiarity may also be acquired, and this leads to a consideration of the causes which are recognized as influential in favouring the occurrence of this disease.

It is beyond dispute that gout is in a marked degree hereditary, fully more than half the number of cases being, according to Sir C. Scudamore and Dr Garrod, of this character. But it is no less certain that there are habits and modes of life the observance of which may induce the disease even where no hereditary tendencies can be traced, and the avoidance of which may, on the other hand, go far towards weakening or neutralizing the influence of inherited liability. Gout is said to affect the sedentary more readily than the active. If, however, inadequate exercise be combined with a luxurious manner of living, with habitual over-indulgence in animal food and rich dishes, and especially in alcoholic beverages, then undoubtedly the chief factors in the production of the disease are present.

Much has been written upon the relative influence of various forms of alcoholic drinks in promoting the development of gout. It is generally stated that fermented are more injurious than distilled liquors, and that, in particular, the stronger wines, such as port, sherry and madeira, are much more potent in their gout-producing action than the lighter class of wines, such as hock, moselle, &c., while malt liquors are fully as hurtful as strong wines. It seems quite as probable, however, that over-indulgence in any form of alcohol, when associated with the other conditions already adverted to, will have very much the same effect in developing gout. The comparative absence of gout in countries where spirituous liquors are chiefly used, such as Scotland, is cited as showing their relatively slight effect in encouraging that disease; but it is to be noticed that in such countries there is on the whole a less marked tendency to excess in the other pleasures of the table, which in no degree less

than alcohol are chargeable with inducing the gouty habit. Gout is not a common disease among the poor and labouring classes, and when it does occur may often be connected even in them with errors in living. It is not very rare to meet gout in butlers, coachmen, &c., who are apt to live luxuriously while leading comparatively easy lives.

Gout, it must ever be borne in mind, may also affect persons who observe the strictest temperance in living, and whose only excesses are in the direction of over-work, either physical or intellectual. Many of the great names in history in all times have had their existence embittered by this malady, and have died from its effects. The influence of hereditary tendency may often be traced in such instances, and is doubtless called into activity by the depressing consequences of over-work. It may, notwithstanding, be affirmed as generally true that those who lead regular lives, and are moderate in the use of animal food and alcoholic drinks, or still better abstain from the latter altogether, are less likely to be the victims of gout even where an undoubted inherited tendency exists.

Gout is more common in mature age than in the earlier years of life, the greatest number of cases in one decennial period being between the ages of thirty and forty, next between twenty and thirty, and thirdly between forty and fifty. It may occasionally affect very young persons; such cases are generally regarded as hereditary, but, so far as diet is concerned, it has to be remembered that their home life has probably been a predisposing cause. After middle life gout rarely appears for the first time. Women are much less the subjects of gout than men, apparently from their less exposure to the influences (excepting, of course, that of heredity) which tend to develop the disease, and doubtless also from the differing circumstances of their physical constitution. It most frequently appears in females after the cessation of the menses. Persons exposed to the influence of lead poisoning, such as plumbers, painters, &c., are apt to suffer from gout; and it would seem that impregnation of the system with this metal markedly interferes with the uric acid excreting function of the kidneys.

Attacks of gout are readily excited in those predisposed to the disease. Exposure to cold, disorders of digestion, fatigue, and irritation or injuries of particular joints will often precipitate the gouty paroxysm.

With respect to the treatment of gout the greatest variety of opinion has prevailed and practice been pursued, from the numerous quaint nostrums detailed by Lucian to the “expectant” or do-nothing system recommended by Sydenham. But gout, although, as has been shown, a malady of a most severe and intractable character, may nevertheless be successfully dealt with by appropriate medicinal and hygienic measures. The general plan of treatment can be here only briefly indicated. During the acute attack the affected part should be kept at perfect rest, and have applied to it warm opiate fomentations or poultices, or, what answers quite as well, be enveloped in cotton wool covered in with oil silk. The diet of the patient should be light, without animal food or stimulants. The administration of some simple laxative will be of service, as well as the free use of alkaline diuretics, such as the bicarbonate or acetate of potash. The medicinal agent most relied on for the relief of pain is colchicum, which manifestly exercises a powerful action on the disease. This drug (*Colchicum autumnale*), which is believed to correspond to the hermodactyl of the ancients, has proved of such efficacy in modifying the attacks that, as observed by Dr Garrod, “we may safely assert that colchicum possesses as specific a control over the gouty inflammation as cinchona barks or their alkaloids over intermittent fever.” It is usually administered in the form of the wine in doses of 10 to 30 drops every four or six hours, or in pill as the acetous extract (gr. ½-gr. i.). The effect of colchicum in subduing the pain of gout is generally so prompt and marked that it is unnecessary to have recourse to opiates; but its action requires to be carefully watched by the physician from its well-known nauseating and depressing consequences, which, should they appear, render the suspension of the drug necessary. Otherwise the remedy may be continued in gradually diminishing doses for some days after the disappearance of the gouty inflammation. Should gout give evidence of its presence in an irregular form by attacking internal organs, besides the medicinal treatment above mentioned, the use of frictions and mustard applications to the joints is indicated with the view of exciting its appearance there. When gout has become chronic, colchicum, although of less service than in acute gout, is yet valuable, particularly when the inflammatory attacks recur. More benefit, however, appears to be derived from potassium iodide, guaiacum, the alkalis potash and lithia, and from the administration of aspirin and sodium salicylate. Salicylate of menthol is an effective local application, painted on and covered with a gutta-percha bandage. Lithia was strongly recommended by Dr Garrod from its solvent action upon the urates. It is usually administered in the form of the carbonate (gr. v., freely diluted).

The treatment and regimen to be employed in the intervals of the gouty attacks are of the highest importance. These bear reference for the most part to the habits and mode of life of the patient. Restriction must be laid upon the amount and quality of the food, and equally, or still more, upon the alcoholic stimulants. “The instances,” says Sir Thomas Watson, “are not few of men of good sense, and masters of themselves, who, being warned by one visitation of the gout, have thenceforward resolutely abstained from rich living and from wine and strong drinks of all kinds, and who have been rewarded for their prudence and self-denial by complete immunity from any return of the disease, or upon whom, at any rate, its future assaults have been few and feeble.” The same eminent authority adds: “I am sure it is worth any *young* man’s while, who has had the gout, to become a teetotaller.” By those more advanced in life who, from long continued habit, are unable entirely to relinquish the use of stimulants, the strictest possible temperance must be observed. Regular but moderate exercise in the form of walking or riding, in the case of those who lead sedentary lives, is of great advantage, and all over-work, either physical or mental, should be avoided. *Fatiguez la bête, et reposez la tête* is the maxim of an experienced French doctor (Dr Debout d’Estrées of Contrexéville). Unfortunately the complete carrying out of such directions, even by those who feel their importance, is too often rendered difficult or impossible by circumstances of occupation and otherwise, and at most only an approximation can be made. Certain mineral waters and baths (such as those of Vichy, Royat, Contrexéville, &c.) are of undoubted value in cases of gout and arthritis. The particular place must in each case be determined by the physician, and special caution must be observed in recommending this plan of treatment in persons whose gout is complicated by organic disease of any kind.

Dr Alexander Haig’s “uric acid free diet” has found many adherents. His view as regards the pathology is that in gouty persons the blood is less alkaline than in normal, and therefore less able to hold in solution uric acid or its salts, which are retained in the joints. Assuming gout to be a poisoning by animal food (meat, fish, eggs), and by tea, coffee, cocoa and other vegetable alkaloid-containing substances, he recommends an average daily diet excluding these, and containing 24 oz. of breadstuffs (toast, bread, biscuits and puddings) together with 24 oz. of fruit and vegetables (excluding peas, beans, lentils, mushrooms and asparagus); 8 oz. of the breadstuffs may be replaced by 21 oz. of milk or 2 oz. of cheese, butter and oil being taken as required, so that it is not strictly a vegetarian diet.

Precisely the opposite view as to diet has recently been put forward by Professor A. Robin of the Hôpital Beaujon, who says serious mistakes are made in ordering patients to abstain from red meats and take light food, fish, eggs, &c. The common object in view is the diminished output of uric acid. This output is chiefly obtained from food rich in nucleins and in collagenous matters, *i.e.* young white meats, eggs, &c. Consequently the gouty subject ought to restrict himself to the consumption of red meat, beef and mutton, and leave out of his dietary all white meat and internal organs. He should take little hydrocarbons and sugars, and be moderate in fats. Vegetarian diet he regards as a mistake, likewise milk diet, as they tend to weaken the patient. To prevent the formation of uric acid Robin prescribes quinic acid combined with formine or urotropine.

GOUTHIÈRE, PIERRE (1740-1806), French metal worker, was born at Troyes and went to Paris at an early age as the pupil of Martin Cour. During his brilliant career he executed a vast quantity of metal work of the utmost variety, the best of which was unsurpassed by any of his rivals in that great art period. It was long believed that he received many commissions for furniture from the court of Louis XVI., and especially from Marie Antoinette, but recent searches suggest that his work for the queen was confined to bronzes. Gouthière can, however, well bear this loss, nor will his reputation suffer should those critics ultimately be justified who believe that many of the furniture mounts attributed to him were from the hand of Thomire. But if he did not work for the court he unquestionably produced many of the most splendid belongings of the duc d’Aumont, the duchesse de Mazarin and Mme du Barry. Indeed the custom of the beautiful mistress of Louis XV. brought about the financial ruin of the great artist, who accomplished more than any other man for the fame of her château of Louveciennes. When the collection of the duc d’Aumont was sold by auction in Paris in 1782 so many objects mounted by Gouthière were bought for Louis XVI. and Marie Antoinette that it is not difficult to perceive the basis of the belief that they were actually made for the court. The duc’s sale catalogue is, however, in existence, with the names of the purchasers and the prices realized. The auction was almost an apotheosis of Gouthière. The precious lacquer

cabinets, the chandeliers and candelabra, the tables and cabinets in marquetry, the columns and vases in porphyry, jasper and choice marbles, the porcelains of China and Japan were nearly all mounted in bronze by him. More than fifty of these pieces bore Gouthière's signature. The duc d'Aumont's cabinet represented the high-water mark of the chaser's art, and the great prices which were paid for Gouthière's work at this sale are the most conclusive criterion of the value set upon his achievement in his own day. Thus Marie Antoinette paid 12,000 livres for a red jasper bowl or *brûle-parfums* mounted by him, which was then already famous. Curiously enough it commanded only one-tenth of that price at the Fournier sale in 1831; but in 1865, when the marquis of Hertford bought it at the prince de Beauvais's sale, it fetched 31,900 francs. It is now in the Wallace Collection, which contains the finest and most representative gathering of Gouthière's undoubted work. The mounts of gilt bronze, cast and elaborately chased, show satyrs' heads, from which hang festoons of vine leaves, while within the feet a serpent is coiled to spring. A smaller cup is one of the treasures of the Louvre. There too is a bronze clock, signed by "Gouthière, *cizileur et doreur du Roy à Paris*," dated 1771, with a river god, a water nymph symbolizing the Rhône and its tributary the Durance, and a female figure typifying the city of Avignon. Not all of Gouthière's work is of the highest quality, and much of what he executed was from the designs of others. At his best his delicacy, refinement and finish are exceedingly delightful—in his great moments he ranks with the highest alike as artist and as craftsman. The tone of soft dead gold which is found on some of his mounts he is believed to have invented, but indeed the gilding of all his superlative work possesses a remarkable quality. This charm of tone is admirably seen in the bronzes and candelabra which he executed for the chimney-piece of Marie Antoinette's boudoir at Fontainebleau. He continued to embellish Louveciennes for Madame du Barry until the Revolution, and then the guillotine came for her and absolute ruin for him. When her property was seized she owed him 756,000 livres, of which he never received a sol, despite repeated applications to the administrators. "*Réduit à solliciter une place à l'hospice, il mourut dans la misère.*" So it was stated in a lawsuit brought by his sons against du Barry's heirs.

GOUVION SAINT-CYR, LAURENT, Marquis de (1764-1830), French marshal, was born at Toul on the 13th of April 1764. At the age of eighteen he went to Rome with the view of prosecuting the study of painting, but although he continued his artistic studies after his return to Paris in 1784 he never definitely adopted the profession of a painter. In 1792 he was chosen a captain in a volunteer battalion, and served on the staff of General Custine. Promotion rapidly followed, and in the course of two years he had become a general of division. In 1796 he commanded the centre division of Moreau's army in the campaign of the Rhine, and by coolness and sagacity greatly aided him in the celebrated retreat from Bavaria to the Rhine. In 1798 he succeeded Masséna in the command of the army of Italy. In the following year he commanded the left wing of Jourdan's army in Germany; but when Jourdan was succeeded by Masséna, he joined the army of Moreau in Italy, where he distinguished himself in face of the great difficulties that followed the defeat of Novi. When Moreau, in 1800, was appointed to the command of the army of the Rhine, Gouvion St-Cyr was named his principal lieutenant, and on the 9th of May gained a victory over General Kray at Biberach. He was not, however, on good terms with his commander and retired to France after the first operations of the campaign. In 1801 he was sent to Spain to command the army intended for the invasion of Portugal, and was named grand officer of the Legion of Honour. When a treaty of peace was shortly afterwards concluded with Portugal, he succeeded Lucien Bonaparte as ambassador at Madrid. In 1803 he was appointed to the command of an army corps in Italy, in 1805 he served with distinction under Masséna, and in 1806 was engaged in the campaign in southern Italy. He took part in the Prussian and Polish campaigns of 1807, and in 1808, in which year he was made a count, he commanded an army corps in Catalonia; but, not wishing to comply with certain orders he received from Paris (for which see Oman, *Peninsular War*, vol. iii.), he resigned his command and remained in disgrace till 1811. He was still a general of division, having been excluded from the first list of marshals owing to his action in refusing to influence the troops in favour of the establishment of the Empire. On the opening of the Russian campaign he received command of an army corps, and on the 18th of August 1812 obtained a victory over the Russians at Polotsk, in recognition of which he was created a marshal of France. He received a severe wound in one of the actions during the general retreat. St-Cyr distinguished himself at the

battle of Dresden (August 26-27, 1813), and in the defence of that place against the Allies after the battle of Leipzig, capitulating only on the 11th of November, when Napoleon had retreated to the Rhine. On the restoration of the Bourbons he was created a peer of France, and in July 1815 was appointed war minister, but resigned his office in the November following. In June 1817 he was appointed minister of marine, and in September following again resumed the duties of war minister, which he continued to discharge till November 1819. During this time he effected many reforms, particularly in respect of measures tending to make the army a national rather than a dynastic force. He exerted himself also to safeguard the rights of the old soldiers of the Empire, organized the general staff and revised the code of military law and the pension regulations. He was made a marquess in 1817. He died at Hyères (Var) on the 17th of March 1830. Gouvion St-Cyr would doubtless have obtained better opportunities of acquiring distinction had he shown himself more blindly devoted to the interests of Napoleon, but Napoleon paid him the high compliment of referring to his “military genius,” and entrusted him with independent commands in secondary theatres of war. It is doubtful, however, if he possessed energy commensurate with his skill, and in Napoleon’s modern conception of war, as three parts moral to one technical, there was more need for the services of a bold leader of troops whose “doctrine”—to use the modern phrase—predisposed him to self-sacrificing and vigorous action, than for a *savant* in the art of war of the type of St-Cyr. Contemporary opinion, as reflected by Marbot, did justice to his “commanding talents,” but remarked the indolence which was the outward sign of the vague complexity of a mind that had passed beyond the simplicity of mediocrity without attaining the simplicity of genius.

He was the author of the following works, all of the highest value: *Journal des opérations de l’armée de Catalogne en 1808 et 1809* (Paris, 1821); *Mémoires sur les campagnes des armées de Rhin et de Rhin-et-Moselle de 1794 à 1797* (Paris, 1829); and *Mémoires pour servir à l’histoire militaire sous le Directoire, le Consulat, et l’Empire* (1831).

See Gay de Vernon’s *Vie de Gouvion Saint-Cyr* (1857).

GOVAN, a municipal and police burgh of Lanarkshire, Scotland. It lies on the south bank of the Clyde in actual contact with Glasgow, and in a parish of the same name which includes a large part of the city on both sides of the river. Pop. (1891) 61,589; (1901) 76,532. Govan remained little more than a village till 1860, when the growth of shipbuilding and allied trades gave its development an enormous impetus. Among its public buildings are the municipal chambers, combination fever hospital, Samaritan hospital and reception houses for the poor. Elder Park (40 acres) presented to the burgh in 1885 contains a statue of John Elder (1824-1869), the pioneer shipbuilder, the husband of the donor. A statue of Sir William Pearce (1833-1888), another well-known Govan shipbuilder, once M.P. for the burgh, stands at Govan Cross. The Govan lunacy board opened in 1896 an asylum near Paisley. Govan is supplied with Glasgow gas and water, and its tramways are leased by the Glasgow corporation; but it has an electric light installation of its own, and performs all other municipal functions quite independently of the city, annexation to which it has always strenuously resisted. Prince’s Dock lies within its bounds and the shipbuilding yards have turned out many famous ironclads and liners. Besides shipbuilding its other industries are match-making, silk-weaving, hair-working, copper-working, tube-making, weaving, and the manufacture of locomotives and electrical apparatus. The town forms the greater part of the Govan division of Lanarkshire, which returns one member to parliament.

GOVERNMENT (O. Fr. *governement*, mod. *gouvernement*, O. Fr. *governer*, mod. *gouverner*, from Lat. *gubernare*, to steer a ship, guide, rule; cf. Gr. κυβερνᾶν), in its widest sense, the ruling power in a political society. In every society of men there is a determinate body (whether consisting of one individual or a few or many individuals) whose commands the rest of the community are bound to obey. This sovereign body is what in more popular phrase is termed the government of the country, and the varieties which may exist in its constitution are known as forms of government. For the opposite theory of a community with

"no government," see Anarchism.

How did government come into existence? Various answers to this question have at times been given, which may be distinguished broadly into three classes. The first class would comprehend the legendary accounts which nations have given in primitive times of their own forms of government. These are always attributed to the mind of a single lawgiver. The government of Sparta was the invention of Lycurgus. Solon, Moses, Numa and Alfred in like manner shaped the government of their respective nations. There was no curiosity about the institutions of other nations—about the origin of governments in general; and each nation was perfectly ready to accept the traditional νομοθέται of any other.

The second may be called the logical or metaphysical account of the origin of government. It contained no overt reference to any particular form of government, whatever its covert references may have been. It answered the question, how government in general came into existence; and it answered it by a logical analysis of the elements of society. The phenomenon to be accounted for being government and laws, it abstracted government and laws, and contemplated mankind as existing without them. The characteristic feature of this 293
kind of speculation is that it reflects how contemporary men would behave if all government were removed, and infers that men must have behaved so before government came into existence. Society without government resolves itself into a number of individuals each following his own aims, and therefore, in the days before government, each man followed his own aims. It is easy to see how this kind of reasoning should lead to very different views of the nature of the supposed original state. With Hobbes, it is a state of war, and government is the result of an agreement among men to keep the peace. With Locke, it is a state of liberty and equality,—it is not a state of war; it is governed by its own law,—the law of nature, which is the same thing as the law of reason. The state of nature is brought to an end by the voluntary agreement of individuals to surrender their natural liberty and submit themselves to one supreme government. In the words of Locke, "Men being by nature all free, equal and independent, no one can be put out of this estate and subjected to the political power of another without his own consent. The only way whereby any one divests himself of his natural liberty, and puts on the *bonds of civil society*, is by agreeing with other men to join and unite into a community" (*On Civil Government*, c. viii.). Locke boldly defends his theory as founded on historical fact, and it is amusing to compare his demonstration of the baselessness of Sir R. Filmer's speculations with the scanty and doubtful examples which he accepts as the foundation of his own. But in general the various forms of the hypothesis eliminate the question of time altogether. The original contract from which government sprang is likewise the subsisting contract on which civil society continues to be based. The historical weakness of the theory was probably always recognized. Its logical inadequacy was conclusively demonstrated by John Austin. But it still clings to speculations on the principles of government.

The "social compact" (see Rousseau) is the most famous of the metaphysical explanations of government. It has had the largest history, the widest influence and the most complete development. To the same class belong the various forms of the theory that governments exist by divine appointment. Of all that has been written about the divine right of kings, a great deal must be set down to the mere flatteries of courtiers and ecclesiastics. But there remains a genuine belief that men are bound to obey their rulers because their rulers have been appointed by God. Like the social compact, the theory of divine appointment avoided the question of historical fact.

The application of the historical method to the phenomena of society has changed the aspect of the question and robbed it of its political interest. The student of the history of society has no formula to express the law by which government is born. All that he can do is to trace governmental forms through various stages of social development. The more complex and the larger the society, the more distinct is the separation between the governing part and the rest, and the more elaborate is the subdivision of functions in the government. The primitive type of ruler is king, judge, priest and general. At the same time, his way of life differs little from that of his followers and subjects. The metaphysical theories were so far right in imputing greater equality of social conditions to more primitive times. Increase of bulk brings with it a more complex social organization. War tends to develop the strength of the governmental organization; peace relaxes it. All societies of men exhibit the germs of government; but there would appear to be races of men so low that they cannot be said to live together in society at all. Modern investigations have illustrated very fully the importance of the family (*q.v.*) in primitive societies, and the belief in a common descent has much to do with the social cohesion of a tribe. The government of a tribe resembles the government of a household; the head of the family is the ruler. But we cannot affirm that

political government has its origin in family government, or that there may not have been states of society in which government of some sort existed while the family did not.

I. Forms of Government

Three Standard Forms.—Political writers from the time of Aristotle have been singularly unanimous in their classification of the forms of government. There are three ways in which states may be governed. They may be governed by one man, or by a number of men, small in proportion to the whole number of men in the state, or by a number large in proportion to the whole number of men in the state. The government may be a monarchy, an aristocracy or a democracy. The same terms are used by John Austin as were used by Aristotle, and in very nearly the same sense. The determining quality in governments in both writers, and it may safely be said in all intermediate writers, is the numerical relation between the constituent members of the government and the population of the state. There were, of course, enormous differences between the state-systems present to the mind of the Greek philosopher and the English jurist. Aristotle was thinking of the small independent states of Greece, Austin of the great peoples of modern Europe. The unit of government in the one case was a city, in the other a nation. This difference is of itself enough to invalidate all generalization founded on the common terminology. But on one point there is a complete parallel between the politics of Aristotle and the politics of Austin. The Greek cities were to the rest of the world very much what European nations and European colonies are to the rest of the world now. They were the only communities in which the governed visibly took some share in the work of government. Outside the European system, as outside the Greek system, we have only the stereotyped uniformity of despotism, whether savage or civilized. The question of forms of government, therefore, belongs characteristically to the European races. The virtues and defects of monarchy, aristocracy and democracy are the virtues and defects manifested by the historical governments of Europe. The generality of the language used by political writers must not blind us to the fact that they are thinking only of a comparatively small portion of mankind.

Greek Politics.—Aristotle divides governments according to two principles. In all states the governing power seeks either its own advantage or the advantage of the whole state, and the government is bad or good accordingly. In all states the governing power is one man, or a few men or many men. Hence six varieties of government, three of which are bad and three good. Each excellent form has a corresponding depraved form, thus:—

The good government of one (Monarchy) corresponds to the depraved form (Tyranny).

The good government of few (Aristocracy) corresponds to the depraved form (Oligarchy).

The good government of many (Commonwealth) corresponds to the depraved form (Democracy).

The fault of the depraved forms is that the governors act unjustly where their own interests are concerned. The worst of the depraved forms is tyranny, the next oligarchy and the least bad democracy.[1] Each of the three leading types exhibits a number of varieties. Thus in monarchy we have the heroic, the barbaric, the elective dictatorship, the Lacedemonian (hereditary generalship, στρατηγία), and absolute monarchy. So democracy and oligarchy exhibit four corresponding varieties. The best type of democracy is that of a community mainly agricultural, whose citizens, therefore, have not leisure for political affairs, and allow the law to rule. The best oligarchy is that in which a considerable number of small proprietors have the power; here, too, the laws prevail. The worst democracy consists of a larger citizen class having leisure for politics; and the worst oligarchy is that of a small number of very rich and influential men. In both the sphere of law is reduced to a minimum. A good government is one in which as much as possible is left to the laws, and as little as possible to the will of the governor.

The *Politics* of Aristotle, from which these principles are taken, presents a striking picture of the variety and activity of political life in the free communities of Greece. The king and council of heroic times had disappeared, and self-government in some form or other was the general rule. It is to be noticed, however, that the governments of Greece were essentially unstable. The political philosophers could lay down the law of development by which one form of government gives birth to another. Aristotle devotes a large portion of his work to the consideration of the causes of revolutions. The dread of tyranny was kept alive by the facility with which an over-powerful and unscrupulous citizen could seize the whole machinery of government. Communities oscillated between some form of oligarchy and some form of democracy. The security of each was constantly imperilled by the conspiracies of the

opposing factions. Hence, although political life exhibits that exuberant variety of form and expression which characterizes all the intellectual products of Greece, it lacks the quality of persistent progress. Then there was no approximation to a national government, even of the federal type. The varying confederacies and hegemonies are the nearest approach to anything of the kind. What kind of national government would ultimately have arisen if Greece had not been crushed it is needless to conjecture; the true interest of Greek politics lies in the fact that the free citizens were, in the strictest sense of the word, self-governed. Each citizen took his turn at the common business of the state. He spoke his own views in the agora, and from time to time in his own person acted as magistrate or judge. Citizenship in Athens was a liberal education, such as it never can be made under any representative system.

The Government of Rome.—During the whole period of freedom the government of Rome was, in theory at least, municipal self-government. Each citizen had a right to vote laws in his own person in the comitia of the centuries or the tribes. The administrative powers of government were, however, in the hands of a bureaucratic assembly, recruited from the holders of high public office. The senate represented capacity and experience rather than rank and wealth. Without some such instrument the city government of Rome could never have made the conquest of the world. The gradual extension of the citizenship to other Italians changed the character of Roman government. The distant citizens could not come to the voting booths; the device of representation was not discovered; and the comitia fell into the power of the town voters. In the last stage of the Roman republic, the inhabitants of one town wielded the resources of a world-wide empire. We can imagine what would be the effect of leaving to the people of London or Paris the supreme control of the British empire or of France,—irresistible temptation, inevitable corruption. The rabble of the capital learn to live on the rest of the empire.[2] The favour of the effeminate masters of the world is purchased by *panem et circenses*. That capable officers and victorious armies should long be content to serve such masters was impossible. A conspiracy of generals placed itself at the head of affairs, and the most capable of them made himself sole master. Under Caesar, Augustus and Tiberius, the Roman people became habituated to a new form of government, which is best described by the name of Caesarism. The outward forms of republican government remained, but one man united in his own person all the leading offices, and used them to give a seemingly legal title to what was essentially military despotism. There is no more interesting constitutional study than the chapters in which Tacitus traces the growth of the new system under the subtle and dissimulating intellect of Tiberius. The new Roman empire was as full of fictions as the English constitution of the present day. The master of the world posed as the humble servant of a menial senate. Deprecating the outward symbols of sovereignty, he was satisfied with the modest powers of a consul or a tribunus plebis. The reign of Tiberius, little capable as he was by personal character of captivating the favour of the multitude, did more for imperialism than was done by his more famous predecessors. Henceforward free government all over the world lay crushed beneath the military despotism of Rome. Caesarism remained true to the character imposed upon it by its origin. The Caesar was an elective not an hereditary king. The real foundation of his power was the army, and the army in course of time openly assumed the right of nominating the sovereign. The characteristic weakness of the Roman empire was the uncertainty of the succession. The nomination of a Caesar in the lifetime of the emperor was an ineffective remedy. Rival emperors were elected by different armies; and nothing less than the force of arms could decide the question between them.

Modern Governments.—Feudalism.—The Roman empire bequeathed to modern Europe the theory of universal dominion. The nationalities which grew up after its fall arranged themselves on the basis of territorial sovereignty. Leaving out of account the free municipalities of the middle ages, the problem of government had now to be solved, not for small urban communities, but for large territorial nations. The medieval form of government was feudal. One common type pervaded all the relations of life. The relation of king and lord was like the relation between lord and vassal (see Feudalism). The bond between them was the tenure of land. In England there had been, before the Norman Conquest, an approximation to a feudal system. In the earlier English constitution, the most striking features were the power of the witan, and the common property of the nation in a large portion of the soil. The steady development of the power of the king kept pace with the aggregation of the English tribes under one king. The conception that the land belonged primarily to the people gave way to the conception that everything belonged primarily to the king.[3] The Norman Conquest imposed on England the already highly developed feudalism of France, and out of this feudalism the free governments of modern Europe have grown. One or two of the leading steps in this process may be indicated here. The first, and perhaps the

most important, was the device of representation. For an account of its origin, and for instances of its use in England before its application to politics, we must be content to refer to Stubbs's *Constitutional History*, vol. ii. The problem of combining a large area of sovereignty with some degree of self-government, which had proved fatal to ancient commonwealths, was henceforward solved. From that time some form of representation has been deemed essential to every constitution professing, however remotely, to be free.

The connexion between representation and the feudal system of estates must be shortly noticed. The feudal theory gave the king a limited right to military service and to certain aids, both of which were utterly inadequate to meet the expenses of the government, especially in time of war. The king therefore had to get contributions from his people, and he consulted them in their respective orders. The three estates were simply the three natural divisions of the people, and Stubbs has pointed out that, in the occasional treaties between a necessitous king and the order of merchants or lawyers, we have examples of inchoate estates or sub-estates of the realm. The right of representation was thus in its origin a right to consent to taxation. The pure theory of feudalism had from the beginning been broken by William the Conqueror causing all free-holders to take an oath of direct allegiance to himself. The institution of parliaments, and the association of the king's smaller tenants *in capite* with other commoners, still further removed the government from the purely feudal type in which the mesne lord stands between the inferior vassal and the king.

Parliamentary Government.—The English System.—The right of the commons to share the power of the king and lords in legislation, the exclusive right of the commons to impose taxes, the disappearance of the clergy as a separate order, were all important steps in the movement towards popular government. The extinction of the old feudal nobility in the dynastic wars of the 15th century simplified the question by leaving the crown face to face with parliament. The immediate result was no doubt an increase in the power of the crown, which probably never stood higher than it did in the reigns of Henry VIII. and Elizabeth; but even these powerful monarchs were studious in their regard for parliamentary conventionalities. After a long period of speculative controversy and civil war, the settlement of 1688 established limited monarchy as the government of England. Since that time the external form of government has remained unchanged, and, so far as legal description goes, the constitution of William III. might be taken for the same system as that which still exists. The silent changes have, however, been enormous. The most striking of these, and that which has produced the most salient features of the English system, is the growth of cabinet government. Intimately connected with this is the rise of the two great historical parties of English politics. The normal state of government in England is that the cabinet of the day shall represent that which is, for the time, the stronger of the two. Before the Revolution the king's ministers had begun to act as a united body; but even after the Revolution the union was still feeble and fluctuating, and each individual minister was bound to the others only by the tie of common service to the king. Under the Hanoverian sovereigns the ministry became consolidated, the position of the cabinet became definite, and its dependence on parliament, and more particularly on the House of Commons, was established. Ministers were chosen exclusively from one house or the other, and they assumed complete responsibility for every act done in the name of the crown. The simplicity of English politics has divided parliament into the representatives of two parties, and the party in opposition has been steadied by the consciousness that it, too, has constitutional functions of high importance, because at any moment it may be called to provide a ministry. Criticism is sobered by being made responsible. Along with this movement went the withdrawal of the personal action of the sovereign in politics. No king has attempted to veto a bill since the Scottish Militia Bill was vetoed by Queen Anne. No ministry has been dismissed by the sovereign since 1834. Whatever the power of the sovereign may be, it is unquestionably limited to his personal influence over his ministers. And it must be remembered that since the Reform Act of 1832 ministers have become, in practice, responsible ultimately, not to parliament, but to the House of Commons. Apart, therefore, from democratic changes due to a wider suffrage, we find that the House of Commons, as a body, gradually made itself the centre of the government. Since the area of the constitution has been enlarged, it may be doubted whether the orthodox descriptions of the government any longer apply. The earlier constitutional writers, such as Blackstone and J. L. Delolme, regard it as a wonderful compound of the three standard forms,—monarchy, aristocracy and democracy. Each has its place, and each acts as a check upon the others. Hume, discussing the question "Whether the British government inclines more to absolute monarchy or to a republic," decides in favour of the former alternative. "The tide has run long and with some rapidity to the side of popular government, and is just beginning to turn toward monarchy." And he gives it as his own opinion that absolute monarchy would be the easiest death, the true euthanasia of the

British constitution. These views of the English government in the 18th century may be contrasted with Bagehot's sketch of the modern government as a working instrument.[4]

Leading Features of Parliamentary Government.—The parliamentary government developed by England out of feudal materials has been deliberately accepted as the type of constitutional government all over the world. Its leading features are popular representation more or less extensive, a bicameral legislature, and a cabinet or consolidated ministry. In connexion with all of these, numberless questions of the highest practical importance have arisen, the bare enumeration of which would surpass the limits of our space. We shall confine ourselves to a few very general considerations.

The Two Chambers.—First, as to the double chamber. This, which is perhaps more accidental than any other portion of the British system, has been the most widely imitated. In most European countries, in the British colonies, in the United States Congress, and in the separate states of the Union,[5] there are two houses of legislature. This result has been brought about partly by natural imitation of the accepted type of free government, partly from a conviction that the second chamber will moderate the democratic tendencies of the first. But the elements of the British original cannot be reproduced to order under different conditions. There have, indeed, been a few attempts to imitate the special character of hereditary nobility attaching to the British House of Lords. In some countries, where the feudal tradition is still strong (*e.g.* Prussia, Austria, Hungary), the hereditary element in the upper chambers has survived as truly representative of actual social and economic relations. But where these social conditions do not obtain (*e.g.* in France after the Revolution) the attempt to establish an hereditary peerage on the British model has always failed. For the peculiar solidarity between the British nobility and the general mass of the people, the outcome of special conditions and tendencies, is a result beyond the power of constitution-makers to attain. The British system too, after its own way, has for a long period worked without any serious collision between the Houses,—the standing and obvious danger of the bicameral system. The actual ministers of the day must possess the confidence of the House of Commons; they need not—in fact they often do not—possess the confidence of the House of Lords. It is only in legislation that the Lower House really shares its powers with the Upper; and (apart from any such change in the constitution as was suggested in 1907 by Sir H. Campbell-Bannerman) the constitution possesses, in the unlimited power of nominating peers, a well-understood last resource should the House of Lords persist in refusing important measures demanded by the representatives of the people. In the United Kingdom it is well understood that the real sovereignty lies with the people (the electorate), and the House of Lords recognizes the principle that it must accept a measure when the popular will has been clearly expressed. In all but measures of first-class importance, however, the House of Lords is a real second chamber, and in these there is little danger of a collision between the Houses. There is the widest possible difference between the British and any other second chamber. In the United States the Senate (constituted on the system of equal representation of states) is the more important of the two Houses, and the only one whose control of the executive can be compared to that exercised by the British House of Commons.

The real strength of popular government in England lies in the ultimate supremacy of the House of Commons. That supremacy had been acquired, perhaps to its full extent, before the extension of the suffrage made the constituencies democratic. Foreign imitators, it may be observed, have been more ready to accept a wide basis of representation than to confer real power on the representative body. In all the monarchical countries of Europe, however unrestricted the right of suffrage may be, the real victory of constitutional government has yet to be won. Where the suffrage means little or nothing, there is little or no reason for guarding it against abuse. The independence of the executive in the United States brings that country, from one point of view, more near to the state system of the continent of Europe than to that of the United Kingdom. The people make a more complete surrender of power to the government (State or Federal) than is done in England.

Cabinet Government.—The peculiar functions of the English cabinet are not easily matched in any foreign system. They are a mystery even to most educated Englishmen. The cabinet (*q.v.*) is much more than a body consisting of chiefs of departments. It is the inner council of the empire, the arbiter of national policy, foreign or domestic, the sovereign in commission. The whole power of the House of Commons is concentrated in its hands. At the same time, it has no place whatever in the legal constitution. Its numbers and its constitution are not fixed even by any rule of practice. It keeps no record of its proceedings. The relations of an individual minister to the cabinet, and of the cabinet to its head and creator, the premier, are things known only to the initiated. With the doubtful exception of France, no

other system of government presents us with anything like its equivalent. In the United States, as in the European monarchies, we have a council of ministers surrounding the chief of the state.

Change of Power in the English System.—One of the most difficult problems of government is how to provide for the devolution of political power, and perhaps no other question is so generally and justly applied as the test of a working constitution. If the transmission works smoothly, the constitution, whatever may be its other defects, may at least be pronounced stable. It would be tedious to enumerate all the contrivances which this problem has suggested to political societies. Here, as usual, oriental despotism stands at the bottom of the scale. When sovereign power is imputed to one family, and the law of succession fails to designate exclusively the individual entitled to succeed, assassination becomes almost a necessary measure of precaution. The prince whom chance or intrigue has promoted to the throne of a father or an uncle must make himself safe from his relatives and competitors. Hence the scenes which shock the European conscience when "Amurath an Amurath succeeds." The strong monarchical governments of Europe have been saved from this evil by an indisputable law of succession, which marks out from his infancy the next successor to the throne. The king names his ministers, and the law names the king. In popular or constitutional governments far more elaborate precautions are required. It is one of the real merits of the English constitution that it has solved this problem—in a roundabout way perhaps, after its fashion—but with perfect success. The ostensible seat of power is the throne, and down to a time not long distant the demise of the crown suspended all the other powers of the state. In point of fact, however, the real change of power occurs on a change of ministry. The constitutional practice of the 19th century settled, beyond the reach of controversy, the occasions on which a ministry is bound to retire. It must resign or dissolve when it is defeated[6] in the House of Commons, and if after a dissolution it is beaten again, it must resign without alternative. It may resign if it thinks its majority in the House of Commons not sufficiently large. The dormant functions of the crown now come into existence. It receives back political power from the old ministry in order to transmit it to the new. When the new ministry is to be formed, and how it is to be formed, is also clearly settled by established practice. The outgoing premier names his successor by recommending the king to consult him; and that successor must be the recognized leader of his successful rivals. All this is a matter of custom, not of law; and it is doubtful if any two authorities could agree in describing the custom in language of precision. In theory the monarch may send for any one he pleases, and charge him with the formation of a government; but the ability to form a government restricts this liberty to the recognized head of a party, subject to there being such an individual. It is certain that the intervention of the crown facilitates the transfer of power from one party to another, by giving it the appearance of a mere change of servants. The real disturbance is that caused by the appeal to the electors. A general election is always a struggle between the great political parties for the possession of the powers of government. It may be noted that modern practice goes far to establish the rule that a ministry beaten at the hustings should resign at once without waiting for a formal defeat in the House of Commons.

The English custom makes the ministry dependent on the will of the House of Commons; and, on the other hand, the House of Commons itself is dependent on the will of the ministry. In the last result both depend on the will of the constituencies, as expressed at the general election. There is no fixity in either direction in the tenure of a ministry. It may be challenged at any moment, and it lasts until it is challenged and beaten. And that there should be a ministry and a House of Commons in harmony with each other but out of harmony with the people is rendered all but impossible by the law and the practice as to the duration of parliaments.

Change of Power in the United States.—The United States offers a very different solution of the problem. The American president is at once king and prime minister; and there is no titular superior to act as a conduit-pipe between him and his successor. His crown is rigidly fixed; he can be removed only by the difficult method of impeachment. No hostile vote on matters of legislation can affect his position. But the end of his term is known from the first day of his government; and almost before he begins to reign the political forces of the country are shaping out a new struggle for the succession. Further, a change of government in America means a considerable change in the administrative staff (see Civil Service). The commotion caused by a presidential election in the United States is thus infinitely greater and more prolonged than that caused by a general election in England. A change of power in England affects comparatively few personal interests, and absorbs the attention of the country for a comparatively short space of time. In the United States it is long foreseen and elaborately prepared for, and when it comes it involves the personal fortunes of large

numbers of citizens. And yet the British constitution is more democratic than the American, in the sense that the popular will can more speedily be brought to bear upon the government.

Change of Power in France.—The established practice of England and America may be compared with the constitutionalism of France. Here the problem presents different conditions. The head of the state is neither a premier of the English, nor a president of the American type. He is served by a prime minister and a cabinet, who, like an English ministry, hold office on the condition of parliamentary confidence; but he holds office himself on the same terms, and is, in fact, a minister like the others. So far as the transmission of power from cabinet to cabinet is concerned, he discharges the functions of an English king. But the transmission of power between himself and his successor is protected by no constitutional devices whatever, and experience would seem to show that no such devices are really necessary. Other European countries professing constitutional government appear to follow the English practice. The Swiss republic is so peculiarly situated that it is hardly fair to compare it with any other. But it is interesting to note that, while the rulers of the states are elected annually, the same persons are generally re-elected.

The Relation between Government and Laws.—It might be supposed that, if any general proposition could be established about government, it would be one establishing some constant relation between the form of a government and the character of the laws which it enforces. The technical language of the English school of jurists is certainly of a kind to encourage such a supposition. The entire body of law in force in a country at any moment is regarded as existing solely by the fiat of the governing power. There is no maxim more entirely in the spirit of this jurisprudence than the following:—"The real legislator is not he by whom the law was first ordained, but he by whose will it continues to be law." The whole of the vast repertory of rules which make up the law of England—the rules of practice in the courts, the local customs of a county or a manor, the principles formulated by the sagacity of generations of judges, equally with the statutes for the year, are conceived of by the school of Austin as created by the will of the sovereign and the two Houses of Parliament, or so much of them as would now satisfy the definition of sovereignty. It would be out of place to examine here the difficulties which embarrass this definition, but the statement we have made carries on its face a demonstration of its own falsity in fact. There is probably no government in the world of which it could be said that it might change at will the substantive laws of the country and still remain a government. However well it may suit the purposes of analytical jurisprudence to define a law as a command set by sovereign to subject, we must not forget that this is only a definition, and that the assumption it rests upon is, to the student of society, anything but a universal fact. From his point of view the cause of a particular law is not one but many, and of the many the deliberate will of a legislator may not be one. Sir Henry Maine has illustrated this point by the case of the great tax-gathering empires of the east, in which the absolute master of millions of men never dreams of making anything in the nature of a law at all. This view is no doubt as strange to the English statesman as to the English jurist. The most conspicuous work of government in his view is that of parliamentary legislation. For a large portion of the year the attention of the whole people is bent on the operations of a body of men who are constantly engaged in making new laws. It is natural, therefore, to think of law as a factitious thing, made and unmade by the people who happen for the time being to constitute parliament. It is forgotten how small a proportion the laws actually devised by parliament are of the law actually prevailing in the land. No European country has undergone so many changes in the form of government as France. It is surprising how little effect these political revolutions have had on the body of French law. The change from empire to republic is not marked by greater legislative effects than the change from a Conservative to a Liberal ministry in England would be.

These reflections should make us cautious in accepting any general proposition about forms of government and the spirit of their laws. We must remember, also, that the classification of governments according to the numerical proportion between governors and governed supplies but a small basis for generalization. What parallel can be drawn between a small town, in which half the population are slaves, and every freeman has a direct voice in the government, and a great modern state, in which there is not a single slave, while freemen exercise their sovereign powers at long intervals, and through the action of delegates and representatives? Propositions as vague as those of Montesquieu may indeed be asserted with more or less plausibility. But to take any leading head of positive law, and to say that monarchies treat it in one way, aristocracies and democracies in another, is a different matter.

The action of the state, or sovereign power, or government in a civilized community shapes itself into the threefold functions of legislation, judicature and administration. The two first are perfectly well-defined, and the last includes all the kinds of state action not included in the other two. It is with reference to legislation and administration that the line of permissible state-action requires to be drawn. There is no doubt about the province of the judicature, and that function of government may therefore be dismissed with a very few observations.

The complete separation of the three functions marks a high point of social organization. In simple societies the same officers discharge all the duties which we divide between the legislator, the administrator and the judge. The acts themselves are not consciously recognized as being of different kinds. The evolution of all the parts of a highly complex government from one original is illustrated in a striking way by the history of English institutions. All the conspicuous parts of the modern government, however little they may resemble each other now, can be followed back without a break to their common origin. Parliament, the cabinet, the privy council, the courts of law, all carry us back to the same *nidus* in the council of the feudal king.

Judicature.—The business of judicature, requiring as it does the possession of a high degree of technical skill and knowledge, is generally entrusted by the sovereign body or people to a separate and independent class of functionaries. In England the appellate jurisdiction of the House of Lords still maintains in theory the connexion between the supreme legislative and the supreme judicial functions. In some states of the American Union certain judicial functions of the upper house were for a time maintained after the example of the English constitution as it existed when the states were founded. In England there is also still a considerable amount of judicial work in which the people takes its share. The inferior magistracies, except in populous places, are in the hands of private persons. And by the jury system the ascertainment of fact has been committed in very large measure to persons selected indiscriminately from the mass of the people, subject to a small property qualification. But the higher functions of the judicature are exercised by persons whom the law has jealously fenced off from external interference and control. The independence of the bench distinguishes the English system from every other. It was established in principle as a barrier against monarchical power, and hence has become one of the traditional ensigns of popular government. In many of the American states the spirit of democracy has demanded the subjection of the judiciary to popular control. The judges are elected directly by the people, and hold office for a short term, instead of being appointed, as in England, by the responsible executive, and removable only by a vote of the two Houses. At the same time the constitution of the United States has assigned to the supreme court of the Union a perfectly unique position. The supreme court is the guardian of the constitution (as are the state courts of the constitution of the states: see United States). It has to judge whether a measure passed by the legislative powers is not void by reason of being unconstitutional, and it may therefore have to veto the deliberate resolutions of both Houses of Congress and the president. It is admitted that this singular experiment in government has been completely justified by its success.

Limits of State Interference in Legislation and Administration.—The question of the limits of state action does not arise with reference to the judiciary. The enforcement of the laws is a duty which the sovereign power must of absolute necessity take upon itself. But to what conduct of the citizens the laws shall extend is the most perplexing of all political questions. The correlative question with regard to the executive would be what works of public convenience should the state undertake through its own servants. The whole question of the sphere of government may be stated in these two questions: What should the state do for its citizens? and How far should the state interfere with the action of its citizens? These questions are the direct outcome of modern popular government; they are equally unknown to the small democracies of ancient times and to despotic governments at all times. Accordingly ancient political philosophy, rich as it is in all kinds of suggestions, has very little to say that has any bearing on the sphere of government. The conception that the power of the state can be and ought to be limited belongs to the times of “government by discussion,” to use Bagehot’s expression,—to the time when the sovereign number is divided by class interests, and when the action of the majority has to be carried out in the face of strong minorities, capable of making themselves heard. Aristotle does indeed dwell on one aspect of the question. He would limit the action of the government in the sense of leaving as little as possible to the personal will of the governors, whether one or many. His maxim is

that the law should reign. But that the sphere of law itself should be restricted, otherwise than by general principles of morality, is a consideration wholly foreign to ancient philosophy. The state is conceived as acting like a just man, and justice in the state is the same thing as justice in the individual. The Greek institutions which the philosophers are unanimous in commending are precisely those which the most state-ridden nations of modern times would agree in repudiating. The exhaustive discussion of all political measures, which for over two centuries has been a fixed habit of English public life, has of itself established the principle that there are assignable limits to the action of the state. Not that the limits ever have been assigned in terms, but popular sentiment has more or less vaguely fenced off departments of conduct as sacred from the interference of the law. Phrases like “the liberty of the subject,” the “sanctity of private property,” “an Englishman’s house is his castle,” “the rights of conscience,” are the commonplaces of political discussion, and tell the state, “Thus far shalt thou go and no further.”

The two contrasting policies are those of *laissez-faire* (let alone) and Protection, or individualism and state-socialism, the one a policy of non-interference with the free play of social forces, the other of their regulation for the benefit of the community. The *laissez-faire* theory was prominently upheld by John Stuart Mill, whose essay on *Liberty*, together with the concluding chapters of his treatise on *Political Economy*, gives a tolerably complete view of the principles of government. There is a general presumption against the interference of government, which is only to be overcome by very strong evidence of necessity. Governmental action is generally less effective than voluntary action. The necessary duties of government are so burdensome, that to increase them destroys its efficiency. Its powers are already so great that individual freedom is constantly in danger. As a general rule, nothing which can be done by the voluntary agency of individuals should be left to the state. Each man is the best judge of his own interests. But, on the other hand, when the thing itself is admitted to be useful or necessary, and it cannot be effected by voluntary agency, or when it is of such a nature that the consumer cannot be considered capable of judging of the quality supplied, then Mill would allow the state to interpose. Thus the education of children, and even of adults, would fairly come within the province of the state. Mill even goes so far as to admit that, where a restriction of the hours of labour, or the establishment of a periodical holiday, is proved to be beneficial to labourers as a class, but cannot be carried out voluntarily on account of the refusal of individuals to co-operate, government may justifiably compel them to co-operate. Still further, Mill would desire to see some control exercised by the government over the operations of those voluntary associations which, consisting of large numbers of shareholders, necessarily leave their affairs in the hands of one or a few persons. In short, Mill’s general rule against state action admits of many important exceptions, founded on no principle less vague than that of public expediency. The essay on *Liberty* is mainly concerned with freedom of individual character, and its arguments apply to control exercised, not only by the state, but by society in the form of public opinion. The leading principle is that of Humboldt, “the absolute and essential importance of human development in its richest diversity.” Humboldt broadly excluded education, religion and morals from the action, direct and indirect, of the state. Mill, as we have seen, conceives education to be within the province of the state, but he would confine its action to compelling parents to educate their children.

The most thoroughgoing opponent of state action, however, is Herbert Spencer. In his *Social Statics*, published in 1850, he holds it to be the essential duty of government to *protect*—to maintain men’s rights to life, to personal liberty and to property; and the theory that the government ought to undertake other offices besides that of protector he regards as an untenable theory. Each man has a right to the fullest exercise of all his faculties, compatible with the same right in others. This is the fundamental law of equal freedom, which it is the duty and the only duty of the state to enforce. If the state goes beyond this duty, it becomes, not a protector, but an aggressor. Thus all state regulations of commerce, all religious establishments, all government relief of the poor, all state systems of education and of sanitary superintendence, even the state currency and the post-office, stand condemned, not only as ineffective for their respective purposes, but as involving violations of man’s natural liberty.

The tendency of modern legislation is more a question of political practice than of political theory. In some cases state interference has been abolished or greatly limited. These cases are mainly two—in matters of opinion (especially religious opinion), and in matters of contract.

> The mere enumeration of the individual instances would occupy a formidable amount of space. The reader is referred to such articles as England, Church of; Establishment; Marriage; Oath; Roman Catholic Church, &c., and Company; Contract; Partnership, &c. In

other cases the state has interfered for the protection and assistance of definite classes of persons. For example, the education and protection of children (see Children, Law Relating to; Education; Technical Education); the regulation of factory labour and dangerous employment (see Labour Legislation); improved conditions of health (see Adulteration; Housing; Public Health, Law of, &c.); coercion for moral purposes (see Bet and Betting; Criminal Law; Gaming and Wagering; Liquor Laws; Lotteries, &c.). Under numerous other headings in this work the evolution of existing forms of government is discussed; see also the bibliographical note to the article Constitution and Constitutional Law.

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1 Aristotle elsewhere speaks of the error of those who think that any one of the depraved forms is better than any other.

2 None of the free states of Greece ever made extensive or permanent conquests; but the tribute sometimes paid by one state to another (as by the Aeginetans to the Athenians) was a manifest source of corruption. Compare the remarks of Hume (*Essays*, part i. 3, *That Politics may be reduced to a Science*), "free governments are the most ruinous and oppressive for their provinces."

3 Ultimately, in the theory of English law, the king may be said to have become the universal successor of the people. Some of the peculiarities of the prerogative rights seem to be explainable only on this view, *e.g.* the curious distinction between wrecks come to land and wrecks still on water. The common right to wreckage was no doubt the origin of the prerogative right to the former. Every ancient common right has come to be a right of the crown or a right held of the crown by a vassal.

4 See Bagehot's *English Constitution*; or, for a more recent analysis, Sidney Low's *Governance of England*.

5 For an account of the double chamber system in the state legislatures see United States: *Constitution and Government*, and also S. G. Fisher, *The Evolution of the Constitution* (Philadelphia, 1897).

6 A government "defeat" may, of course, not really represent a hostile vote in exceptional cases, and in some instances a government has obtained a reversal of the vote and has *not* resigned.

GOVERNOR (from the Fr. *gouverneur*, from *gouverner*, O. Fr. *governer*, Lat. *gubernare*, to steer a ship, to direct, guide), in general, one who governs or exercises authority; specifically, an official appointed to govern a district, province, town, &c. In British colonies or dependencies the representative of the crown is termed a governor. Colonial governors are classed as governors-general, governors and lieutenant-governors, according to the status of the colony or group of colonies over which they preside. Their powers vary according to the position which they occupy. In all cases they represent the authority of the crown. In the United States (*q.v.*) the official at the head of every state government is called a governor.

GOW, NIEL (1727-1807), Scottish musician of humble parentage, famous as a violinist and player of reels, but more so for the part he played in preserving the old melodies of Scotland. His compositions, and those of his four sons, Nathaniel, the most famous (1763-1831), William (1751-1791), Andrew (1760-1803), and John (1764-1826), formed the "Gow Collection," comprising various volumes edited by Niel and his sons, a valuable repository of Scottish traditional airs. The most important of Niel's sons was Nathaniel, who is remembered as the author of the well-known "Caller Herrin," taken from the fishwives' cry, a tune to which words were afterwards written by Lady Nairne. Nathaniel's son, Niel Gow junior (1795-1823), was the author of the famous songs "Flora Macdonald's Lament" and "Cam' ye by Athol."

GOWER, JOHN (d. 1408), English poet, died at an advanced age in 1408, so that he may be presumed to have been born about 1330. He belonged to a good Kentish family, but the suggestion of Sir Harris Nicolas that the poet is to be identified with a John Gower who was at one time possessed of the manor of Kentwell is open to serious objections. There is no evidence that he ever lived as a country gentleman, but he was undoubtedly possessed of some wealth, and we know that he was the owner of the manors of Feltwell in Suffolk and Moulton in Norfolk. In a document of 1382 he is called an “Esquier de Kent,” and he was certainly not in holy orders. That he was acquainted with Chaucer we know, first because Chaucer in leaving England for Italy in 1378 appointed Gower and another to represent him in his absence, secondly because Chaucer addressed his *Troilus and Criseide* to Gower and Strode (whom he addresses as “moral Gower” and “philosophical Strode”) for criticism and correction, and thirdly because of the lines in the first edition of Gower’s *Confessio amantis*, “And gret wel Chaucer whan ye mete,” &c. There is no sufficient ground for the suggestion, based partly on the subsequent omission of these lines and partly on the humorous reference of Chaucer to Gower’s *Confessio amantis* in the introduction to the *Man of Law’s Tale*, that the friendship was broken by a quarrel. From his Latin poem *Vox clamantis* we know that he was deeply and painfully interested in the peasants’ rising of 1381; and by the alterations which the author made in successive revisions of this work we can trace a gradually increasing sense of disappointment in the youthful king, whom he at first acquits of all responsibility for the state of the kingdom on account of his tender age. That he became personally known to the king we learn from his own statement in the first edition of the *Confessio amantis*, where he says that he met the king upon the river, was invited to enter the royal barge, and in the conversation which followed received the suggestion which led him to write his principal English poem. At the same time we know, especially from the later revisions of the *Confessio amantis*, that he was a great admirer of the king’s brilliant cousin, Henry of Lancaster, afterwards Henry IV., whom he came eventually to regard as a possible saviour of society from the misgovernment of Richard II. We have a record that in 1393 he received a collar from his favourite political hero, and it is to be observed that the effigy upon Gower’s tomb is wearing a collar of SS. with the swan badge which was used by Henry.

The first edition of the *Confessio amantis* is dated 1390, and this contains, at least in some copies, a secondary dedication to the then earl of Derby. The later form, in which Henry became the sole object of the dedication, is of the year 1393. Gower’s political opinions are still more strongly expressed in the *Cronica tripartita*.

In 1398 he was married to Agnes Groundolf, and from the special licence granted by the bishop of Winchester for the celebration of this marriage in John Gower’s private oratory we gather that he was then living in lodgings assigned to him within the priory of St Mary Overy, and perhaps also that he was too infirm to be married in the parish church. It is probable that this was not his first marriage, for there are indications in his early French poem that he had a wife at the time when that was written. His will is dated the 15th of August 1408, and his death took place very soon after this. He had been blind for some years before his death. A magnificent tomb with a recumbent effigy was erected over his grave in the chapel of St John the Baptist within the church of the priory, now St Saviour’s, Southwark, and this is still to be seen, though not quite in its original state or place. From the inscription on the tomb, as well as from other indications, it appears that he was a considerable benefactor of the priory and contributed largely to the rebuilding of the church.

The effigy on Gower’s tomb rests its head upon a pile of three folio volumes entitled *Speculum meditantis*, *Vox clamantis* and *Confessio amantis*. These are his three principal works. The first of these was long supposed to have perished, but a copy of it was discovered in the year 1895 under the title *Mirour de l’omme*. It is a French poem of about 30,000 lines in twelve-line stanzas, and under the form of an allegory of the human soul describes the seven deadly sins and their opposing virtues, and then the various estates of man and the vices incident to each, concluding with a narrative of the life of the Virgin Mary, and with praise of her as the means of reconciliation between God and man. The work is extremely tedious for the most part, but shows considerable command over the language and a great facility in metrical expression.

Gower’s next work was the *Vox clamantis* in Latin elegiac verse, in which the author takes occasion from the peasants’ insurrection of 1381 to deal again with the faults of the various classes of society. In the earlier portion the insurrection itself is described in a rather vivid manner, though under the form of an allegory: the remainder contains much the same material as we have already seen in that part of the French poem where the classes of society are described. Gower’s Latin verse is very fair, as judged by the medieval standard, but in this book he has borrowed very freely from Ovid, Alexander Neckam, Peter de Riga

and others.

Gower's chief claim, however, to reputation as a poet rests upon his English work, the *Confessio amantis*, in which he displays in his native language a real gift as a story-teller. He is himself the lover of his poem, in spite of his advancing years, and he makes his confession to Genius, the priest of Venus, under the usual headings supplied by the seven deadly sins. These with their several branches are successively described, and the nature of them illustrated by tales, which are directed to the illustration both of the general nature of the sin, and of the particular form which it may take in a lover. Finally he receives at once his absolution, and his dismissal from the service of Venus, for which his age renders him unfit. The idea is ingenious, and there is often much quaintness of fancy in the application of moral ideas to the relations of the lover and his mistress. The tales are drawn from very various sources and are often extremely well told. The metre is the short couplet, and it is extremely smooth and regular. The great fault of the *Confessio amantis* is the extent of its digressions, especially in the fifth and seventh books.

Gower also wrote in 1397 a short series of French ballades on the virtue of the married state (*Traitié pour essampler les amantz mariés*), and after the accession of Henry IV. he produced the *Cronica tripartita*, a partisan account in Latin leonine hexameters of the events of the last twelve years of the reign of Richard II. About the same time he addressed an English poem in seven-line stanzas to Henry IV. (*In Praise of Peace*), and dedicated to the king a series of French ballades (*Cinkante Balades*), which deal with the conventional topics of love, but are often graceful and even poetical in expression. Several occasional Latin pieces also belong to the later years of his life.

On the whole Gower must be admitted to have had considerable literary powers; and though not a man of genius, and by no means to be compared with Chaucer, yet he did good service in helping to establish the standard literary language, which at the end of the 14th century took the place of the Middle English dialects. The *Confessio amantis* was long regarded as a classic of the language, and Gower and Chaucer were often mentioned side by side as the fathers of English poetry.

A complete edition of Gower's works in four volumes, edited by G. C. Macaulay, was published in 1899-1902, the first volume containing the French works, the second and third the English, and the fourth the Latin, with a biography. Before this the *Confessio amantis* had been published in the following editions: Caxton (1483); Berthelette (1532 and 1554); Chalmers, *British Poets* (1810); Reinhold Pauli (1857); H. Morley (1889, incomplete). The two series of French ballades and the *Praise of Peace* were printed for the Roxburghe Club in 1818, and the *Vox clamantis* and *Cronica tripartita* were edited by H. O. Coxe for the Roxburghe Club in 1850. The *Cronica tripartita*, the *Praise of Peace* and some of the minor Latin poems were printed in Wright's *Political Poems* (Rolls series, 14). The *Praise of Peace* appeared in the early folio editions of Chaucer, and has been edited also by Dr Skeat in his *Chaucerian and other Pieces*. Reference may be made to Todd's *Illustrations of the Lives and Writings of Gower and Chaucer*; the article (by Sir H. Nicolas) in the *Retrospective Review* for 1828; *Observations on the Language of Chaucer and Gower*, by F. J. Child; H. Morley's English Writers, iv.; Ten Brink's *History of Early English Literature*, ii.; and Courthope's *History of English Poetry*, i.

(G. C. M.)

GOWER, a seigniory and district in the county of Glamorgan, lying between the rivers Tawe and Loughor and between Breconshire and the sea, its length from the Breconshire border to Worm's Head being 28 m., and its breadth about 8 m. It corresponds to the ancient commote of Gower (in Welsh *Gwyr*) which in early Welsh times was grouped with two other commotes stretching westwards to the Towy and so formed part of the principality of Ystrad Tywi. Its early association with the country to the west instead of with Glamorgan is perpetuated by its continued inclusion in the diocese of St Davids, its two rural deaneries, West and East Gower, being in the archdeaconry of Carmarthen. What is meant by Gower in modern popular usage, however, is only the peninsular part or "English Gower" (that is the Welsh *Bro-wyr*, as distinct from *Gwyr* proper), roughly corresponding to the hundred of Swansea and lying mainly to the south of a line drawn from Swansea to Loughor.

The numerous limestone caves of the coast are noted for their immense deposits of animal remains, but their traces of man are far scantier, those found in Bacon Hole and in Paviland

cave being the most important. In the Roman period the river Tawe, or the great morass between it and the Neath, probably formed the boundary between the Silures and the Goidelic population to the west. The latter, reinforced perhaps from Ireland, continued to be the dominant race in Gower till their conquest or partial expulsion in the 4th century by the sons of Cunedda who introduced a Brythonic element into the district. Centuries later Scandinavian rovers raided the coasts, leaving traces of their more or less temporary occupation in such place-names as Burry Holms, Worms Head and Swansea, and probably also in some cliff earthworks. About the year 1100 the conquest of Gower was undertaken by Henry de Newburgh, first earl of Warwick, with the assistance of Maurice de Londres and others. His followers, who were mostly Englishmen from the marches and Somersetshire with perhaps a sprinkling of Flemings, settled for the most part on the southern side of the peninsula, leaving the Welsh inhabitants of the northern half of Gower practically undisturbed. These invaders were probably reinforced a little later by a small detachment of the larger colony of Flemings which settled in south Pembrokeshire. Moated mounds, which in some cases developed into castles, were built for the protection of the various manors into which the district was parcelled out, the castles of Swansea and Loughor being ascribed to the earl of Warwick and that of Oystermouth to Maurice de Londres. These were repeatedly attacked and burnt by the Welsh during the 12th and 13th centuries, notably by Griffith ap Rhys in 1113, by his son the Lord Rhys in 1189, by his grandsons acting in concert with Llewelyn the Great in 1215, and by the last Prince Llewelyn in 1257. With the Norman conquest the feudal system was introduced, and the manors were held *in capite* of the lord by the tenure of castle-guard of the castle of Swansea, the *caput baroniae*.

About 1189 the lordship passed from the Warwick family to the crown and was granted in 1203 by King John to William de Braose, in whose family it remained for over 120 years except for three short intervals when it was held for a second time by King John (1211-1215), by Llewelyn the Great (1216-1223), and the Despensers (*c.* 1323-1326). In 1208 the Welsh and English inhabitants who had frequent cause to complain of their treatment, received each a charter, in similar terms, from King John, who also visited the town of Swansea in 1210 and in 1215 granted its merchants liberal privileges. In 1283 a number of de Braose’s tenants—unquestionably Welshmen—left Gower for the royal lordship of Carmarthen, declaring that they would live under the king rather than under a lord marcher. In the following year the king visited de Braose at Oystermouth Castle, which seems to have been made the lord’s chief residence, after the destruction of Swansea Castle by Llewelyn. Later on the king’s officers of the newly organized county of Carmarthen repeatedly claimed jurisdiction over Gower, thereby endeavouring to reduce its status from that of a lordship marcher with semi-regal jurisdiction, into that of an ordinary constituent of the new county. De Braose resisted the claim and organized the English part of his lordship on the lines of a county palatine, with its own *comitatus* and chancery held in Swansea Castle, the sheriff and chancellor being appointed by himself. The inhabitants, who had no right of appeal to the crown against their lord or the decisions of his court, petitioned the king, who in 1305 appointed a special commission to enquire into their alleged grievances, but in the following year the de Braose of the time, probably in alarm, conceded liberal privileges both to the burgesses of Swansea and to the English and Welsh inhabitants of his “county” of English Gower. He was the last lord seignior to live within the seigniory, which passed from him to his son-in-law John de Mowbray. Other troubles befell the de Braose barons and their successors in title, for their right to the lordship was contested by the Beauchamps, representatives of the earlier earls of Warwick, in prolonged litigation carried on intermittently from 1278 to 1396, the Beauchamps being actually in possession from 1354, when a decision was given in their favour, till its reversal in 1396. It then reverted to the Mowbrays and was held by them until the 4th duke of Norfolk exchanged it in 1489, for lands in England, with William Herbert, earl of Pembroke. The latter’s granddaughter brought it to her husband Charles Somerset, who in 1506 was granted her father’s subtitle of Baron Herbert of Chepstow, Raglan and Gower, and from him the lordship has descended to the present lord, the duke of Beaufort.

Gower was made subject to the ordinary law of England by its inclusion in 1535 in the county of Glamorgan as then reorganized; its chancery, which from about the beginning of the 14th century had been located at Oystermouth Castle, came to an end, but though the Welsh acts of 1535 and 1542 purported to abolish the rights and privileges of the lords marchers as conquerors, yet some of these, possibly from being regarded as private rights, have survived into modern times. For instance, the seignior maintained a franchise gaol in Swansea Castle till 1858, when it was abolished by act of parliament, the appointment of coroner for Gower is still vested in him, all writs are executed by the lord’s officers instead of by the officers of the sheriff for the county, and the lord’s rights to the foreshore, treasure

trove, felon's goods and wrecks are undiminished.

The characteristically English part of Gower lies to the south and south-west of its central ridge of Cefn y Bryn. It was this part that was declared by Professor Freeman to be "more Teutonic than Kent itself." The seaside fringe lying between this area and the town of Swansea, as well as the extreme north-west of the peninsula, also became anglicized at a comparatively early date, though the place-names and the names of the inhabitants are still mainly Welsh. The present line of demarcation between the two languages is one drawn from Swansea in a W.N.W. direction to Llanrhidian on the north coast. It has remained practically the same for several centuries, and is likely to continue so, as it very nearly coincides with the southern outcrop of the coal measures, the industrial population to the north being Welsh-speaking, the agriculturists to the south being English. In 1901 the Gower rural district (which includes the Welsh-speaking industrial parish of Llanrhidian, with about three-sevenths of the total population) had 64.5% of the population above three years of age that spoke English only, 5.2% that spoke Welsh only, the remainder being bilinguals, as compared with 17% speaking English only, 17.7% speaking Welsh only and the rest bilinguals in the Swansea rural district, and 7% speaking English only, 55.2% speaking Welsh only and the rest bilinguals in the Pontardawe rural district, the last two districts constituting Welsh Gower.

More than one-fourth of the whole area of Gower is unenclosed common land, of which in English Gower fully one-half is apparently capable of cultivation. Besides the demesne manors of the lord seignior, six in number, there are some twelve mesne manors and fees belonging to the Penrice estate, and nearly twenty more belonging to various other owners. The tenure is customary freehold, though in some cases described as copyhold, and in the ecclesiastical manor of Bishopston, descent is by borough English. The holdings are on the whole probably smaller in size than in any other area of corresponding extent in Wales, and agriculture is still in a backward state.

In the Arthurian romances Gower appears in the form of Goire as the island home of the dead, a view which probably sprang up among the Celts of Cornwall, to whom the peninsula would appear as an island. It is also surmised by Sir John Rhys that Malory's Brandegore (*i.e.* Brân of Gower) represents the Celtic god of the other world (Rhys, *Arthurian Legend*, 160, 329 et seq.). On Cefn Bryn, almost in the centre of the peninsula, is a cromlech with a large capstone known as Arthur's Stone. The unusually large number of cairns on this hill, given as eighty by Sir Gardner Wilkinson, suggests that this part of Gower was a favourite burial-place in early British times.

See Rev. J. D. Davies, *A History of West Gower* (4 vols., 1877-1894); Col. W. Ll-Morgan, *An Antiquarian Survey of East Gower* (1899); an article (probably by Professor Freeman) entitled "Anglia Trans-Walliana" in the *Saturday Review* for May 20, 1876; "The Signory of Gower" by G. T. Clark in *Archaeologia Cambrensis* for 1893-1894; *The Surveys of Gower and Kilvey*, ed. by Baker and Grant-Francis (1861-1870).

(D. Ll. T.)

GOWN, properly the term for a loose outer garment formerly worn by either sex but now generally for that worn by women. While "dress" is the usual English word, except in such combinations as "tea-gown," "dressing-gown" and the like, where the original loose flowing nature of the "gown" is referred to, "gown" is the common American word. "Gown" comes from the O. Fr. *goune* or *gonne*. The word appears in various Romanic languages, cf. Ital. *gonna*. The medieval Lat. *gunna* is used of a garment of skin or fur. A Celtic origin has been usually adopted, but the Irish, Gaelic and Manx words are taken from the English. Outside the ordinary use of the word, "gown" is the name for the distinctive robes worn by holders of particular offices or by members of particular professions or of universities, &c. (see Robes).

GOWRIE, JOHN RUTHVEN, 3rd Earl of (*c.* 1577-1600), Scottish conspirator, was the second son of William, 4th Lord Ruthven and 1st earl of Gowrie (cr. 1581), by his wife

Dorothea, daughter of Henry Stewart, 2nd Lord Methven. The Ruthven family was of ancient Scottish descent, and had owned extensive estates in the time of William the Lion; the Ruthven peerage dated from the year 1488. The 1st earl of Gowrie (? 1541-1584), and his father, Patrick, 3rd Lord Ruthven (*c.* 1520-1566), had both been concerned in the murder of Rizzio in 1566; and both took an active part on the side of the Kirk in the constant intrigues and factions among the Scottish nobility of the period. The former had been the custodian of Mary, queen of Scots, during her imprisonment in Loch Leven, where, according to the queen, he had pestered her with amorous attentions; he had also been the chief actor in the plot known as the "raid of Ruthven" when King James VI. was treacherously seized while a guest at the castle of Ruthven in 1582, and kept under restraint for several months while the earl remained at the head of the government. Though pardoned for this conspiracy he continued to plot against the king in conjunction with the earls of Mar and Angus; and he was executed for high treason on the 2nd of May 1584; his friends complaining that the confession on which he was convicted of treason was obtained by a promise of pardon from the king. His eldest son, William, 2nd earl of Gowrie, only survived till 1588, the family dignities and estates, which had been forfeited, having been restored to him in 1586.

When, therefore, John Ruthven succeeded to the earldom while still a child, he inherited along with his vast estates family traditions of treason and intrigue. There was also a popular belief, though without foundation, that there was Tudor blood in his veins; and Burnet afterwards asserted that Gowrie stood next in succession to the crown of England after King James VI. Like his father and grandfather before him, the young earl attached himself to the party of the reforming preachers, who procured his election in 1592 as provost of Perth, a post that was almost hereditary in the Ruthven family. He received an excellent education at the grammar school of Perth and the university of Edinburgh, where he was in the summer of 1593, about the time when his mother, and his sister the countess of Atholl, aided Bothwell in forcing himself sword in hand into the king's bedchamber in Holyrood Palace. A few months later Gowrie joined with Atholl and Montrose in offering to serve Queen Elizabeth, then almost openly hostile to the Scottish king; and it is probable that he had also relations with the rebellious Bothwell. Gowrie had thus been already deeply engaged in treasonable conspiracy when, in August 1594, he proceeded to Italy with his tutor, William Rhynd, to study at the university of Padua. On his way home in 1599 he remained for some months at Geneva with the reformer Theodore Beza; and at Paris he made acquaintance with the English ambassador, who reported him to Cecil as devoted to Elizabeth's service, and a nobleman "of whom there may be exceeding use made." In Paris he may also at this time have had further communication with the exiled Bothwell; in London he was received with marked favour by Queen Elizabeth and her ministers.

These circumstances owe their importance to the light they throw on the obscurity of the celebrated "Gowrie conspiracy," which resulted in the slaughter of the earl and his brother by attendants of King James at Gowrie House, Perth, a few weeks after Gowrie's return to Scotland in May 1600. This event ranks among the unsolved enigmas of history. The mystery is caused by the improbabilities inherent in any of the alternative hypotheses suggested to account for the unquestionable facts of the occurrence; the discrepancies in the evidence produced at the time; the apparent lack of forethought or plan on the part of the chief actors, whichever hypothesis be adopted, as well as the thoughtless folly of their actual procedure; and the insufficiency of motive, whoever the guilty parties may have been. The solutions of the mystery that have been suggested are three in number: first, that Gowrie and his brother had concocted a plot to murder, or more probably to kidnap King James, and that they lured him to Gowrie House for this purpose; secondly, that James paid a surprise visit to Gowrie House with the intention, which he carried out, of slaughtering the two Ruthvens; and thirdly, that the tragedy was the outcome of an unpremeditated brawl following high words between the king and the earl, or his brother. To understand the relative probabilities of these hypotheses regard must be had to the condition of Scotland in the year 1600 (see Scotland: *History*). Here it can only be recalled that plots to capture the person of the sovereign for the purpose of coercing his actions were of frequent occurrence, more than one of which had been successful, and in several of which the Ruthven family had themselves taken an active part; that the relations between England and Scotland were at this time more than usually strained, and that the young earl of Gowrie was reckoned in London among the adherents of Elizabeth; that the Kirk party, being at variance with James, looked upon Gowrie as an hereditary partisan of their cause, and had recently sent an agent to Paris to recall him to Scotland as their leader; that Gowrie was believed to be James's rival for the succession to the English crown. Moreover, as regards the question of motive it is to be observed, on the one hand, that the Ruthvens believed Gowrie's father to have been

The Gowrie conspiracy.

treacherously done to death, and his widow insulted by the king's favourite minister; while, on the other, James was indebted in a large sum of money to the earl of Gowrie's estate, and popular gossip credited either Gowrie or his brother, Alexander Ruthven, with being the lover of the queen. Although the evidence on these points, and on every minute circumstance connected with the tragedy itself, has been exhaustively examined by historians of the Gowrie conspiracy, it cannot be asserted that the mystery has been entirely dispelled; but, while it is improbable that complete certainty will ever be arrived at as to whether the guilt lay with James or with the Ruthven brothers, the most modern research in the light of materials inaccessible or overlooked till the 20th century, points pretty clearly to the conclusion that there was a genuine conspiracy by Gowrie and his brother to kidnap the king. If this be the true solution, it follows that King James was innocent of the blood of the Ruthvens; and it raises the presumption that his own account of the occurrence was, in spite of the glaring improbabilities which it involved, substantially true.

The facts as related by James and other witnesses were, in outline, as follows. On the 5th of August 1600 the king rose early to hunt in the neighbourhood of Falkland Palace, about 14 m. from Perth. Just as he was setting forth in company with the duke of Lennox, the earl of Mar, Sir Thomas Erskine and others, he was accosted by Alexander Ruthven (known as the master of Ruthven), a younger brother of the earl of Gowrie, who had ridden from Perth that morning to inform the king that he had met on the previous day a man in possession of a pitcher full of foreign gold coins, whom he had secretly locked up in a room at Gowrie House. Ruthven urged the king to ride to Perth to examine this man for himself and to take possession of the treasure. After some hesitation James gave credit to the story, suspecting that the possessor of the coins was one of the numerous Catholic agents at that time moving about Scotland in disguise. Without giving a positive reply to Alexander Ruthven, James started to hunt; but later in the morning he called Ruthven to him and said he would ride to Perth when the hunting was over. Ruthven then despatched a servant, Henderson, by whom he had been accompanied from Perth in the early morning, to tell Gowrie that the king was coming to Gowrie House. This messenger gave the information to Gowrie about ten o'clock in the morning. Meanwhile Alexander Ruthven was urging the king to lose no time, requesting him to keep the matter secret from his courtiers, and to bring to Gowrie House as small a retinue as possible. James, with a train of some fifteen persons, arrived at Gowrie House about one o'clock, Alexander Ruthven having spurred forward for a mile or so to announce the king's approach. But notwithstanding Henderson's warning some three hours earlier, Gowrie had made no preparations for the king's entertainment, thus giving the impression of having been taken by surprise. After a meagre repast, for which he was kept waiting an hour, James, forbidding his retainers to follow him, went with Alexander Ruthven up the main staircase and passed through two chambers and two doors, both of which Ruthven locked behind them, into a turret-room at the angle of the house, with windows looking on the courtyard and the street. Here James expected to find the mysterious prisoner with the foreign gold. He found instead an armed man, who, as appeared later, was none other than Gowrie's servant, Henderson. Alexander Ruthven immediately put on his hat, and drawing Henderson's dagger, presented it to the king's breast with threats of instant death if James opened a window or called for help. An allusion by Ruthven to the execution of his father, the 1st earl of Gowrie, drew from James a reproof of Ruthven's ingratitude for various benefits conferred on his family. Ruthven then uncovered his head, declaring that James's life should be safe if he remained quiet; then, committing the king to the custody of Henderson, he left the turret—ostensibly to consult Gowrie—and locked the door behind him. While Ruthven was absent the king questioned Henderson, who professed ignorance of any plot and of the purpose for which he had been placed in the turret; he also at James's request opened one of the windows, and was about to open the other when Ruthven returned. Whether or not Alexander had seen his brother is uncertain. But Gowrie had meantime spread the report below that the king had taken horse and had ridden away; and the royal retinue were seeking their horses to follow him. Alexander, on re-entering the turret, attempted to bind James's hands; a struggle ensued, in the course of which the king was seen at the window by some of his followers below in the street, who also heard him cry "treason" and call for help to the earl of Mar. Gowrie affected not to hear these cries, but kept asking what was the matter. Lennox, Mar and most of the other lords and gentlemen ran up the main staircase to the king's help, but were stopped by the locked door, which they spent some time in trying to batter down. John Ramsay (afterwards earl of Holdernesse), noticing a small dark stairway leading directly to the inner chamber adjoining the turret, ran up it and found the king struggling at grips with Ruthven. Drawing his dagger, Ramsay wounded Ruthven, who was then pushed down the stairway by the king. Sir Thomas Erskine, summoned by Ramsay, now followed up the small stairs with Dr Hugh Herries, and these

The slaughter of the Ruthvens.

two coming upon the wounded Ruthven despatched him with their swords. Gowrie, entering the courtyard with his stabler Thomas Cranstoun and seeing his brother's body, rushed up the staircase after Erskine and Herries, followed by Cranstoun and others of his retainers; and in the melée Gowrie was killed. Some commotion was caused in the town by the noise of these proceedings; but it quickly subsided, though the king did not deem it safe to return to Falkland for some hours.

The tragedy caused intense excitement throughout Scotland, and the investigation of the circumstances was followed with much interest in England also, where all the details were reported to Elizabeth's ministers. The preachers of the Kirk, whose influence in Scotland was too extensive for the king to neglect, were only with the greatest difficulty persuaded to accept James's account of the occurrence, although he voluntarily submitted himself to cross-examination by one of their number. Their belief, and that of their partisans, influenced no doubt by political hostility to James, was that the king had invented the story of a conspiracy by Gowrie to cover his own design to extirpate the Ruthven family. James gave some colour to this belief, which has not been entirely abandoned, by the relentless severity with which he pursued the two younger, and unquestionably innocent, brothers of the earl. Great efforts were made by the government to prove the complicity of others in the plot. One noted and dissolute conspirator, Sir Robert Logan of Restalrig, was posthumously convicted of having been privy to the Gowrie conspiracy on the evidence of certain letters produced by a notary, George Sprot, who swore they had been written by Logan to Gowrie and others. These letters, which are still in existence, were in fact forged by Sprot in imitation of Logan's handwriting; but the researches of Andrew Lang have shown cause for suspecting that the most important of them was either copied by Sprot from a genuine original by Logan, or that it embodied the substance of such a letter. If this be correct, it would appear that the conveyance of the king to Fast Castle, Logan's impregnable fortress on the coast of Berwickshire, was part of the plot; and it supplies, at all events, an additional piece of evidence to prove the genuineness of the Gowrie conspiracy.

The Sprot forgeries.

Gowrie's two younger brothers, William and Patrick Ruthven, fled to England; and after the accession of James to the English throne William escaped abroad, but Patrick was taken and imprisoned for nineteen years in the Tower of London. Released in 1622, Patrick Ruthven resided first at Cambridge and afterwards in Somersetshire, being granted a small pension by the crown. He married Elizabeth Woodford, widow of the 1st Lord Gerrard, by whom he had two sons and a daughter, Mary; the latter entered the service of Queen Henrietta Maria, and married the famous painter van Dyck, who painted several portraits of her. Patrick died in poverty in a cell in the King's Bench in 1652, being buried as "Lord Ruthven." His son, Patrick, presented a petition to Oliver Cromwell in 1656, in which, after reciting that the parliament of Scotland in 1641 had restored his father to the barony of Ruthven, he prayed that his "extreme poverty" might be relieved by the bounty of the Protector.

See Andrew Lang, *James VI. and the Gowrie Mystery* (London, 1902), and the authorities there cited; Robert Pitcairn, *Criminal Trials in Scotland* (3 vols., Edinburgh, 1833); David Moysie, *Memoirs of the Affairs of Scotland, 1577-1603* (Edinburgh, 1830); Louis A. Barbé, *The Tragedy of Gowrie House* (London, 1887); Andrew Bisset, *Essays on Historical Truth* (London, 1871); David Calderwood, *History of the Kirk of Scotland* (8 vols., Edinburgh, 1842-1849); P. F. Tytler, *History of Scotland* (9 vols., Edinburgh, 1828-1843); John Hill Burton, *History of Scotland* (7 vols., Edinburgh, 1867-1870). W. A. Craigie has edited as *Skotlands Rimur* some Icelandic ballads relating to the Gowrie conspiracy. He has also printed the Danish translation of the official account of the conspiracy, which was published at Copenhagen in 1601.

(R. J. M.)

GOWRIE, a belt of fertile alluvial land (*Scotice*, "carse") of Perthshire, Scotland. Occupying the northern shore of the Firth of Tay, it has a generally north-easterly trend and extends from the eastern boundaries of Perth city to the confines of Dundee. It measures 15 m. in length, its breadth from the river towards the base of the Sidlaw Hills varying from 2 to 4 m. Probably it is a raised beach, submerged until a comparatively recent period. Although it contained much bog land and stagnant water as late as the 18th century, it has since been drained and cultivated, and is now one of the most productive tracts in Perthshire. The

district is noteworthy for the number of its castles and mansions, almost wholly residential, among which may be mentioned Kinfauns Castle, Inchyra House, Pitfour Castle, Errol Park, Megginch Castle, dating from 1575; Fingask Castle, Kinnaird Castle, erected in the 15th century and occupied by James VI. in 1617; Rossie Priory, the seat of Lord Kinnaird; and Huntly Castle, built by the 3rd earl of Kinghorne.

GOYA, a river town and port of Corrientes, Argentine Republic, the commercial centre of the south-western departments of the province and chief town of a department of the same name, on a *riacho* or side channel of the Paraná about 5 m. from the main channel and about 120 m. S. of the city of Corrientes. Pop. (1905, est.) 7000. The town is built on low ground which is subject to inundations in very wet weather, but its streets are broad and the general appearance of its edifices is good. Among its public buildings is a handsome parish church and a national normal school. The productions of the neighbourhood are chiefly pastoral, and its exports include cattle, hides, wool and oranges. Goya had an export of crudely-made cheese long before the modern cheese factories of the Argentine Republic came into existence. The place dates from 1807, and had its origin, it is said, in the trade established there by a ship captain and his wife Gregoria or Goya, who supplied passing vessels with beef.

GOYANNA, or Goiana, a city of Brazil in the N.E. angle of the state of Pernambuco, about 65 m. N. of the city of Pernambuco. Pop.(1890) 15,436. It is built on a fertile plain between the rivers Tracunhaem and Capibaribe-mirim near their junction to form the Goyanna river, and is 15 m. from the coast. It is surrounded by, and is the commercial centre for, one of the richest agricultural districts of the state, which produces sugar, rum, coffee, tobacco, cotton, cattle, hides and castor oil. The Goyanna river is navigable for small vessels nearly up to the city, but its entrance is partly obstructed and difficult. Goyanna is one of the oldest towns of the state, and was occupied by the Dutch from 1636 to 1654. It has several old-style churches, an orphans' asylum, hospital and some small industries.

GOYA Y LUCIENTES, FRANCISCO (1746-1828), Spanish painter, was born in 1746 at Fuendetodos, a small Aragonese village near Saragossa. At an early age he commenced his artistic career under the direction of José Luzan Martinez, who had studied painting at Naples under Mastroleo. It is clear that the accuracy in drawing Luzan is said to have acquired by diligent study of the best Italian masters did not much influence his erratic pupil. Goya, a true son of his province, was bold, capricious, headstrong and obstinate. He took a prominent part on more than one occasion in those rival religious processions at Saragossa which often ended in unseemly frays; and his friends were led in consequence to despatch him in his nineteenth year to Madrid, where, prior to his departure for Rome, his mode of life appears to have been anything but that of a quiet orderly citizen. Being a good musician, and gifted with a voice, he sallied forth nightly, serenading the caged beauties of the capital, with whom he seems to have been a very general favourite.

Lacking the necessary royal patronage, and probably scandalizing by his mode of life the sedate court officials, he did not receive—perhaps did not seek—the usual honorarium accorded to those students who visited Rome for the purpose of study. Finding it convenient to retire for a time from Madrid, he decided to visit Rome at his own cost; and being without resources he joined a "quadrilla" of bull-fighters, passing from town to town until he reached the shores of the Mediterranean. We next hear of him reaching Rome, broken in health and financially bankrupt. In 1772 he was awarded the second prize in a competition initiated by the academy of Parma, styling himself "pupil to Bayeu, painter to the king of Spain."

Compelled to quit Rome somewhat suddenly, he appears again in Madrid in 1775, the husband of Bayeu's daughter, and father of a son. About this time he appears to have visited his parents at Fuendetodos, no doubt noting much which later on he utilized in his genre works. On returning to Madrid he commenced painting canvases for the tapestry factory of Santa Barbara, in which the king took much interest. Between 1776 and 1780 he appears to have supplied thirty examples, receiving about £1200 for them. Soon after the revolution of 1868, an official was appointed to take an inventory of all works of art belonging to the nation, and in one of the cellars of the Madrid palace were discovered forty-three of these works of Goya on rolls forgotten and neglected (see *Los Tapices de Goya; por Cruzado Villaamil, Madrid*, 1870).

His originality and talent were soon recognized by Mengs, the king's painter, and royal favour naturally followed. His career now becomes intimately connected with the court life of his time. He was commissioned by the king to design a series of frescoes for the church of St Anthony of Florida, Madrid, and he also produced works for Saragossa, Valencia and Toledo. Ecclesiastical art was not his forte, and although he cannot be said to have failed in any of his work, his fame was not enhanced by his religious subjects.

In portraiture, without doubt, Goya excelled: his portraits are evidently life-like and unexaggerated, and he disdained flattery. He worked rapidly, and during his long stay at Madrid painted, amongst many others, the portraits of four sovereigns of Spain—Charles III. and IV., Ferdinand VII. and "King Joseph." The duke of Wellington also sat to him; but on his making some remark which raised the artist's choler, Goya seized a plaster cast and hurled it at the head of the duke. There are extant two pencil sketches of Wellington, one in the British Museum, the other in a private collection. One of his best portraits is that of the lovely Andalusian duchess of Alva. He now became the spoiled child of fortune, and acquired, at any rate externally, much of the polish of court manners. He still worked industriously upon his own lines, and, while there is a stiffness almost ungainly in the pose of some of his portraits, the stern individuality is always preserved.

Including the designs for tapestry, Goya's genre works are numerous and varied, both in style and feeling, from his Watteau-like "Al Fresco Breakfast," "Romeria de San Isidro," to the "Curate feeding the Devil's Lamp," the "Meson del Gallo," and the painfully realistic massacre of the "Dos de Mayo" (1808). Goya's versatility is proverbial; in his hands the pencil, brush and graver are equally powerful. Some of his crayon sketches of scenes in the bull ring are full of force and character, slight but full of meaning. He was in his thirty-second year when he commenced his etchings from Velasquez, whose influence may, however, be traced in his work at an earlier date. A careful examination of some of the drawings made for these etchings indicates a steadiness of purpose not usually discovered in Goya's craft as draughtsman. He is much more widely known by his etchings than his oils; the latter necessarily must be sought in public and private collections, principally in Spain, while the former are known and prized in every capital of Europe. The etched collections by which Goya is best known include "Los Caprichos," which have a satirical meaning known only to the few; they are bold, weird and full of force. "Los Proverbios" are also supposed to have some hidden intention. "Los Desastres de la Guerra" may fairly claim to depict Spain during the French invasion. In the bull-fight series Goya is evidently at home; he was a skilled master of the barbarous art, and no doubt every sketch is true to nature, and from life.

Goya retired from Madrid, desiring probably during his latter years to escape the trying climate of that capital. He died at Bordeaux on the 16th of April 1828, and a monument has been erected there over his remains. From the deaths of Velasquez and Murillo to the advent of Fortuny, Goya's name is the only important one found in the history of Spanish art.

See also the lives by Paul Lefort (1877), and Yriarte (1867).

GOYÁZ, an inland state of Brazil, bounded by Matto Grosso and Pará on the W., Maranhão, Bahia and Minas Geraes on the E., and Minas Geraes and Matto Grosso on the S. Pop. (1890) 227,572; (1900) 255,284, including many half-civilized Indians and many half-breeds. Area, 288,549 sq. m. The outline of the state is that of a roughly-shaped wedge with the thin edge extending northward between and up to the junction of the rivers Araguaya and Upper Tocantins, and its length is nearly 15° of latitude. The state lies wholly within the

great Brazilian plateau region, but its surface is much broken towards the N. by the deeply eroded valleys of the Araguaya and Upper Tocantins rivers and their tributaries. The general slope of the plateau is toward the N., and the drainage of the state is chiefly through the above-named rivers—the principal tributaries of the Araguaya being the Grande and Vermelho, and of the Upper Tocantins, the Manoel Alves Grande, Somno, Paranan and Maranhão. A considerable part of southern Goyáz, however, slopes southward and the drainage is through numerous small streams flowing into the Paranahyba, a large tributary of the Paraná. The general elevation of the plateau is estimated to be about 2700 ft., and the highest elevation was reported in 1892 to be the Serra dos Pyreneos (5250 ft.). Crossing the state N.N.E. to S.S.W. there is a well-defined chain of mountains, of which the Pyreneos, Santa Rita and Santa Martha ranges form parts, but their elevation above the plateau is not great. The surface of the plateau is generally open campo and scrubby arboreal growth called *caatingas*, but the streams are generally bordered with forest, especially in the deeper valleys. Towards the N. the forest becomes denser and of the character of the Amazon Valley. The climate of the plateau is usually described as temperate, but it is essentially sub-tropical. The valley regions are tropical, and malarial fevers are common. The cultivation of the soil is limited to local needs, except in the production of tobacco, which is exported to neighbouring states. The open campos afford good pasturage, and live stock is largely exported. Gold-mining has been carried on in a primitive manner for more than two centuries, but the output has never been large and no very rich mines have been discovered. Diamonds have been found, but only to a very limited extent. There is a considerable export of quartz crystal, commercially known as “Brazilian pebbles,” used in optical work. Although the northern and southern extremities of Goyáz lie within two great river systems—the Tocantins and Paraná—the upper courses of which are navigable, both of them are obstructed by falls. The only outlet for the state has been by means of mule trains to the railway termini of São Paulo and Minas Geraes, pending the extension of railways from both of those states, one entering Goyáz by way of Catalão, near the southern boundary, and the other at some point further N.

The capital of the state is Goyáz, or Villa-Boa de Goyáz, a mining town on the Rio Vermelho, a tributary of the Araguaya rising on the northern slopes of the Serra de Santa Rita. Pop. (1890) 6807. Gold was discovered here in 1682 by Bartholomeu Bueno, the first European explorer of this region, and the settlement founded by him was called Santa Anna, which is still the name of the parish. The site of the town is a barren, rocky mountain valley, 1900 ft. above sea-level, in which the heat is most oppressive at times and the nights are unpleasantly cold. Goyáz is the see of a bishopric founded in 1826, and possesses a small cathedral and some churches.

GOYEN, JAN JOSEPHSZOON VAN (1596-1656), Dutch painter, was born at Leiden on the 13th of January 1596, learned painting under several masters at Leiden and Haarlem, married in 1618 and settled at the Hague about 1631. He was one of the first to emancipate himself from the traditions of minute imitation embodied in the works of Breughel and Savery. Though he preserved the dun scale of tone peculiar to those painters, he studied atmospheric effects in black and white with considerable skill. He had much influence on Dutch art. He formed Solomon Ruysdael and Pieter Potter, forced attention from Rembrandt, and bequeathed some of his precepts to Pieter de Molyn, Coelenbier, Saftleven, van der Kabel and even Berghem. His life at the Hague for twenty-five years was very prosperous, and he rose in 1640 to be president of his gild. A friend of van Dyck and Bartholomew van der Helst, he sat to both these artists for his likeness. His daughter Margaret married Jan Steen, and he had steady patrons in the stadtholder Frederick Henry, and the chiefs of the municipality of the Hague. He died at the Hague in 1656, possessed of land and houses to the amount of 15,000 florins.

Between 1610 and 1616 van Goyen wandered from one school to the other. He was first apprenticed to Isaak Swanenburgh; he then passed through the workshops of de Man, Klok and de Hoorn. In 1616 he took a decisive step and joined Esaias van der Velde at Haarlem; amongst his earlier pictures, some of 1621 (Berlin Museum) and 1623 (Brunswick Gallery) show the influence of Esaias very perceptibly. The landscape is minute. Details of branching and foliage are given, and the figures are important in relation to the distances. After 1625 these peculiarities gradually disappear. Atmospheric effect in landscapes of cool tints

varying from grey green to pearl or brown and yellow dun is the principal object which van Goyen holds in view, and he succeeds admirably in light skies with drifting misty cloud, and downs with cottages and scanty shrubbery or stunted trees. Neglecting all detail of foliage he now works in a thin diluted medium, laying on rubbings as of sepia or Indian ink, and finishing without loss of transparence or lucidity. Throwing his foreground into darkness, he casts alternate light and shade upon the more distant planes, and realizes most pleasing views of large expanse. In buildings and water, with shipping near the banks, he sometimes has the strength if not the colour of Albert Cuyp. The defect of his work is chiefly want of solidity. But even this had its charm for van Goyen's contemporaries, and some time elapsed before Cuyp, who imitated him, restricted his method of transparent tinting to the foliage of foreground trees.

Van Goyen's pictures are comparatively rare in English collections, but his work is seen to advantage abroad, and chiefly at the Louvre, and in Berlin, Gotha, Vienna, Munich and Augsburg. Twenty-eight of his works were exhibited together at Vienna in 1873. Though he visited France once or twice, van Goyen chiefly confined himself to the scenery of Holland and the Rhine. Nine times from 1633 to 1655 he painted views of Dordrecht. Nimeguen was one of his favourite resorts. But he was also fond of Haarlem and Amsterdam, and he did not neglect Arnheim or Utrecht. One of his largest pieces is a view of the Hague, executed in 1651 for the municipality, and now in the town collection of that city. Most of his panels represent reaches of the Rhine, the Waal and the Maese. But he sometimes sketched the downs of Scheveningen, or the sea at the mouth of the Rhine and Scheldt; and he liked to depict the calm inshore, and rarely ventured upon seas stirred by more than a curling breeze or the swell of a coming squall. He often painted winter scenes, with ice and skaters and sledges, in the style familiar to Isaac van Ostade. There are numerous varieties of these subjects in the master's works from 1621 to 1653. One historical picture has been assigned to van Goyen—the "Embarkation of Charles II." in the Bute collection. But this canvas was executed after van Goyen's death. When he tried this form of art he properly mistrusted his own powers. But he produced little in partnership with his contemporaries, and we can only except the "Watering-place" in the gallery of Vienna, where the landscape is enlivened with horses and cattle by Philip Wouvermans. Even Jan Steen, who was his son-in-law, only painted figures for one of his pictures, and it is probable that this piece was completed after van Goyen's death. More than 250 of van Goyen's pictures are known and accessible. Of this number little more than 70 are undated. None exist without the full name or monogram, and yet there is no painter whose hand it is easier to trace without the help of these adjuncts. An etcher, but a poor one, van Goyen has only bequeathed to us two very rare plates.

GOZLAN, LÉON (1806-1866), French novelist and play-writer, was born on the 1st of September 1806, at Marseilles. When he was still a boy, his father, who had made a large fortune as a ship-broker, met with a series of misfortunes, and Léon, before completing his education, had to go to sea in order to earn a living. In 1828 we find him in Paris, determined to run the risks of literary life. His townsman, Joseph Méry, who was then making himself famous by his political satires, introduced him to several newspapers, and Gozlan's brilliant articles in the *Figaro* did much harm to the already tottering government of Charles X. His first novel was *Les Mémoires d'un apothicaire* (1828), and this was followed by numberless others, among which may be mentioned *Washington Levert et Socrate Leblanc* (1838), *Le Notaire de Chantilly* (1836), *Aristide Froissart* (1843) (one of the most curious and celebrated of his productions), *Les Nuits du Père Lachaise* (1846), *Le Tapis vert* (1855), *La Folle du logis* (1857), *Les Émotions de Polydore Marasquin* (1857), &c. His best-known works for the theatre are—*La Pluie et le beau temps* (1861), and *Une Tempête dans un verre d'eau* (1850), two curtain-raisers which have kept the stage; *Le Lion empaillé* (1848), *La Queue du chien d'Alcibiade* (1849), *Louise de Nanteuil* (1854), *Le Gâteau des reines* (1855), *Les Paniers de la comtesse* (1852); and he adapted several of his own novels to the stage. Gozlan also wrote a romantic and picturesque description of the old manors and mansions of his country entitled *Les Châteaux de France* (2 vols., 1844), originally published (1836) as *Les Tourelles*, which has some archaeological value, and a biographical essay on Balzac (*Balzac chez lui*, 1862). He was made a member of the Legion of Honour in 1846, and in 1859 an officer of that order. Gozlan died on the 14th of September 1866, in Paris.

See also P. Audebrand, *Léon Gozlan* (1887).

GOZO (Gozzo), an island of the Maltese group in the Mediterranean Sea, second in size to Malta. It lies N.W. and 3¼ m. from the nearest point of Malta, is of oval form, 8¾ m. in length and 4½ m. in extreme breadth, and has an area of nearly 25 m. Its chief town, Victoria, formerly called Rabato (pop. in 1901, 5057) stands near the middle of the island on one of a cluster of steep conical hills, 3½ m. from the port of Migiarro Bay, on the south-east shore, below Fort Chambray. The character of the island is similar to that of Malta. The estimated population in 1907 was 21,911.

GOZZI, CARLO, Count (1722-1806), Italian dramatist, was descended from an old Venetian family, and was born at Venice in March 1722. Compelled by the embarrassed condition of his father's affairs to procure the means of self-support, he, at the age of sixteen, joined the army in Dalmatia; but three years afterwards he returned to Venice, where he soon made a reputation for himself as the wittiest member of the Granelleschi society, to which the publication of several satirical pieces had gained him admission. This society, nominally devoted to conviviality and wit, had also serious literary aims, and was especially zealous to preserve the Tuscan literature pure and untainted by foreign influences. The displacement of the old Italian comedy by the dramas of Pietro Chiari (1700-1788) and Goldoni, founded on French models, threatened defeat to all their efforts; and in 1757 Gozzi came to the rescue by publishing a satirical poem, *Tartana degli influssi per l' anno bisestile*, and in 1761 by his comedy, *Fiaba dell' amore delle tre melarancie*, a parody of the manner of the two obnoxious poets, founded on a fairy tale. For its representation he obtained the services of the Sacchi company of players, who, on account of the popularity of the comedies of Chiari and Goldoni—which afforded no scope for the display of their peculiar talents—had been left without employment; and as their satirical powers were thus sharpened by personal enmity, the play met with extraordinary success. Struck by the effect produced on the audience by the introduction of the supernatural or mythical element, which he had merely used as a convenient medium for his satirical purposes, Gozzi now produced a series of dramatic pieces based on fairy tales, which for a period obtained great popularity, but after the breaking up of the Sacchi company were completely disregarded. They have, however, obtained high praise from Goethe, Schlegel, Madame de Staël and Sismondi; and one of them, *Re Turandote*, was translated by Schiller. In his later years Gozzi set himself to the production of tragedies in which the comic element was largely introduced; but as this innovation proved unacceptable to the critics he had recourse to the Spanish drama, from which he obtained models for various pieces, which, however, met with only equivocal success. He died on the 4th of April 1806.

His collected works were published under his own superintendence, at Venice, in 1792, in 10 volumes; and his dramatic works, translated into German by Werthes, were published at Bern in 1795. See Gozzi's work, *Memorie inutili della vita di Carlo Gozzi* (3 vols., Venice, 1797), translated into French by Paul de Musset (1848), and into English by J. A. Symonds (1889); F. Horn, *Über Gozzis dramatische Poesie* (Venice, 1803); Gherardini, *Vita di Gasp. Gozzi* (1821); "Charles Gozzi," by Paul de Musset, in the *Revue des deux mondes* for 15th November 1844; Magrini, *Carlo Gozzi e la fiabe: saggi storici, biografici, e critici* (Cremona, 1876), and the same author's book on Gozzi's life and times (Benevento, 1883).

GOZZI, GASPARO, Count (1713-1786), eldest brother of Carlo Gozzi, was born on the 4th of December 1713. In 1739 he married the poetess Luise Bergalli, and she undertook the management of the theatre of Sant' Angelo, Venice, he supplying the performers with dramas chiefly translated from the French. The speculation proved unfortunate, but meantime he had attained a high reputation for his contributions to the *Gazzetta Veneta*, and he soon came to be known as one of the ablest critics and purest and most elegant stylists in

Italy. For a considerable period he was censor of the press in Venice, and in 1774 he was appointed to reorganize the university system at Padua. He died at Padua on the 26th of December 1786.

His principal writings are *Osservatore Veneto periodico* (1761), on the model of the English *Spectator*, and distinguished by its high moral tone and its light and pleasant satire; *Lettere famigliari* (1755), a collection of short racy pieces in prose and verse, on subjects of general interest; *Sermoni*, poems in blank verse after the manner of Horace; *Il Mondo morale* (1760), a personification of human passions with inwoven dialogues in the style of Lucian; and *Giudizio degli antichi poeti sopra la moderna censura di Dante* (1755), a defence of the great poet against the attacks of Bettinelli. He also translated various works from the French and English, including Marmontel's *Tales* and Pope's *Essay on Criticism*. His collected works were published at Venice, 1794-1798, in 12 volumes, and several editions have appeared since.

GOZZOLI, BENOZZO, Italian painter, was born in Florence in 1424, or perhaps 1420, and in the early part of his career assisted Fra Angelico, whom he followed to Rome and worked with at Orvieto. In Rome he executed in Santa Maria in Aracoeli a fresco of "St Anthony and Two Angels." In 1449 he left Angelico, and went to Montefalco, near Foligno in Umbria. In S. Fortunate, near Montefalco, he painted a "Madonna and Child with Saints and Angels," and three other works. One of these, the altar-piece representing "St Thomas receiving the Girdle of the Virgin," is now in the Lateran Museum, and shows the affinity of Gozzoli's early style to Angelico's. He next painted in the monastery of S. Francesco, Montefalco, filling the choir with a triple course of subjects from the life of the saint, with various accessories, including heads of Dante, Petrarch and Giotto. This work was completed in 1452, and is still marked by the style of Angelico, crossed here and there with a more distinctly Giottesque influence. In the same church, in the chapel of St Jerome, is a fresco by Gozzoli of the Virgin and Saints, the Crucifixion and other subjects. He remained at Montefalco (with an interval at Viterbo) probably till 1456, employing Mesastris as assistant. Thence he went to Perugia, and painted in a church a "Virgin and Saints," now in the local academy, and soon afterwards to his native Florence, the headquarters of art. By the end of 1459 he had nearly finished his important labour in the chapel of the Palazzo Riccardi, the "Journey of the Magi to Bethlehem," and, in the tribune of this chapel, a composition of "Angels in a Paradise." His picture in the National Gallery, London, a "Virgin and Child with Saints," 1461, belongs also to the period of his Florentine sojourn. Another small picture in the same gallery, the "Rape of Helen," is of dubious authenticity. In 1464 Gozzoli left Florence for S. Gimignano, where he executed some extensive works; in the church of S. Agostino, a composition of St Sebastian protecting the City from the Plague of this same year, 1464; over the entire choir of the church, a triple course of scenes from the legends of St Augustine, from the time of his entering the school of Tegaste on to his burial, seventeen chief subjects, with some accessories; in the Pieve di S. Gimignano, the "Martyrdom of Sebastian," and other subjects, and some further works in the city and its vicinity. Here his style combined something of Lippo Lippi with its original elements, and he received co-operation from Giusto d'Andrea. He stayed in this city till 1467, and then began, in the Campo Santo of Pisa, from 1469, the vast series of mural paintings with which his name is specially identified. There are twenty-four subjects from the Old Testament, from the "Invention of Wine by Noah" to the "Visit of the Queen of Sheba to Solomon." He contracted to paint three subjects per year for about ten ducats each—a sum which may be regarded as equivalent to £100 at the present day. It appears, however, that this contract was not strictly adhered to, for the actual rate of painting was only three pictures in two years. Perhaps the great multitude of figures and accessories was accepted as a set-off against the slower rate of production. By January 1470 he had executed the fresco of "Noah and his Family,"—followed by the "Curse of Ham," the "Building of the Tower of Babel" (which contains portraits of Cosmo de' Medici, the young Lorenzo Politian and others), the "Destruction of Sodom," the "Victory of Abraham," the "Marriages of Rebecca and of Rachel," the "Life of Moses," &c. In the Cappella Ammannati, facing a gate of the Campo Santo, he painted also an "Adoration of the Magi," wherein appears a portrait of himself. All this enormous mass of work, in which Gozzoli was probably assisted by Zanobi Macchiavelli, was performed, in addition to several other pictures during his stay in Pisa (we need only specify the "Glory of St Thomas Aquinas," now in the Louvre), in sixteen years, lasting up to 1485. This is the

latest date which can with certainty be assigned to any work from his hand, although he is known to have been alive up to 1498. In 1478 the Pisan authorities had given him, as a token of their regard, a tomb in the Campo Santo. He had likewise a house of his own in Pisa, and houses and land in Florence. In rectitude of life he is said to have been worthy of his first master, Fra Angelico.

The art of Gozzoli does not rival that of his greatest contemporaries either in elevation or in strength, but is pre-eminently attractive by its sense of what is rich, winning, lively and abundant in the aspects of men and things. His landscapes, thronged with birds and quadrupeds, especially dogs, are more varied, circumstantial and alluring than those of any predecessor; his compositions are crowded with figures, more characteristically true when happily and gracefully occupied than when the demands of the subject require tragic or dramatic intensity, or turmoil of action; his colour is bright, vivacious and festive. Gozzoli's genius was, on the whole, more versatile and assimilative than vigorously original; his drawing not free from considerable imperfections, especially in the extremities and articulations, and in the perspective of his gorgeously-schemed buildings. In fresco-painting he used the methods of tempera, and the decay of his works has been severe in proportion. Of his untiring industry the recital of his labours and the number of works produced are the most forcible attestation.

Vasari, Crowe and Cavalcaselle, and the other ordinary authorities, can be consulted as to the career of Gozzoli. A separate *Life* of him, by H. Stokes, was published in 1903 in Newnes's Art library.

(W. M. R.)

GRAAFF REINET, a town of South Africa, 185 m. by rail N.W. by N. of Port Elizabeth. Pop. (1904) 10,083, of whom 4055 were whites. The town lies 2463 ft. above the sea and is built on the banks of the Sunday river, which rises a little farther north on the southern slopes of the Sneeuwberg, and here ramifies into several channels. The Dutch church is a handsome stone building with seating accommodation for 1500 people. The college is an educational centre of some importance; it was rebuilt in 1906. Graaff Reinet is a flourishing market for agricultural produce, the district being noted for its mohair industry, its orchards and vineyards.

The town was founded by the Cape Dutch in 1786, being named after the then governor of Cape Colony, C. J. van de Graaff, and his wife. In 1795 the burghers, smarting under the exactions of the Dutch East India Company proclaimed a republic. Similar action was taken by the burghers of Swellendam. Before the authorities at Cape Town could take decisive measures against the rebels, they were themselves compelled to capitulate to the British. The burghers having endeavoured, unsuccessfully, to get aid from a French warship at Algoa Bay surrendered to Colonel (afterwards General Sir) J. O. Vandeleur. In January 1799 Marthinus Prinsloo, the leader of the republicans in 1795, again rebelled, but surrendered in April following. Prinsloo and nineteen others were imprisoned in Cape Town castle. After trial, Prinsloo and another commandant were sentenced to death and others to banishment. The sentences were not carried out and the prisoners were released, March 1803, on the retrocession of the Cape to Holland. In 1801 there had been another revolt in Graaff Reinet, but owing to the conciliatory measures of General F. Dundas (acting governor of the Cape) peace was soon restored. It was this district, where a republican government in South Africa was first proclaimed, which furnished large numbers of the voortrekkers in 1835-1842. It remains a strong Dutch centre.

See J. C. Voight, *Fifty Years of the History of the Republic in South Africa 1795-1845*, vol. i. (London, 1899).

GRABBE, CHRISTIAN DIETRICH (1801-1836), German dramatist, was born at Detmold on the 11th of December 1801. Entering the university of Leipzig in 1819 as a student of law, he continued the reckless habits which he had begun at Detmold, and neglected his

studies. Being introduced into literary circles, he conceived the idea of becoming an actor and wrote the drama *Herzog Theodor von Gothland* (1822). This, though showing considerable literary talent, lacks artistic form, and is morally repulsive. Ludwig Tieck, while encouraging the young author, pointed out its faults, and tried to reform Grabbe himself. In 1822 Grabbe removed to Berlin University, and in 1824 passed his advocate's examination. He now settled in his native town as a lawyer and in 1827 was appointed a *Militärauditeur*. In 1833 he married, but in consequence of his drunken habits was dismissed from his office, and, separating from his wife, visited Düsseldorf, where he was kindly received by Karl Immermann. After a serious quarrel with the latter, he returned to Detmold, where, as a result of his excesses, he died on the 12th of September 1836.

Grabbe had real poetical gifts, and many of his dramas contain fine passages and a wealth of original ideas. They largely reflect his own life and character, and are characterized by cynicism and indelicacy. Their construction also is defective and little suited to the requirements of the stage. The boldly conceived *Don Juan und Faust* (1829) and the historical dramas *Friedrich Barbarossa* (1829), *Heinrich VI.* (1830), and *Napoleon oder die Hundert Tage* (1831), the last of which places the battle of Waterloo upon the stage, are his best works. Among others are the unfinished tragedies *Marius and Sulla* (continued by Erich Korn, Berlin, 1890); and *Hannibal* (1835, supplemented and edited by C. Spielmann, Halle, 1901); and the patriotic *Hermannsschlacht* or the battle between Arminius and Varus (posthumously published with a biographical notice, by E. Duller, 1838).

Grabbe's works have been edited by O. Blumenthal (4 vols., 1875), and E. Grisebach (4 vols., 1902). For further notices of his life, see K. Ziegler, *Grabbes Leben und Charakter* (1855); O. Blumenthal, *Beiträge zur Kenntnis Grabbes* (1875); C. A. Piper, *Grabbe* (1898), and A. Ploch, *Grabbes Stellung in der deutschen Literatur* (1905).

GRABE, JOHN ERNEST (1666-1711), Anglican divine, was born on the 10th of July 1666, at Königsberg, where his father, Martin Sylvester Grabe, was professor of theology and history. In his theological studies Grabe succeeded in persuading himself of the schismatical character of the Reformation, and accordingly he presented to the consistory of Samland in Prussia a memorial in which he compared the position of the evangelical Protestant churches with that of the Novatians and other ancient schismatics. He had resolved to join the Church of Rome when a commission of Lutheran divines pointed out flaws in his written argument and called his attention to the English Church as apparently possessing that apostolic succession and manifesting that fidelity to ancient institutions which he desired. He came to England, settled in Oxford, was ordained in 1700, and became chaplain of Christ Church. His inclination was towards the party of the nonjurors. The learned labours to which the remainder of his life was devoted were rewarded with an Oxford degree and a royal pension. He died on the 3rd of November 1711, and in 1726 a monument was erected to him by Edward Harley, earl of Oxford, in Westminster Abbey. He was buried in St Pancras Church, London.

Some account of Grabe's life is given in R. Nelson's *Life of George Bull*, and by George Hickes in a discourse prefixed to the pamphlet against W. Whiston's *Collection of Testimonies against the True Deity of the Son and of the Holy Ghost*. His works, which show him to have been learned and laborious but somewhat deficient in critical acumen, include a *Spicilegium SS. Patrum et haereticorum* (1698-1699), which was designed to cover the first three centuries of the Christian church, but was not continued beyond the close of the second. A second edition of this work was published in 1714. He brought out an edition of Justin Martyr's *Apologia prima* (1700), of Irenaeus, *Adversus omnes haereses* (1702), of the Septuagint, and of Bishop Bull's Latin works (1703). His edition of the Septuagint was based on the *Codex Alexandrinus*; it appeared in 4 volumes (1707-1720), and was completed by Francis Lee and by George Wigan.

GRACCHUS, in ancient Rome, the name of a plebeian family of the Sempronian gens. Its

most distinguished representatives were the famous tribunes of the people, Tiberius and Gaius Sempronius Gracchus, (4) and (5) below, usually called simply “the Gracchi.”

1. Tiberius Sempronius Gracchus, consul in 238 B.C., carried on successful operations against the Ligurian mountaineers, and, at the conclusion of the Carthaginian mercenary war, was in command of the fleet which at the invitation of the insurgents took possession of the island of Sardinia.

2. Tiberius Sempronius Gracchus, probably the son of (1), distinguished himself during the second Punic war. Consul in 215, he defeated the Capuans who had entered into an alliance with Hannibal, and in 214 gained a signal success over Hanno near Beneventum, chiefly owing to the *volones* (slave-volunteers), to whom he had promised freedom in the event of victory. In 213 Gracchus was consul a second time and carried on the war in Lucania; in the following year, while advancing northward to reinforce the consuls in their attack on Capua, he was betrayed into the hands of the Carthaginian Mago by a Lucanian of rank, who had formerly supported the Roman cause and was connected with Gracchus himself by ties of hospitality. Gracchus fell fighting bravely; his body was sent to Hannibal, who accorded him a splendid burial.

3. Tiberius Sempronius Gracchus (*c.* 210-151 B.C.), father of the tribunes, and husband of Cornelia, the daughter of the elder Scipio Africanus, was possibly the son of a Publius Sempronius Gracchus who was tribune in 189. Although a determined political opponent of the two Scipios (Asiaticus and Africanus), as tribune in 187 he interfered on their behalf when they were accused of having accepted bribes from the king of Syria after the war. In 185 he was a member of the commission sent to Macedonia to investigate the complaints made by Eumenes II. of Pergamum against Philip V. of Macedon. In his curule aedileship (182) he celebrated the games on so magnificent a scale that the burdens imposed upon the Italian and extra-Italian communities led to the official interference of the senate. In 181 he went as praetor to Hither Spain, and, after gaining signal successes in the field, applied himself to the pacification of the country. His strict sense of justice and sympathetic attitude won the respect and affection of the inhabitants; the land had rest for a quarter of a century. When consul in 177, he was occupied in putting down a revolt in Sardinia, and brought back so many prisoners that *Sardi venales* (Sardinians for sale) became a proverbial expression for a drug in the market. In 169 Gracchus was censor, and both he and his colleague (C. Claudius Pulcher) showed themselves determined opponents of the capitalists. They deeply offended the equestrian order by forbidding any contractor who had obtained contracts under the previous censors to make fresh offers. Gracchus stringently enforced the limitation of the freedmen to the four city tribes, which completely destroyed their influence in the comitia. In 165 and 161 he went as ambassador to several Asiatic princes, with whom he established friendly relations. Amongst the places visited by him was Rhodes, where he delivered a speech in Greek, which he afterwards published. In 163 he was again consul.

4. Tiberius Sempronius Gracchus (163-133 B.C.), son of (3), was the elder of the two great reformers. He and his brother were brought up by their mother Cornelia, assisted by the rhetorician Diophanes of Mytilene and the Stoic Blossius of Cumae. In 147 he served under his brother-in-law the younger Scipio in Africa during the last Punic war, and was the first to mount the walls in the attack on Carthage. When quaestor in 137, he accompanied the consul C. Hostilius Mancinus to Spain. During the Numantine war the Roman army was saved from annihilation only by the efforts of Tiberius, with whom alone the Numantines consented to treat, out of respect for the memory of his father. The senate refused to ratify the agreement; Mancinus was handed over to the enemy as a sign that it was annulled, and only personal popularity saved Tiberius himself from punishment. In 133 he was tribune, and championed the impoverished farmer class and the lower orders. His proposals (see Agrarian Laws) met with violent opposition, and were not carried until he had, illegally and unconstitutionally, secured the deposition of his fellow-tribune, M. Octavius, who had been persuaded by the optimates to veto them. The senate put every obstacle in the way of the three commissioners appointed to carry out the provisions of the law, and Tiberius, in view of the bitter enmity he had aroused, saw that it was necessary to strengthen his hold on the popular favour. The legacy to the Roman people of the kingdom and treasures of Attalus III. of Pergamum gave him an opportunity. He proposed that the money realized by the sale of the treasures should be divided, for the purchase of implements and stock, amongst those to whom assignments of land had been made under the new law. He is also said to have brought forward measures for shortening the period of military service, for extending the right of appeal from the *judices* to the people, for abolishing the exclusive privilege of the senators to act as jurymen, and even for admitting the Italian allies to citizenship. To strengthen his position further, Tiberius offered himself for re-election as tribune for the

following year. The senate declared that it was illegal to hold this office for two consecutive years; but Tiberius treated this objection with contempt. To win the sympathy of the people, he appeared in mourning, and appealed for protection for his wife and children, and whenever he left his house he was accompanied by a bodyguard of 3000 men, chiefly consisting of the city rabble. The meeting of the tribes for the election of tribunes broke up in disorder on two successive days, without any result being attained, although on both occasions the first divisions voted in favour of Tiberius. A rumour reached the senate that he was aiming at supreme power, that he had touched his head with his hand, a sign that he was asking for a crown. An appeal to the consul P. Mucius Scaevola to order him to be put to death at once having failed, P. Scipio Nasica exclaimed that Scaevola was acting treacherously towards the state, and called upon those who agreed with him to take up arms and follow him. During the riot that followed, Tiberius attempted to escape, but stumbled on the slope of the Capitol and was beaten to death with the end of a bench. At night his body, with those of 300 others, was thrown into the Tiber. The aristocracy boldly assumed the responsibility for what had occurred, and set up a commission to inquire into the case of the partisans of Tiberius, many of whom were banished and others put to death. Even the moderate Scaevola subsequently maintained that Nasica was justified in his action; and it was reported that Scipio, when he heard at Numantia of his brother-in-law's death, repeated the line of Homer—"So perish all who do the like again."

See Livy, *Epit.* 58; Appian, *Bell. civ.* i. 9-17; Plutarch, *Tiberius Gracchus*; Vell. Pat. ii. 2, 3.

5. Gaius Sempronius Gracchus (153-121 B.C.), younger brother of (4), was a man of greater abilities, bolder and more passionate, although possessed of considerable powers of self-control, and a vigorous and impressive orator. When twenty years of age he was appointed one of the commissioners to carry out the distribution of land under the provisions of his brother's agrarian law. At the time of Tiberius's death, Gaius was serving under his brother-in-law Scipio in Spain, but probably returned to Rome in the following year (132). In 131 he supported the bill of C. Papirius Carbo, the object of which was to make it legal for a tribune to offer himself as candidate for the office in two consecutive years, and thus to remove one of the chief obstacles that had hampered Tiberius. The bill was then rejected, but appears to have subsequently passed in a modified form, as Gaius himself was re-elected without any disturbance. Possibly, however, his re-election was illegal, and he had only succeeded where his brother had failed. For the next few years nothing is heard of Gaius. Public opinion pointed him out as the man to avenge his brother's death and carry out his plans, and the aristocratic party, warned by the example of Tiberius, were anxious to keep him away from Rome. In 126 Gaius accompanied the consul L. Aurelius Orestes as quaestor to Sardinia, then in a state of revolt. Here he made himself so popular that the senate in alarm prolonged the command of Orestes, in order that Gaius might be obliged to remain there in his capacity of quaestor. But he returned to Rome without the permission of the senate, and, when called to account by the censors, defended himself so successfully that he was acquitted of having acted illegally. The disappointed aristocrats then brought him to trial on the charge of being implicated in the revolt of Fregellae, and in other ways unsuccessfully endeavoured to undermine his influence. Gaius then decided to act; against the wishes of his mother he became a candidate for the tribuneship, and, in spite of the determined opposition of the aristocracy, he was elected for the year 123, although only fourth on the list. The legislative proposals[1] brought forward by him had for their object:—the punishment of his brother's enemies; the relief of distress and the attachment to himself of the city populace; the diminution of the power of the senate and the increase of that of the *equites*; the amelioration of the political status of the Italians and provincials.

A law was passed that no Roman citizen should be tried in a matter affecting his life or political status unless the people had previously given its assent. This was specially aimed at Popilius Laenas, who had taken an active part in the prosecution of the adherents of Tiberius. Another law enacted that any magistrate who had been deprived of office by decree of the people should be incapacitated from holding office again. This was directed against M. Octavius, who had been illegally deprived of his tribunate through Tiberius. This unfair and vindictive measure was withdrawn at the earnest request of Cornelia.

He revived his brother's agrarian law, which, although it had not been repealed, had fallen into abeyance. By his *Lex Frumentaria* every citizen resident in Rome was entitled to a certain amount of corn at about half the usual price; as the distribution only applied to those living in the capital, the natural result was that the poorer country citizens flocked into Rome and swelled the number of Gaius's supporters. No citizen was to be obliged to serve in the army before the commencement of his eighteenth year, and his military outfit was to be supplied by the state, instead of being deducted from his pay. Gaius also proposed the establishment of colonies in Italy (at Tarentum and Capua), and sent out to the site of

Carthage 6000 colonists to found the new city of Junonia, the inhabitants of which were to possess the rights of Roman citizens; this was the first attempt at over-sea colonization. A new system of roads was constructed which afforded easier access to Rome. Having thus gained over the city proletariat, in order to secure a majority in the comitia by its aid, Gaius did away with the system of voting in the comitia centuriata, whereby the five property classes in each tribe gave their votes one after another, and introduced promiscuous voting in an order fixed by lot.

The judices in the standing commissions for the trial of particular offences (the most important of which was that dealing with the trial of provincial magistrates for extortion, *de repetundis*) were in future to be chosen from the equites (*q.v.*), not as hitherto from the senate. The taxes of the new province of Asia were to be let out by the censors to Roman *publicani* (who belonged to the equestrian order), who paid down a lump sum for the right of collecting them. It is obvious that this afforded the equites extensive opportunities for money-making and extortion, while the alteration in the appointment of the judices gave them the same practical immunity and perpetuated the old abuses, with the difference that it was no longer senators, but equites, who could look forward with confidence to being leniently dealt with by men belonging to their own order; Gaius also expected that this moneyed aristocracy, which had taken the part of the senate against Tiberius, would now support him against it. It was enacted that the provinces to be assigned to the consuls, should be determined before, instead of after their election; and the consuls themselves had to settle, by lot or other arrangement, which province each of them would take.[2]

These measures raised Gaius to the height of his popularity, and during the year of his first tribuneship he may be considered the absolute ruler of Rome. He was chosen tribune for the second time for the year 122. To this period is probably to be assigned his proposal that the franchise should be given to all the Latin communities and that the status of the Latins should be conferred upon the Italian allies. In 125 M. Fulvius Flaccus had brought forward a similar measure, but he was got out of the way by the senate, who sent him to fight in Gaul. This proposal, more statesmanlike than any of the others, was naturally opposed by the aristocratic party, and lessened Gaius's popularity amongst his own supporters, who viewed with disfavour the prospect of an increase in the number of Roman citizens. The senate put up M. Livius Drusus to outbid him, and his absence from Rome while superintending the organization of the newly-founded colony, Junonia-Carthago, was taken advantage of by his enemies to weaken his influence. On his return he found his popularity diminished. He failed to secure the tribuneship for the third time, and his bitter enemy L. Opimius was elected consul. The latter at once decided to propose the abandonment of the new colony, which was to occupy the site cursed by Scipio, while its foundation had been attended by unmistakable manifestations of the wrath of the gods. On the day when the matter was to be put to the vote, a lictor named Antyllius, who had insulted the supporters of Gaius, was stabbed to death. This gave his opponents the desired opportunity. Gaius was declared a public enemy, and the consuls were invested with dictatorial powers. The Gracchans, who had taken up their position in the temple of Diana on the Aventine, offered little resistance to the attack ordered by Opimius. Gaius managed to escape across the Tiber, where his dead body was found on the following day in the grove of Furrina by the side of that of a slave, who had probably slain his master and then himself. The property of the Gracchans was confiscated, and a temple of Concord erected in the Forum from the proceeds. Beneath the inscription recording the occasion on which the temple had been built some one during the night wrote the words: "The work of Discord makes the temple of Concord."

Bibliography.—See Livy, *Epit.* 60; Appian, *Bell. Civ.* i. 21; Plutarch, *Gaius Gracchus*; Orosius v. 12; Aulus Gellius x. 3, xi. 10. For an account of the two tribunes see Mommsen, *Hist. of Rome* (Eng. trans.), bk. iv., chs. 2 and 3; C. Neumann, *Geschichte Roms während des Verfalles der Republik* (1881); A. H. J. Greenidge, *History of Rome* (1904); E. Meyer, *Untersuchungen zur Geschichte der Gracchen* (1894); G. E. Underhill, Plutarch's *Lives of the Gracchi* (1892); W. Warde Fowler in *English Historical Review* (1905), pp. 209 and 417; Long, *Decline of the Roman Republic*, chs. 10-13, 17-19, containing a careful examination of the ancient authorities; G. F. Hertzberg in Ersch and Gruber's *Allgemeine Encyclopädie*; C. W. Oman, *Seven Roman Statesmen of the later Republic* (1902); T. Lau, *Die Gracchen und ihre Zeit* (1854). The exhaustive monograph by C. W. Nitzsch, *Die Gracchen und ihre nächsten Vorgänger* (1847), also contains an account of the other members of the family, with full references to ancient authorities in the notes.

(J. H. F.)

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1 These measures cannot be arranged in any definite chronological order, nor can it be decided which belong to his first, which to his second tribuneship. See W. Warde Fowler in *Eng. Hist. Review*, 1905. pp. 209 sqq., 417 sqq.

2 It is suggested by W. Warde Fowler that Gracchus proposed to add a certain number of *equites* to the senate, thereby increasing it to 900, but the plan was never carried out.

GRACE, WILLIAM GILBERT (1848-), English cricketer, was born at Downend, Gloucestershire, on the 18th of July 1848. He found himself in an atmosphere charged with cricket, his father (Henry Mills Grace) and his uncle (Alfred Pocock) being as enthusiastic over the game as his elder brothers, Henry, Alfred and Edward Mills; indeed, in E. M. Grace the family name first became famous. A younger brother, George Frederick, also added to the cricket reputation of the family. "W. G." witnessed his first great match when he was hardly six years old, the occasion being a game between W. Clarke's All-England Eleven and twenty-two of West Gloucestershire. He was endowed by nature with a splendid physique as well as with powers of self-restraint and determination. At the acme of his career he stood full 6 ft. 2 in., being powerfully proportioned, loose yet strong of limb. A non-smoker, and very moderate in all matters, he kept himself in condition all the year round, shooting, 309 hunting or running with the beagles as soon as the cricket season was over. He was also a fine runner, 440 yds. over 20 hurdles being his best distance; and it may be quoted as proof of his stamina that on the 30th of July 1866 he scored 224 not out for England *v.* Surrey, and two days later won a race in the National and Olympian Association meeting at the Crystal Palace. The title of "champion" was well earned by one who for thirty-six years (1865-1900 inclusive) was actively engaged in first-class cricket. In each of these years he was invited to represent the Gentlemen in their matches against the Players, and, when an Australian eleven visited England, to play for the mother country. As late as 1899 he played in the first of the five international contests; in 1900 he played against the players at the Oval, scoring 58 and 3. At fifty-three he scored nearly 1300 runs in first-class cricket, made 100 runs and over on three different occasions and could claim an average of 42 runs. Moreover, his greatest triumphs were achieved when only the very best cricket grounds received serious attention; when, as some consider, bowling was maintained at a higher standard and when all hits had to be run out. He, with his two brothers, E. M. and G. F., assisted by some fine amateurs, made Gloucestershire in one season a first-class county; and it was he who first enabled the amateurs of England to meet the paid players on equal terms and to beat them. There was hardly a "record" connected with the game which did not stand to his credit. Grace was one of the finest fieldsmen in England, in his earlier days generally taking long-leg and cover-point, in later times generally standing point. He was, at his best, a fine thrower, fast runner and safe "catch." As a bowler he was long in the first flight, originally bowling fast, but in later times adopting a slower and more tricky style, frequently very effective. By profession he was a medical man. In later years he became secretary and manager of the London County Cricket Club. He was married in 1873 to Miss Agnes Day, and one of his sons played for two years in the Cambridge eleven. He was the recipient of two national testimonials: the first, amounting to £1500, being presented to him in the form of a clock and a cheque at Lord's ground by Lord Charles Russell on the 22nd of July 1879; the second, collected by the M.C.C., the county of Gloucestershire, the *Daily Telegraph* and the *Sportsman*, amounted to about £10,000, and was presented to him in 1896. He visited Australia in 1873-1874 (captain), and in 1891-1892 with Lord Sheffield's Eleven (captain); the United States and Canada in 1872, with R. A. Fitzgerald's team.

Dr Grace played his first great match in 1863, when, being only fifteen years of age, he scored 32 against the All-England Eleven and the bowling of Jackson, Tarrant and Tinley; but the scores which first made his name prominent were made in 1864, viz. 170 and 56 not out for the South Wales Club against the Gentlemen of Sussex. It was in 1865 that he first took an active part in first-class cricket, being then 6 ft. in height, and 11 stone in weight, and playing twice for the Gentlemen *v.* the Players, but his selection was mainly due to his bowling powers, the best exposition of which was his aggregate of 13 wickets for 84 runs for the Gentlemen of the South *v.* the Players of the South. His highest score was 400 not out, made in July 1876 against twenty-two of Grimsby; but on three occasions he was twice dismissed without scoring in matches against odds, a fate that never befell him in important cricket. In first-class matches his highest score was 344, made for the M.C.C. v. Kent at Canterbury, in August 1876; two days later he made 177 for Gloucestershire *v.* Notts, and two days after this 318 not out for Gloucestershire *v.* Yorkshire, the two last-named opposing counties being possessed of exceptionally strong bowling; thus in three consecutive innings Grace scored 839 runs, and was only got out twice. His 344 was the third highest individual score made in a big match in England up to the end of 1901. He also scored 301 for

Gloucestershire *v.* Sussex at Bristol, in August 1896. He made over 200 runs on ten occasions, the most notable perhaps being in 1871, when he performed the feat twice, each time in benefit matches, and each time in the second innings, having been each time got out in the first over of the first innings. He scored over 100 runs on 121 occasions, the hundredth score being 288, made at Bristol for Gloucestershire *v.* Somersetshire in 1895. He made every figure from 0 to 100, on one occasion "closing" the innings when he had made 93, the only total he had never made between these limits. In 1871 he made ten "centuries," ranging from 268 to 116. In the matches between the Gentlemen and Players he scored "three figures" fifteen times, and at every place where these matches have been played. He made over 100 in each of his "first appearances" at Oxford and Cambridge. Three times he made over 100 in each innings of the same match, viz. at Canterbury, in 1868, for South v. North of the Thames, 130 and 102 not out; at Clifton, in 1887, for Gloucestershire *v.* Kent, 101 and 103 not out; and at Clifton, in 1888, for Gloucestershire *v.* Yorkshire, 148 and 153. In 1869, playing at the Oval for the Gentlemen of the South *v.* the Players of the South, Grace and B. B. Cooper put on 283 runs for the first wicket, Grace scoring 180 and Cooper 101. In 1886 Grace and Scotton put on 170 runs for the first wicket of England *v.* Australia; this occurred at the Oval in August, and Grace's total score was 170. In consecutive innings against the Players from 1871 to 1873 he scored 217, 77 and 112, 117, 163, 158 and 70. He only twice scored over 100 in a big match in Australia, nor did he ever make 200 at Lord's, his highest being 196 for the M.C.C. *v.* Cambridge University in 1894. His highest aggregates were 2739 (1871), 2622 (1876), 2346 (1895), 2139 (1873), 2135 (1896) and 2062 (1887). He scored three successive centuries in first-class cricket in 1871, 1872, 1873, 1874 and 1876. Playing against Kent at Gravesend in 1895, he was batting, bowling or fielding during the whole time the game was in progress, his scores being 257 and 73 not out. He scored over 1000 runs and took over 100 wickets in seven different seasons, viz. in 1874, 1665 runs and 129 wickets; in 1875, 1498 runs, 192 wickets; in 1876, 2622 runs, 124 wickets; in 1877, 1474 runs, 179 wickets; in 1878, 1151 runs, 153 wickets; in 1885, 1688 runs, 118 wickets; in 1886, 1846 runs, 122 wickets. He never captured 200 wickets in a season, his highest record being 192 in 1875. Playing against Oxford University in 1886, he took all the wickets in the first innings, at a cost of 49 runs. In 1895 he not only made his hundredth century, but actually scored 1000 runs in the month of May alone, his chief scores in that month being 103, 288, 256, 73 and 169, he being then forty-seven years old. He also made during that year scores of 125, 119, 118, 104 and 103 not out, his aggregate for the year being 2346 and his average 51; his innings of 118 was made against the Players (at Lord's), the chief bowlers being Richardson, Mold, Peel and Attewell; he scored level with his partner, A. E. Stoddart (his junior by fifteen years), the pair making 151 before a wicket fell, Grace making in all 118 out of 241. This may fairly be considered one of his most wonderful years. In 1898 the match between Gentlemen *v.* Players was, as a special compliment, arranged by the M.C.C. committee to take place on his birthday, and he celebrated the event by scoring 43 and 31 not out, though handicapped by lameness and an injured hand. In twenty-six different seasons he scored over 1000 runs, in three of these years being the only man to do so and five times being one out of two.

During the thirty-six years up to and including 1900 he scored nearly 51,000 runs, with an average of 43; and in bowling he took more than 2800 wickets, at an average cost of about 20 runs per wicket. He made his highest aggregate (2739 runs) and had his highest average (78) in 1871; his average for the decade 1868-1877 was 57 runs. His style as a batsman was more commanding than graceful, but as to its soundness and efficacy there were never two opinions; the severest criticism ever passed upon his powers was to the effect that he did not play slow bowling quite as well as fast.

(W. J. F.)

GRACE (Fr. *grâce*, Lat. *gratia*, from *gratus*, beloved, pleasing; formed from the root *cra-*, Gr. χασ- cf. χαίρω, χάρμα, χάρις), a word of many shades of meaning, but always connoting the idea of favour, whether that in which one stands to others or that which one shows to others. The *New English Dictionary* groups the meanings of the word under three main heads: (1) Pleasing quality, gracefulness, (2) favour, goodwill, (3) gratitude, thanks.

It is in the second general sense of "favour bestowed" that the word has its most important connotations. In this sense it means something given by superior authority as a concession made of favour and goodwill, not as an obligation or of right. Thus, a concession may be made by a sovereign or other public authority "by way of grace." Previous to the Revolution of 1688 such concessions on the part of the crown were known in constitutional law as

"Graces." "Letters of Grace" (*gratiae, gratiosa rescripta*) is the name given to papal rescripts granting special privileges, indulgences, exemptions and the like. In the language of the universities the word still survives in a shadow of this sense. The word "grace" was originally a dispensation granted by the congregation of the university, or by one of the faculties, from some statutable conditions required for a degree. In the English universities these conditions ceased to be enforced, and the "grace" thus became an essential preliminary to any degree; so that the word has acquired the meaning of (*a*) the licence granted by congregation to take a degree, (*b*) other decrees of the governing body (originally dispensations from statutes), all such degrees being called "graces" at Cambridge, (*c*) the permission which a candidate for a degree must obtain from his college or hall.

To this general sense of exceptional favour belong the uses of the word in such phrases as "do me this grace," "to be in some one's good graces" and certain meanings of "the grace of God." The style "by the grace of God," borne by the king of Great Britain and Ireland among other sovereigns, though, as implying the principle of "legitimacy," it has been since the Revolution sometimes qualified on the continent by the addition of "and the will of the people," means in effect no more than the "by Divine Providence," which is the style borne by archbishops. To the same general sense of exceptional favour belong the phrases implying the concession of a right to delay in fulfilling certain obligations, *e.g.* "a fortnight's grace." In law the "days of grace" are the period allowed for the payment of a bill of exchange, after the term for which it has been drawn (in England three days), or for the payment of an insurance premium, &c. In religious language the "Day of Grace" is the period still open to the sinner in which to repent. In the sense of clemency or mercy, too, "grace" is still, though rarely used: "an Act of Grace" is a formal pardon or a free and general pardon granted by act of parliament. Since to grant favours is the prerogative of the great, "Your Grace," "His Grace," &c., became dutiful paraphrases for the simple "you" and "he." Formerly used in the royal address ("the King's Grace," &c.), the style is in England now confined to dukes and archbishops, though the style of "his most gracious majesty" is still used. In Germany the equivalent, *Euer Gnaden*, is the style of princes who are not *Durchlaucht* (*i.e.* Serene Highness), and is often used as a polite address to any superior.

In the language of theology, though in the English Bible the word is used in several of the above senses, "grace" (Gr. χάρις) has special meanings. Above all, it signifies the spontaneous, unmerited activity of the Divine Love in the salvation of sinners, and the Divine influence operating in man for his regeneration and sanctification. Those thus regenerated and sanctified are said to be in a "state of grace." In the New Testament grace is the forgiving mercy of God, as opposed to any human merit (Rom. xi. 6; Eph. ii. 5; Col. i. 6, &c.); it is applied also to certain gifts of God freely bestowed, *e.g.* miracles, tongues, &c. (Rom. xv. 15; 1 Cor. xv. 10; Eph. iii. 8, &c.), to the Christian virtues, gifts of God also, *e.g.* charity, holiness, &c. (2 Cor. viii. 7; 2 Pet. iii. 18). It is also used of the Gospel generally, as opposed to the Law (John i. 17; Rom. vi. 14; 1 Pet. v. 12, &c.); connected with this is the use of the term "year of grace" for a year of the Christian era.

The word "grace" is the central subject of three great theological controversies: (1) that of the nature of human depravity and regeneration (see Pelagius), (2) that of the relation between grace and free-will (see Calvin, John, and Arminius, Jacobus), (3) that of the "means of grace" between Catholics and Protestants, *i.e.* whether the efficacy of the sacraments as channels of the Divine grace is *ex opere operato* or dependent on the faith of the recipient.

In the third general sense, of thanks for favours bestowed, "grace" survives as the name for the thanksgiving before or after meals. The word was originally used in the plural, and "to do, give, render, yield graces" was said, in the general sense of the French *rendre grâces* or Latin *gratias agere*, of any giving thanks. The close, and finally exclusive, association of the phrase "to say grace" with thanksgiving at meals was possibly due to the formula "Gratias Deo agamus" ("let us give thanks to God") with which the ceremony began in monastic refectories. The custom of saying grace, which obtained in pre-Christian times among the Jews, Greeks and Romans, and was adopted universally by Christian peoples, is probably less widespread in private houses than it used to be. It is, however, still maintained at public dinners and also in schools, colleges and institutions generally. Such graces are generally in Latin and of great antiquity: they are sometimes short, *e.g.* "Laus Deo," "Benedictus benedicat," and sometimes, as at the Oxford and Cambridge colleges, of considerable length. In some countries grace has sunk to a polite formula; in Germany, *e.g.* it is usual before and after meals to bow to one's neighbours and say "Gesegnete Malzeit!" (May your meal be blessed), a phrase often reduced in practice to "Malzeit" simply.

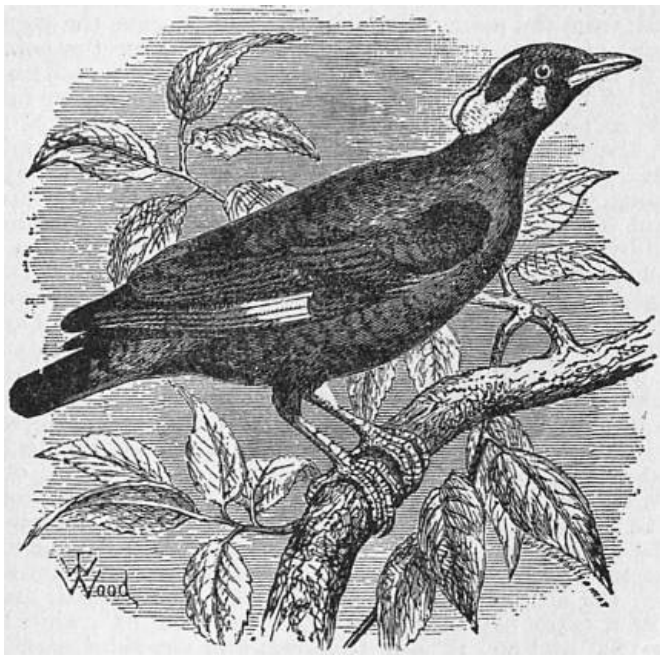
GRACES, THE, (Gr. Χάριτες, Lat. *Gratiae*), in Greek mythology, the personification of grace and charm, both in nature and in moral action. The transition from a single goddess, Charis, to a number or group of Charites, is marked in Homer. In the *Iliad* one Charis is the wife of Hephaestus, another the promised wife of Sleep, while the plural Charites often occurs. The Charites are usually described as three in number—Aglaia (brightness), Euphrosyne (joyfulness), Thalia (bloom)—daughters of Zeus and Hera (or Eurynome, daughter of Oceanus), or of Helios and Aegle; in Sparta, however, only two were known, Cleta (noise) and Phaënna (light), as at Athens Auxo (increase) and Hegemone (queen). They are the friends of the Muses, with whom they live on Mount Olympus, and the companions of Aphrodite, of Peitho, the goddess of persuasion, and of Hermes, the god of eloquence, to each of whom charm is an indispensable adjunct. The need of their assistance to the artist is indicated by the union of Hephaestus and Charis. The most ancient seat of their cult was Orchomenus in Boeotia, where their oldest images, in the form of stones fallen from heaven, were set up in their temple. Their worship was said to have been instituted by Eteocles, whose three daughters fell into a well while dancing in their honour. At Orchomenus nightly dances took place, and the festival Charitesia, accompanied by musical contests, was celebrated; in Paros their worship was celebrated without music or garlands, since it was there that Minos, while sacrificing to the Charites, received the news of the death of his son Androgeus; at Messene they were revered together with the Eumenides; at Athens, their rites, kept secret from the profane, were held at the entrance to the Acropolis. It was by Auxo, Hegemone and Agraulos, the daughter of Cecrops, that young Athenians, on first receiving their spear and shield, took the oath to defend their country. In works of art the Charites were represented in early times as beautiful maidens of slender form, hand in hand or embracing one another and wearing drapery; later, the conception predominated of three naked figures gracefully intertwined. Their attributes were the myrtle, the rose and musical instruments. In Rome the Graces were never the objects of special religious reverence, but were described and represented by poets and artists in accordance with Greek models.

See F. H. Krause, *Musen, Gratien, Horen, und Nymphen* (1871), and the articles by Stoll and Furtwängler in Roscher's *Lexikon der Mythologie*, and by S. Gsell in Daremberg and Saglio's *Dictionnaire des antiquités*, with the bibliography.

GRACIÁN Y MORALES, BALTASAR (1601-1658), Spanish prose writer, was born at Calatayud (Aragon) on the 8th of January 1601. Little is known of his personal history except that on May 14, 1619, he entered the Society of Jesus, and that ultimately he became rector of the Jesuit college at Tarazona, where he died on the 6th of December, 1658. His principal works are *El Héroe* (1630), which describes in apophthegmatic phrases the qualities of the ideal man; the *Arte de ingenio, tratado de la Agudeza* (1642), republished six years afterwards under the title of *Agudeza, y arte de ingenio* (1648), a system of rhetoric in which the principles of *conceptismo* as opposed to culteranismo are inculcated; *El Discreto* (1645), a delineation of the typical courtier; *El Oráculo manual y arte de prudencia* (1647), a system of rules for the conduct of life; and *El Criticón* (1651-1653-1657), an ingenious philosophical allegory of human existence. The only publication which bears Gracián's name is *El Comulgatorio* (1655); his more important books were issued under the pseudonym of Lorenzo Gracián (possibly a brother of the writer) or under the anagram of Gracian de Marlones. Gracián was punished for publishing without his superior's permission *El Criticón* (in which Defoe is alleged to have found the germ of *Robinson Crusoe*); but no objection was taken to its substance. He has been excessively praised by Schopenhauer, whose appreciation of the author induced him to translate the *Oráculo manual*, and he has been unduly depreciated by Ticknor and others. He is an acute thinker and observer, misled by his systematic misanthropy and by his fantastic literary theories.

See Karl Borinski, *Baltasar Gracián und die Hoflitteratur in Deutschland* (Halle, 1894); Benedetto Croce, *I Trattatisti italiani del "concettismo" e Baltasar Gracián* (Napoli, 1899); Narciso José Liñán y Heredia, *Baltasar Gracián* (Madrid, 1902). Schopenhauer and Joseph Jacobs have respectively translated the *Oráculo manual* into German and English.

GRACKLE (Lat. *Gracculus* or *Graculus*), a word much used in ornithology, generally in a vague sense, though restricted to members of the families *Sturnidae* belonging to the Old World and *Icteridae* belonging to the New. Of the former those to which it has been most commonly applied are the species known as mynas, mainas, and minors of India and the adjacent countries, and especially the *Gracula religiosa* of Linnaeus, who, according to Jerdon and others, was probably led to confer this epithet upon it by confounding it with the *Sturnus* or *Acridotheres tristis*,[1] which is regarded by the Hindus as sacred to Ram Deo, one of their deities, while the true *Gracula religiosa* does not seem to be anywhere held in veneration. This last is about 10 in. in length, clothed in a plumage of glossy black, with purple and green reflections, and a conspicuous patch of white on the quill-feathers of the wings. The bill is orange and the legs yellow, but the bird's most characteristic feature is afforded by the curious wattles of bright yellow, which, beginning behind the eyes, run backwards in form of a lappet on each side, and then return in a narrow stripe to the top of the head. Beneath each eye also is a bare patch of the same colour. This species is common in southern India, and is represented farther to the north, in Ceylon, Burma, and some of the Malay Islands by cognate forms. They are all frugivorous, and, being easily tamed and learning to pronounce words very distinctly, are favourite cage-birds.[2]



Gracula religiosa.

In America the name Grackle has been applied to several species of the genera *Scolecophagus* and *Quiscalus*, though these are more commonly called in the United States and Canada "blackbirds," and some of them "boat-tails." They all belong to the family *Icteridae*. The best known of these are the rusty grackle, *S. ferrugineus*, which is found in almost the whole of North America, and *Q. purpureus*, the purple grackle or crow-blackbird, of more limited range, for though abundant in most parts to the east of the Rocky Mountains, it seems not to appear on the Pacific side. There is also Brewer's or the blue-headed grackle, *S. cyanocephalus*, which has a more western range, not occurring to the eastward of Kansas and Minnesota. A fourth species, *Q. major*, inhabits the Atlantic States as far north as North Carolina. All these birds are of exceedingly omnivorous habit, and though destroying large numbers of pernicious insects are in many places held in bad repute from the mischief they do to the corn-crops.

(A. N.)

1 By some writers the birds of the genera *Acridotheres* and *Temenuchus* are considered to be the true mynas, and the species of *Gracula* are called "hill mynas" by way of distinction.

2 For a valuable monograph on the various species of *Gracula* and its allies see Professor Schlegel's "Bijdrage tot de Kennis von het Geschlacht Beo'" (*Nederlandsch Tijdschrift voor de Dierkunde* i. 1-9).

GRADISCA, a town of Austria, in the province of Görz and Gradisca, 10 m. S.W. of Görz by rail. Pop. (1900) 3843, mostly Italians. It is situated on the right bank of the Isonzo and was formerly a strongly fortified place. Its principal industry is silk spinning. Gradisca originally formed part of the margraviate of Friuli, came under the patriarchate of Aquileia in 1028, and in 1420 to Venice. Between 1471 and 1481 Gradisca was fortified by the Venetians, but in 1511 they surrendered it to the emperor Maximilian I. In 1647 Gradisca and its territory, including Aquileia and forty-three smaller places, were erected into a separate countship in favour of Johann Anton von Eggenberg, duke of Krumau. On the extinction of his line in 1717, it reverted to Austria, and was completely incorporated with Görz in 1754. The name was revived by the constitution of 1861, which established the crownland of Görz and Gradisca.

GRADO, a town of northern Spain, in the province of Oviedo; 11 m. W. by N. of the city of Oviedo, on the river Cubia, a left-hand tributary of the Nalon. Pop. (1900) 17,125. Grado is built in the midst of a mountainous, well-wooded and fertile region. It has some trade in timber, live stock, cider and agricultural produce. The nearest railway station is that of the Fabrica de Trubia, a royal cannon-foundry and small-arms factory, 5 m. S.E.

GRADUAL (Med. Lat. *gradualis*, of or belonging to steps or degrees; *gradus*, step), advancing or taking place by degrees or step by step; hence used of a slow progress or a gentle declivity or slope, opposed to steep or precipitous. As a substantive, “gradual” (Med. Lat. *graduale* or *gradale*) is used of a service book or antiphonal of the Roman Catholic Church containing certain antiphons, called “graduals,” sung at the service of the Mass after the reading or singing of the Epistle. This antiphon received the name either because it was sung on the steps of the altar or while the deacon was mounting the steps of the ambo for the reading or singing of the Gospel. For the so-called Gradual Psalms, cxx.-cxxxiv., the “songs of degrees,” LXX. ᾠδὴ ἀνὰ βαθμῶν, see Psalms, Book of.

GRADUATE (Med. Lat. *graduare*, to admit to an academical degree, *gradus*), in Great Britain a verb now only used in the academical sense intransitively, *i.e.* “to take or proceed to a university degree,” and figuratively of acquiring knowledge of, or proficiency in, anything. The original transitive sense of “to confer or admit to a degree” is, however, still preserved in America, where the word is, moreover, not strictly confined to university degrees, but is used also of those successfully completing a course of study at any educational establishment. As a substantive, a “graduate” (Med. Lat. *graduatus*) is one who has taken a degree in a university. Those who have matriculated at a university, but not yet taken a degree, are known as “undergraduates.” The word “student,” used of undergraduates *e.g.* in Scottish universities, is never applied generally to those of the English and Irish universities. At Oxford the only “students” are the “senior students” (*i.e.* fellows) and “junior students” (*i.e.* undergraduates on the foundation, or “scholars”) of Christ Church. The verb “to graduate” is also used of dividing anything into degrees or parts in accordance with a given scale. For the scientific application see Graduation below. It may also mean “to arrange in gradations” or “to adjust or apportion according to a given scale.” Thus by “a graduated income-tax” is meant the system by which the percentage paid differs according to the amount of income on a pre-arranged scale.

GRADUATION (see also Graduate), the art of dividing straight scales, circular arcs or whole circumferences into any required number of equal parts. It is the most important and difficult part of the work of the mathematical instrument maker, and is required in the construction of most physical, astronomical, nautical and surveying instruments.

The art was first practised by clockmakers for cutting the teeth of their wheels at regular intervals; but so long as it was confined to them no particular delicacy or accurate nicety in its performance was required. This only arose when astronomy began to be seriously studied, and the exact position of the heavenly bodies to be determined, which created the necessity for strictly accurate means of measuring linear and angular magnitudes. Then it was seen that graduation was an art which required special talents and training, and the best artists gave great attention to the perfecting of astronomical instruments. Of these may be named Abraham Sharp (1651-1742), John Bird (1709-1776), John Smeaton (1724-1792), Jesse Ramsden (1735-1800), John Troughton, Edward Troughton (1753-1835), William Simms (1793-1860) and Andrew Ross.

The first graduated instrument must have been done by the hand and eye alone, whether it was in the form of a straight-edge with equal divisions, or a screw or a divided plate; but, once in the possession of one such divided instrument, it was a comparatively easy matter to employ it as a standard. Hence graduation divides itself into two distinct branches, *original graduation* and *copying*, which latter may be done either by the hand or by a machine called a dividing engine. Graduation may therefore be treated under the three heads of *original graduation*, *copying* and *machine graduation*.

Original Graduation.—In regard to the graduation of straight scales elementary geometry provides the means of dividing a straight line into any number of equal parts by the method of continual bisection; but the practical realization of the geometrical construction is so difficult as to render the method untrustworthy. This method, which employs the common diagonal scale, was used in dividing a quadrant of 3 ft. radius, which belonged to Napier of Merchiston, and which only read to minutes—a result, according to Thomson and Tait (*Nat. Phil.*), “giving no greater accuracy than is now attainable by the pocket sextants of Troughton and Simms, the radius of whose arc is little more than an inch.”

> The original graduation of a straight line is done either by the method of continual bisection or by stepping. In continual bisection the entire length of the line is first laid down. Then, as nearly as possible, half that distance is taken in the beam-compass and marked off by faint arcs from each end of the line. Should these marks coincide the exact middle point of the line is obtained. If not, as will almost always be the case, the distance between the marks is carefully bisected by hand with the aid of a magnifying glass. The same process is again applied to the halves thus obtained, and so on in succession, dividing the line into parts represented by 2, 4, 8, 16, &c. till the desired divisions are reached. In the method of stepping the smallest division required is first taken, as accurately as possible, by spring dividers, and that distance is then laid off, by successive steps, from one end of the line. In this method, any error at starting will be multiplied at each division by the number of that division. Errors so made are usually adjusted by the dots being put either back or forward a little by means of the dividing punch guided by a magnifying glass. This is an extremely tedious process, as the dots, when so altered several times, are apt to get insufferably large and shapeless.

The division of circular arcs is essentially the same in principle as the graduation of straight lines.

> The first example of note is the 8-ft. mural circle which was graduated by George Graham (1673-1751) for Greenwich Observatory in 1725. In this two concentric arcs of radii 96.85 and 95.8 in. respectively were first described by the beam-compass. On the inner of these the arc of 90° was to be divided into degrees and 12th parts of a degree, while the same on the outer was to be divided into 96 equal parts and these again into 16th parts. The reason for adopting the latter was that, 96 and 16 being both powers of 2, the divisions could be got at by continual bisection alone, which, in Graham’s opinion, who first employed it, is the only accurate method, and would thus serve as a check upon the accuracy of the divisions of the outer arc. With the same distance on the beam-compass as was used to describe the inner arc, laid off from 0°, the point 60° was at once determined. With the points 0° and 60° as centres successively, and a distance on the beam-compass very nearly bisecting the arc of 60°, two slight marks were made on the arc; the distance between these marks was divided by the hand aided by a lens, and this gave the point 30°. The chord of 60° laid off from the point 30° gave the point 90°, and the quadrant was now divided into three equal parts. Each of these parts was similarly bisected, and the resulting divisions again trisected, giving 18 parts of 5° each. Each of these quinquesected gave degrees, the 12th parts of which were arrived at by bisecting and trisecting as before. The outer arc was divided by continual

bisection alone, and a table was constructed by which the readings of the one arc could be converted into those of the other. After the dots indicating the required divisions were obtained, either straight strokes all directed towards the centre were drawn through them by the dividing knife, or sometimes small arcs were drawn through them by the beam-compass having its fixed point somewhere on the line which was a tangent to the quadrantal arc at the point where a division was to be marked.

The next important example of graduation was done by Bird in 1767. His quadrant, which was also 8-ft. radius, was divided into degrees and 12th parts of a degree. He employed the method of continual bisection aided by chords taken from an exact scale of equal parts, which could read to .001 of an inch, and which he had previously graduated by continual bisections. With the beam-compass an arc of radius 95.938 in. was first drawn. From this radius the chords of 30°, 15°, 10° 20′, 4° 40′ and 42° 40′ were computed, and each of them by means of the scale of equal parts laid off on a separate beam-compass to be ready. The radius laid off from 0° gave the point 60°; by the chord of 30° the arc of 60° was bisected; from the point 30° the radius laid off gave the point 90°; the chord of 15° laid off backwards from 90° gave the point 75°; from 75° was laid off forwards the chord of 10° 20′; and from 90° was laid off backwards the chord of 4° 40′; and these were found to coincide in the point 85° 20′. Now 85° 20′ being = 5′ × 1024 = 5′ × 2^{10}, the final divisions of 85° 20′ were found by continual bisections. For the remainder of the quadrant beyond 85° 20′, containing 56 divisions of 5′ each, the chord of 64 such divisions was laid off from the point 85° 40′, and the corresponding arc divided by continual bisections as before. There was thus a severe check upon the accuracy of the points already found, viz. 15°, 30°, 60°, 75°, 90°, which, however, were found to coincide with the corresponding points obtained by continual bisections. The short lines through the dots were drawn in the way already mentioned.

The next eminent artists in original graduation are the brothers John and Edward Troughton. The former was the first to devise a means of graduating the quadrant by continual bisection without the aid of such a scale of equal parts as was used by Bird. His method was as follows: The radius of the quadrant laid off from 0° gave the point 60°. This arc bisected and the half laid off from 60° gave the point 90°. The arc between 60° and 90° bisected gave 75°; the arc between 75° and 90° bisected gave the point 82° 30′, and the arc between 82° 30′ and 90° bisected gave the point 86° 15′. Further, the arc between 82° 30′ and 86° 15′ trisected, and two-thirds of it taken beyond 82° 30′, gave the point 85°, while the arc between 85° and 86° 15′ also trisected, and one-third part laid off beyond 85°, gave the point 85° 25′. Lastly, the arc between 85° and 85° 25′ being quinquesected, and four-fifths taken beyond 85°, gave 85° 20′, which as before is = 5′ × 2^{10}, and so can be finally divided by continual bisection.

The method of original graduation discovered by Edward Troughton is fully described in the *Philosophical Transactions* for 1809, as employed by himself to divide a meridian circle of 4 ft. radius. The circle was first accurately turned both on its face and its inner and outer edges. A roller was next provided, of such diameter that it revolved 16 times on its own axis while made to roll once round the outer edge of the circle. This roller, made movable on pivots, was attached to a frame-work, which could be slid freely, yet tightly, along the circle, the roller meanwhile revolving, by means of frictional contact, on the outer edge. The roller was also, after having been properly adjusted as to size, divided as accurately as possible into 16 equal parts by lines parallel to its axis. While the frame carrying the roller was moved once round along the circle, the points of contact of the roller-divisions with the circle were accurately observed by two microscopes attached to the frame, one of which (which we shall call H) commanded the ring on the circle near its edge, which was to receive the divisions and the other viewed the roller-divisions. The points of contact thus ascertained were marked with faint dots, and the meridian circle thereby divided into 256 very nearly equal parts.

The next part of the operation was to find out and tabulate the errors of these dots, which are called *apparent* errors, in consequence of the error of each dot being ascertained on the supposition that its neighbours are all correct. For this purpose two microscopes (which we shall call A and B) were taken, with cross wires and micrometer adjustments, consisting of a screw and head divided into 100 divisions, 50 of which read in the one and 50 in the opposite direction. These microscopes were fixed so that their cross-wires respectively bisected the dots 0 and 128, which were supposed to be diametrically opposite. The circle was now turned half-way round on its axis, so that dot 128 coincided with the wire of A, and, should dot 0 be found to coincide with B, then the two dots were 180° apart. If not, the cross wire of B was moved till it coincided with dot 0, and the number of divisions of the micrometer head noted. Half this number gave clearly the error of dot 128, and it was tabulated + or − according as the arcual distance between 0 and 128 was found to exceed or fall short of the remaining part of the circumference. The microscope B was now shifted, A remaining opposite dot 0 as before, till its wire bisected dot 64, and, by giving the circle one quarter of

a turn on its axis, the difference of the arcs between dots 0 and 64 and between 64 and 128 was obtained. The half of this difference gave the apparent error of dot 64, which was tabulated with its proper sign. With the microscope A still in the same position the error of dot 192 was obtained, and in the same way by shifting B to dot 32 the errors of dots 32, 96, 160 and 224 were successively ascertained. In this way the apparent errors of all the 256 dots were tabulated.

From this table of apparent errors a table of *real* errors was drawn up by employing the following formula:—

$$\tfrac{1}{2}\,(x_a + x_c) + z = \text{the real error of dot b},$$

where x_a is the real error of dot a, x_c the real error of dot c, and z the apparent error of dot b midway between a and c. Having got the real errors of any two dots, the table of apparent errors gives the means of finding the real errors of all the other dots.

The last part of Troughton's process was to employ them to cut the final divisions of the circle, which were to be spaces of 5′ each. Now the mean interval between any two dots is 360°/256 = 5′ × 16⅞, and hence, in the final division, this interval must be divided into 16⅞ equal parts. To accomplish this a small instrument, called a subdividing sector, was provided. It was formed of thin brass and had a radius about four times that of the roller, but made adjustable as to length. The sector was placed concentrically on the axis, and rested on the upper end of the roller. It turned by frictional adhesion along with the roller, but was sufficiently loose to allow of its being moved back by hand to any position without affecting the roller. While the roller passes over an angular space equal to the mean interval between two dots, any point of the sector must pass over 16 times that interval, that is to say, over an angle represented by 360° × 16/256 = 22° 30′. This interval was therefore divided by 16⅞, and a space equal to 16 of the parts taken. This was laid off on the arc of the sector and divided into 16 equal parts, each equal to 1° 20′; and, to provide for the necessary ⅞ths of a division, there was laid off at each end of the sector, and beyond the 16 equal parts, two of these parts each subdivided into 8 equal parts. A microscope with cross wires, which we shall call I, was placed on the main frame, so as to command a view of the sector divisions, just as the microscope H viewed the final divisions of the circle. Before the first or zero mark was cut, the zero of the sector was brought under I and then the division cut at the point on the circle indicated by H, which also coincided with the dot 0. The frame was then slipped along the circle by the slow screw motion provided for the purpose, till the first sector-division, by the action of the roller, was brought under I. The second mark was then cut on the circle at the point indicated by H. That the marks thus obtained are 5′ apart is evident when we reflect that the distance between them must be 1/16th of a division on the section which by construction is 1° 20′. In this way the first 16 divisions were cut; but before cutting the 17th it was necessary to adjust the micrometer wires of H to the real error of dot 1, as indicated by the table, and bring back the sector, not to zero, but to ⅛th short of zero. Starting from this position the divisions between dots 1 and 2 were filled in, and then H was adjusted to the real error of dot 2, and the sector brought back to its proper division before commencing the third course. Proceeding in this manner through the whole circle, the microscope H was finally found with its wire at zero, and the sector with its 16th division under its microscope indicating that the circle had been accurately divided.

Copying.—In graduation by copying the pattern must be either an accurately divided straight scale, or an accurately divided circle, commonly called a *dividing plate*.

In copying a straight scale the pattern and scale to be divided, usually called the work, are first fixed side by side, with their upper faces in the same plane. The dividing square, which closely resembles an ordinary joiner's square, is then laid across both, and the point of the dividing knife dropped into the zero division of the pattern. The square is now moved up close to the point of the knife; and, while it is held firmly in this position by the left hand, the first division on the work is made by drawing the knife along the edge of the square with the right hand.

It frequently happens that the divisions required on a scale are either greater or less than those on the pattern. To meet this case, and still use the same pattern, the work must be fixed at a certain angle of inclination with the pattern. This angle is found in the following way. Take the exact ratio of a division on the pattern to the required division on the scale. Call this ratio α. Then, if the required divisions are longer than those of the pattern, the angle is $\cos^{-1}\alpha$, but, if shorter, the angle is $\sec^{-1}\alpha$. In the former case two operations are required before the divisions are cut: first, the square is laid on the pattern, and the corresponding divisions merely notched very faintly on the edge of the work; and, secondly, the square is applied to the work and the final divisions drawn opposite each faint notch. In the second case, that is, when the angle is $\sec^{-1}\alpha$, the dividing square is applied to the

work, and the divisions cut when the edge of the square coincides with the end of each division on the pattern.

In copying circles use is made of the dividing plate. This is a circular plate of brass, of 36 in. or more in diameter, carefully graduated near its outer edge. It is turned quite flat, and has a steel pin fixed in its centre, and at right angles to its plane. For guiding the dividing knife an instrument called an index is employed. This is a straight bar of thin steel of length equal to the radius of the plate. A piece of metal, having a **V** notch with its angle a right angle, is riveted to one end of the bar in such a position that the vertex of the notch is exactly in a line with the edge of the steel bar. In this way, when the index is laid on the plate, with the notch grasping the central pin, the straight edge of the steel bar lies exactly along a radius. The work to be graduated is laid flat on the dividing plate, and fixed by two clamps in a position exactly concentric with it. The index is now laid on, with its edge coinciding with any required division on the dividing plate, and the corresponding division on the work is cut by drawing the dividing knife along the straight edge of the index.

Machine Graduation.—The first dividing engine was probably that of Henry Hindley of York, constructed in 1740, and chiefly used by him for cutting the teeth of clock wheels. This was followed shortly after by an engine devised by the duc de Chaulnes; but the first notable engine was that made by Ramsden, of which an account was published by the Board of Longitude in 1777. He was rewarded by that board with a sum of £300, and a further sum of £315 was given to him on condition that he would divide, at a certain fixed rate, the instruments of other makers. The essential principles of Ramsden’s machine have been repeated in almost all succeeding engines for dividing circles.

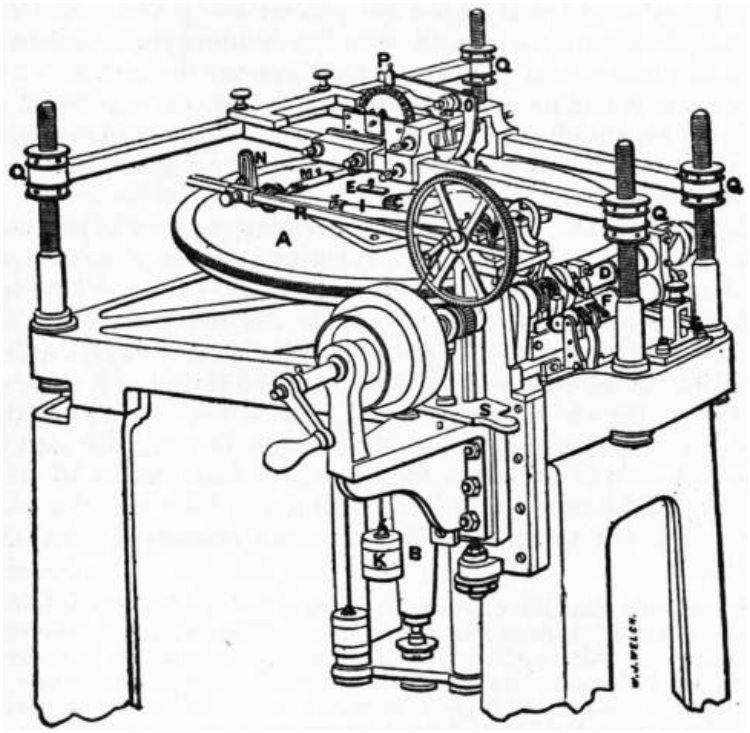
> Ramsden’s machine consisted of a large brass prate 45 in. in diameter, carefully turned and movable on a vertical axis. The edge of the plate was ratched with 2160 teeth, into which a tangent screw worked, by means of which the plate could be made to turn through any required angle. Thus six turns of the screw moved the plate through 1°, and $\frac{1}{60}$th of a turn through $\frac{1}{360}$th of a degree. On the axis of the tangent screw was placed a cylinder having a spiral groove cut on its surface. A ratchet-wheel containing 60 teeth was attached to this cylinder, and was so arranged that, when the cylinder moved in one direction, it carried the tangent screw with it, and so turned the plate, but when it moved in the opposite direction, it left the tangent screw, and with it the plate, stationary. Round the spiral groove of the cylinder a catgut band was wound, one end of which was attached to a treadle and the other to a counterpoise weight. When the treadle was depressed the tangent screw turned round, and when the pressure was removed it returned, in obedience to the weight, to its former position without affecting the screw. Provision was also made whereby certain stops could be placed in the way of the screw, which only allowed it the requisite amount of turning. The work to be divided was firmly fixed on the plate, and made concentric with it. The divisions were cut, while the screw was stationary, by means of a dividing knife attached to a swing frame, which allowed it to have only a radial motion. In this way the artist could divide very rapidly by alternately depressing the treadle and working the dividing knife.

Ramsden also constructed a linear dividing engine on essentially the same principle. If we imagine the rim of the circular plate with its notches stretched out into a straight line and made movable in a straight slot, the screw, treadle, &c., remaining as before, we get a very good idea of the linear engine.

In 1793 Edward Troughton finished a circular dividing engine, of which the plate was smaller than in Ramsden’s, and which differed considerably in simplifying matters of detail. The plate was originally divided by Troughton’s own method, already described, and the divisions so obtained were employed to ratch the edge of the plate for receiving the tangent screw with great accuracy. Andrew Ross (*Trans. Soc. Arts*, 1830-1831) constructed a dividing machine which differs considerably from those of Ramsden and Troughton.

> The essential point of difference is that, in Ross’s engine, the tangent screw does not turn the engine plate; that is done by an independent apparatus, and the function of the tangent screw is only to stop the plate after it has passed through the required angular interval between two divisions on the work to be graduated. Round the circumference of the plate are fixed 48 projections which just look as if the circumference had been divided into as many deep and somewhat peculiarly shaped notches or teeth. Through each of these teeth a hole is bored parallel to the plane of the plate and also to a tangent to its circumference. Into these holes are screwed steel screws with capstan heads and flat ends. The tangent screw consists only of a single turn of a large square thread which works in the teeth or notches of the plate. This thread is pierced by 90 equally distant holes, all parallel to the axis of the screw, and at the same distance from it. Into each of these holes is inserted a steel screw exactly similar to those in the teeth, but with its end rounded. It is the rounded and flat ends

of these sets of screws coming together that stop the engine plate at the desired position, and the exact point can be nicely adjusted by suitably turning the screws.



Dividing Engine.

A description is given of a dividing engine made by William Simms in the *Memoirs of the Astronomical Society*, 1843. Simms became convinced that to copy upon smaller circles the divisions which had been put upon a large plate with very great accuracy was not only more expeditious but more exact than original graduation. His machine involved essentially the same principle as Troughton's. The accompanying figure is taken by permission.

> The plate A is 46 in. in diameter, and is composed of gun-metal cast in one solid piece. It has two sets of 5' divisions—one very faint on an inlaid ring of silver, and the other stronger on the gun-metal. These were put on by original graduation, mainly on the plan of Edward Troughton. One very great improvement in this engine is that the axis B is tubular, as seen at C. The object of this hollow is to receive the axis of the circle to be divided, so that it can be fixed flat to the plate by the clamps E, without having first to be detached from the axis and other parts to which it has already been carefully fitted. This obviates the necessity for resetting, which can hardly be done without some error. D is the tangent screw, and F the frame carrying it, which turns on carefully polished steel pivots. The screw is pressed against the edge of the plate by a spiral spring acting under the end of the lever G, and by screwing the lever down the screw can be altogether removed from contact with the plate. The edge of the plate is ratched by 4320 teeth which were cut opposite the original division by a circular cutter attached to the screw frame. H is the spiral barrel round which the catgut band is wound, one end of which is attached to the crank L on the end of the axis J and the other to a counterpoise weight not seen. On the other end of J is another crank inclined to L and carrying a band and counterpoise weight seen at K. The object of this weight is to balance the former and give steadiness to the motion. On the axis J is seen a pair of bevelled wheels which move the rod I, which, by another pair of bevelled wheels attached to the box N, gives motion to the axis M, on the end of which is an eccentric for moving the bent lever O, which actuates the bar carrying the cutter. Between the eccentric and the point of the screw P is an undulating plate by which long divisions can be cut. The cutting apparatus is supported upon the two parallel rails which can be elevated or depressed at pleasure by the nuts Q. Also the cutting apparatus can be moved forward or backward upon these rails to suit circles of different diameters. The box N is movable upon the bar R, and the rod I is adjustable as to length by having a kind of telescope joint. The engine is self-acting, and can be driven either by hand or by a steam-engine or other motive power. It can be thrown in or out of gear at once by a handle seen at S.

Mention may be made of Donkin's linear dividing engine, in which a compensating arrangement is employed whereby great accuracy is obtained notwithstanding the inequalities of the screw used to advance the cutting tool. Dividing engines have also been made by Reichenbach, Repsold and others in Germany, Gambey in Paris and by several other astronomical instrument-makers. A machine constructed by E. R. Watts & Son is described

by G. T. McCaw, in the *Monthly Not. R. A. S.*, January 1909.

References.—Bird, *Method of dividing Astronomical Instruments* (London, 1767); Duc de Chaulnes, *Nouvelle Méthode pour diviser les instruments de mathématique et d'astronomie* (1768); Ramsden, *Description of an Engine for dividing Mathematical Instruments* (London, 1777); Troughton's memoir, *Phil. Trans.* (1809); *Memoirs of the Royal Astronomical Society*, v. 325, viii. 141, ix. 17, 35. See also J. E. Watkins, "On the Ramsden Machine," *Smithsonian Rep.* (1890), p. 721; and L. Ambronn, *Astronomische Instrumentenkunde* (1899).

(J. Bl.)

GRADUS, or Gradus ad Parnassum (a step to Parnassus), a Latin (or Greek) dictionary, in which the quantities of the vowels of the words are marked. Synonyms, epithets and poetical expressions and extracts are also included under the more important headings, the whole being intended as an aid for students in Greek and Latin verse composition. The first Latin gradus was compiled in 1702 by the Jesuit Paul Aler (1656-1727), a famous schoolmaster. There is a Latin gradus by C. D. Yonge (1850); English-Latin by A. C. Ainger and H. G. Wintle (1890); Greek by J. Brasse (1828) and E. Maltby (1815), bishop of Durham.

GRAETZ, HEINRICH (1817-1891), the foremost Jewish historian of modern times, was born in Posen in 1817 and died at Munich in 1891. He received a desultory education, and was largely self-taught. An important stage in his development was the period of three years that he spent at Oldenburg as assistant and pupil of S. R. Hirsch, whose enlightened orthodoxy was for a time very attractive to Graetz. Later on Graetz proceeded to Breslau, where he matriculated in 1842. Breslau was then becoming the headquarters of Abraham Geiger, the leader of Jewish reform. Graetz was repelled by Geiger's attitude, and though he subsequently took radical views of the Bible and tradition (which made him an opponent of Hirsch), Graetz remained a life-long foe to reform. He contended for freedom of thought; he had no desire to fight for freedom of ritual practice. He momentarily thought of entering the rabbinate, but he was unsuited to that career. For some years he supported himself as a tutor. He had previously won repute by his published essays, but in 1853 the publication of the fourth volume of his history of the Jews made him famous. This fourth volume (the first to be published) dealt with the Talmud. It was a brilliant resuscitation of the past. Graetz's skill in piecing together detached fragments of information, his vast learning and extraordinary critical acumen, were equalled by his vivid power of presenting personalities. No Jewish book of the 19th century produced such a sensation as this, and Graetz won at a bound the position he still occupies as recognized master of Jewish history. His *Geschichte der Juden*, begun in 1853, was completed in 1875; new editions of the several volumes were frequent. The work has been translated into many languages; it appeared in English in five volumes in 1891-1895. The *History* is defective in its lack of objectivity; Graetz's judgments are sometimes biassed, and in particular he lacks sympathy with mysticism. But the history is a work of genius. Simultaneously with the publication of vol. iv. Graetz was appointed on the staff of the new Breslau Seminary, of which the first director was Z. Frankel. Graetz passed the remainder of his life in this office; in 1869 he was created professor by the government, and also lectured at the Breslau University. Graetz attained considerable repute as a biblical critic. He was the author of many bold conjectures as to the date of Ruth, Ecclesiastes, Esther and other biblical books. His critical edition of the Psalms (1882-1883) was his chief contribution to biblical exegesis, but after his death Professor Bacher edited Graetz's *Emendationes* to many parts of the Hebrew scriptures.

A full bibliography of Graetz's works is given in the *Jewish Quarterly Review*, iv. 194; a memoir of Graetz is also to be found there. Another full memoir was prefixed to the "index" volume of the *History* in the American re-issue of the English translation in six volumes (Philadelphia, 1898).

(I. A.)

GRAEVIUS (properly GRÄVE or GREFFE), **JOHANN GEORG** (1632-1703). German classical scholar and critic, was born at Naumburg, Saxony, on the 29th of January 1632. He was originally intended for the law, but having made the acquaintance of J. F. Gronovius during a casual visit to Deventer, under his influence he abandoned jurisprudence for philology. He completed his studies under D. Heinsius at Leiden, and under the Protestant theologians A. Morus and D. Blondel at Amsterdam. During his residence in Amsterdam, under Blondel's influence he abandoned Lutheranism and joined the Reformed Church; and in 1656 he was called by the elector of Brandenburg to the chair of rhetoric in the university of Duisburg. Two years afterwards, on the recommendation of Gronovius, he was chosen to succeed that scholar at Deventer; in 1662 he was translated to the university of Utrecht, where he occupied first the chair of rhetoric, and from 1667 until his death (January 11th, 1703) that of history and politics. Graevius enjoyed a very high reputation as a teacher, and his lecture-room was crowded by pupils, many of them of distinguished rank, from all parts of the civilized world. He was honoured with special recognition by Louis XIV., and was a particular favourite of William III. of England, who made him historiographer royal.

His two most important works are the *Thesaurus antiquitatum Romanarum* (1694-1699, in 12 volumes), and the *Thesaurus antiquitatum et historiarum Italiae* published after his death, and continued by the elder Burmann (1704-1725). His editions of the classics, although they marked a distinct advance in scholarship, arc now for the most part superseded. They include Hesiod (1667), Lucian, *Pseudosophista* (1668), Justin, *Historiae Philippicae* (1669), Suetonius (1672), Catullus, Tibullus et Propertius (1680), and several of the works of Cicero (his best production). He also edited many of the writings of contemporary scholars. The *Oratio funebris* by P. Burmann (1703) contains an exhaustive list of the works of this scholar; see also P. H. Külb in Ersch and Gruber's *Allgemeine Encyklopädie*, and J. E. Sandys, *History of Classical Scholarship*, ii. (1908).

GRAF, ARTURO (1848-), Italian poet, of German extraction, was born at Athens. He was educated at Naples University and became a lecturer on Italian literature in Rome, till in 1882 he was appointed professor at Turin. He was one of the founders of the *Giornale della letteratura italiana*, and his publications include valuable prose criticism; but he is best known as a poet. His various volumes of verse—*Poesie e novelle* (1874), *Dopo il tramonto versi* (1893), &c.—give him a high place among the recent lyrical writers of his country.

GRAF, KARL HEINRICH (1815-1869), German Old Testament scholar and orientalist, was born at Mülhausen in Alsace on the 28th of February 1815. He studied Biblical exegesis and oriental languages at the university of Strassburg under E. Reuss, and, after holding various teaching posts, was made instructor in French and Hebrew at the Landesschule of Meissen, receiving in 1852 the title of professor. He died on the 16th of July 1869. Graf was one of the chief founders of Old Testament criticism. In his principal work, *Die geschichtlichen Bücher des Alten Testaments* (1866), he sought to show that the priestly legislation of Exodus, Leviticus and Numbers is of later origin than the book of Deuteronomy. He still, however, held the accepted view, that the Elohistic narratives formed part of the *Grundschrift* and therefore belonged to the oldest portions of the Pentateuch. The reasons urged against the contention that the priestly legislation and the Elohistic narratives were separated by a space of 500 years were so strong as to induce Graf, in an essay, "Die sogenannte Grundschrift des Pentateuchs," published shortly before his death, to regard the whole *Grundschrift* as post-exilic and as the latest portion of the Pentateuch. The idea had already been expressed by E. Reuss, but since Graf was the first to introduce it into Germany, the theory, as developed by Julius Wellhausen, has been called the Graf-Wellhausen hypothesis.

Graf also wrote, *Der Segen Moses Deut. 33* (1857) and *Der Prophet Jeremia erklärt* (1862). See T. K. Cheyne, *Founders of Old Testament Criticism* (1893); and Otto Pfleiderer's book translated into English by J. F. Smith as *Development of Theology* (1890).

GRÄFE, ALBRECHT VON (1828-1870), German oculist, son of Karl Ferdinand von Gräfe, was born at Berlin on the 22nd of May 1828. At an early age he manifested a preference for the study of mathematics, but this was gradually superseded by an interest in natural science, which led him ultimately to the study of medicine. After prosecuting his studies at Berlin, Vienna, Prague, Paris, London, Dublin and Edinburgh, and devoting special attention to ophthalmology he, in 1850, began practice as an oculist in Berlin, where he founded a private institution for the treatment of the eyes, which became the model of many similar ones in Germany and Switzerland. In 1853 he was appointed teacher of ophthalmology in Berlin university; in 1858 he became extraordinary professor, and in 1866 ordinary professor. Gräfe contributed largely to the progress of the science of ophthalmology, especially by the establishment in 1855 of his *Archiv für Ophthalmologie*, in which he had Ferdinand Arlt (1812-1887) and F. C. Donders (1818-1889) as collaborators. Perhaps his two most important discoveries were his method of treating glaucoma and his new operation for cataract. He was also regarded as an authority in diseases of the nerves and brain. He died at Berlin on the 20th of July 1870.

See *Ein Wort der Erinnerung an Albrecht von Gräfe* (Halle, 1870) by his cousin, Alfred Gräfe (1830-1899), also a distinguished ophthalmologist, and the author of *Das Sehen der Schielenden* (Wiesbaden, 1897); and E. Michaelis, *Albrecht von Gräfe. Sein Leben und Wirken* (Berlin, 1877).

GRAFE, HEINRICH (1802-1868), German educationist, was born at Buttstädt in Saxe-Weimar on the 3rd of May 1802. He studied mathematics and theology at Jena, and in 1823 obtained a curacy in the town church of Weimar. He was transferred to Jena as rector of the town school in 1825; in 1840 he was also appointed extraordinary professor of the science of education (Pädagogik) in that university; and in 1842 he became head of the *Bürgerschule* (middle class school) in Cassel. After reorganizing the schools of the town, he became director of the new *Realschule* in 1843; and, devoting himself to the interests of educational reform in electoral Hesse, he became in 1849 a member of the school commission, and also entered the house of representatives, where he made himself somewhat formidable as an agitator. In 1852 for having been implicated in the September riots and in the movement against the unpopular minister Hassenpflug, who had dissolved the school commission, he was condemned to three years' imprisonment, a sentence afterwards reduced to one of twelve months. On his release he withdrew to Geneva, where he engaged in educational work till 1855, when he was appointed director of the school of industry at Bremen. He died in that city on the 21st of July 1868.

Besides being the author of many text-books and occasional papers on educational subjects, he wrote *Das Rechisverhältnis der Volksschule von innen und aussen* (1829); *Die Schulreform* (1834); *Schule und Unterricht* (1839); *Allgemeine Pädagogik* (1845); *Die deutsche Volksschule* (1847). Together with Naumann, he also edited the *Archiv für das praktische Volksschulwesen* (1828-1835).

GRÄFE, KARL FERDINAND VON (1787-1840), German surgeon, was born at Warsaw on the 8th of March 1787. He studied medicine at Halle and Leipzig, and after obtaining licence from the Leipzig university, he was in 1807 appointed private physician to Duke Alexius of Anhalt-Bernburg. In 1811 he became professor of surgery and director of the surgical clinic at Berlin, and during the war with Napoleon he was superintendent of the military hospitals. When peace was concluded in 1815, he resumed his professorial duties. He was also appointed physician to the general staff of the army, and he became a director of the Friedrich Wilhelm Institute and of the Medico-Chirurgical Academy. He died suddenly on the

4th of July 1840 at Hanover, whither he had been called to operate on the eyes of the crown prince. Gräfe did much to advance the practice of surgery in Germany, especially in the treatment of wounds. He improved the rhinoplastic process, and its revival was chiefly due to him. His lectures at the university of Berlin attracted students from all parts of Europe.

The following are his principal works: *Normen für die Ablösung grosser Gliedmassen* (Berlin, 1812); *Rhinoplastik* (1818); *Neue Beiträge zur Kunst Theile des Angesichts organisch zu ersetzen* (1821); *Die epidemisch-kontagiöse Augenblennorrhoë Ägyptens in den europäischen Befreiungsheeren* (1824); and *Jahresberichte über das klinisch-chirurgisch-augenärztliche Institut der Universität zu Berlin* (1817-1834). He also edited, with Ph. von Walther, the *Journal für Chirurgie und Augenheilkunde*. See E. Michaelis, *Karl Ferdinand von Gräfe in seiner 30 jährigen Wirken für Staat und Wissenschaft* (Berlin, 1840).

GRAFFITO, plural *graffiti*, the Italian word meaning “scribbling” or “scratchings” (*graffiare*, to scribble, Gr. γράφειν), adopted by archaeologists as a general term for the casual writings, rude drawings and markings on ancient buildings, in distinction from the more formal or deliberate writings known as “inscriptions.” These “graffiti,” either scratched on stone or plaster by a sharp instrument such as a nail, or, more rarely, written in red chalk or black charcoal, are found in great abundance, *e.g.* on the monuments of ancient Egypt. The best-known “graffiti” are those in Pompeii and in the catacombs and elsewhere in Rome. They have been collected by R. Garrucci (*Graffiti di Pompei*, Paris, 1856), and L. Correra (“Graffiti di Roma” in *Bolletino della commissione municipale archaeologica*, Rome, 1893; see also *Corp. Ins. Lat.* iv., Berlin, 1871). The subject matter of these scribblings is much the same as that of the similar scrawls made to-day by boys, street idlers and the casual “tripper.” The schoolboy of Pompeii wrote out lists of nouns and verbs, alphabets and lines from Virgil for memorizing, lovers wrote the names of their beloved, “sportsmen” scribbled the names of horses they had been “tipped,” and wrote those of their favourite gladiators. Personal abuse is frequent, and rude caricatures are found, such as that of one Peregrinus with an enormous nose, or of Naso or Nasso with hardly any. Aulus Vettius Firmus writes up his election address and appeals to the *pilicrepi* or ball-players for their votes for him as aedile. Lines of poetry, chiefly suited for lovers in dejection or triumph, are popular, and Ovid and Propertius appear to be favourites. Apparently private owners of property felt the nuisance of the defacement of their walls, and at Rome near the *Porta Portuensis* has been found an inscription begging people not to scribble (*scariphare*) on the walls.

Graffiti are of some importance to the palaeographer and to the philologist as illustrating the forms and corruptions of the various alphabets and languages used by the people, and occasionally guide the archaeologist to the date of the building on which they appear, but they are chiefly valuable for the light they throw on the everyday life of the “man in the street” of the period, and for the intimate details of customs and institutions which no literature or formal inscriptions can give. The graffiti dealing with the gladiatorial shows at Pompeii are in this respect particularly noteworthy; the rude drawings such as that of the *secutor* caught in the net of the *retiarius* and lying entirely at his mercy, give a more vivid picture of what the incidents of these shows were like than any account in words (see Garrucci, *op. cit.*, Pls. x.-xiv.; A. Mau, *Pompeii in Leben und Kunst*, 2nd ed., 1908, ch. xxx.). In 1866 in the Trastevere quarter of Rome, near the church of S. Crisogono, was discovered the guardhouse (*excubitorium*) of the seventh cohort of the city police (*vigiles*), the walls being covered by the scribblings of the guards, illustrating in detail the daily routine, the hardships and dangers, and the feelings of the men towards their officers (W. Henzen, “L’ Escubitorio della Settima coorte dei Vigili” in *Bull. Inst.* 1867, and *Annali Inst.*, 1874; see also R. Lanciani, *Ancient Rome in the Light of Recent Discoveries*, 230, and *Ruins and Excavations of Ancient Rome*, 1897, 548). The most famous graffito yet discovered is that generally accepted as representing a caricature of Christ upon the cross, found on the walls of the Domus Gelotiana on the Palatine in 1857, and now preserved in the Kircherian Museum of the Collegio Romano. Deeply scratched in the wall is a figure of a man clad in the short *tunica* with one hand upraised in salutation to another figure, with the head of an ass, or possibly a horse, hanging on a cross; beneath is written in rude Greek letters “Anaxamenos worships (his) god.” It has been suggested that this represents an adherent of some Gnostic sect worshipping one of the animal-headed deities of Egypt (see Ferd. Becker, *Das Spottcrucifix der römischen Kaiserpaläste*, Breslau, 1866; F. X. Kraus, *Das Spottcrucifix vom Palatin*, Freiburg in Breisgau, 1872; and Visconti and Lanciani, *Guida del Palatino*).

There is an interesting article, with many quotations of graffiti, in the *Edinburgh Review*, October 1859, vol. cx.

(C. We.)

GRAFLY, CHARLES (1862-), American sculptor, was born at Philadelphia, Pennsylvania, on the 3rd of December 1862. He was a pupil of the schools of the Pennsylvania Academy of the Fine Arts, Philadelphia, and of Henri M. Chapu and Jean Dampt, and the École des Beaux Arts, Paris. He received an Honorable Mention in the Paris Salon of 1891 for his "Mauvais Présage," now at the Detroit Museum of Fine Arts, a gold medal at the Paris Exposition, in 1900, and medals at Chicago, 1893, Atlanta, 1895, and Philadelphia (the gold Medal of Honor, Pennsylvania Academy of the Fine Arts), 1899. In 1892 he became instructor in sculpture at the Pennsylvania Academy of the Fine Arts, also filling the same chair at the Drexel Institute, Philadelphia. He was elected a full member of the National Academy of Design in 1905. His better-known works include: "General Reynolds," Fairmount Park, Philadelphia; "Fountain of Man" (made for the Pan-American Exposition at Buffalo); "From Generation to Generation"; "Symbol of Life"; "Vulture of War," and many portrait busts.

GRÄFRATH, a town in Rhenish Prussia, on the Itterbach, 14 m. E. of Düsseldorf on the railway Hilden-Vohwinkel. Pop. (1905) 9030. It has a Roman Catholic and two Evangelical churches, and there was an abbey here from 1185 to 1803. The principal industries are iron and steel, while weaving is carried on in the town.

GRAFT (a modified form of the earlier "graff," through the French from the Late Lat. *graphium*, a stylus or pencil), a small branch, shoot or "scion," transferred from one plant or tree to another, the "stock," and inserted in it so that the two unite (see Horticulture). The name was adopted from the resemblance in shape of the "graft" to a pencil. The transfer of living tissue from one portion of an organism to another part of the same or different organism where it adheres and grows is also known as "grafting," and is frequently practised in modern surgery. The word is applied, in carpentry, to an attachment of the ends of timbers, and, as a nautical term, to the "whipping" or "pointing" of a rope's end with fine twine to prevent unravelling. "Graft" is used as a slang term, in England, for a "piece of hard work." In American usage Webster's *Dictionary* (ed. 1904) defines the word as "the act of any one, especially an official or public employé, by which he procures money surreptitiously by virtue of his office or position; also the surreptitious gain thus procured." It is thus a word embracing blackmail and illicit commission. The origin of the English use of the word is probably an obsolete word "graft," a portion of earth thrown up by a spade, from the Teutonic root meaning "to dig," seen in German *graben*, and English "grave."

GRAFTON, DUKES OF. The English dukes of Grafton are descended from Henry Fitzroy (1663-1690), the natural son of Charles II. by Barbara Villiers (countess of Castlemaine and duchess of Cleveland). In 1672 he was married to the daughter and heiress of the earl of Arlington and created earl of Euston; in 1675 he was created duke of Grafton. He was brought up as a sailor, and saw military service at the siege of Luxemburg in 1684. At James II.'s coronation he was lord high constable. In the rebellion of the duke of Monmouth he

commanded the royal troops in Somersetshire; but later he acted with Churchill (duke of Marlborough), and joined William of Orange against the king. He died of a wound received at the storming of Cork, while leading William's forces, being succeeded as 2nd duke by his son Charles (1682-1757).

Augustus Henry Fitzroy, 3rd duke of Grafton (1735-1811), one of the leading politicians of his time, was the grandson of the 2nd duke, and was educated at Westminster and Cambridge. He first became known in politics as an opponent of Lord Bute; in 1765 he was secretary of state under the marquis of Rockingham; but he retired next year, and Pitt (becoming earl of Chatham) formed a ministry in which Grafton was first lord of the treasury (1766) but only nominally prime minister. Chatham's illness at the end of 1767 resulted in Grafton becoming the effective leader, but political differences and the attacks of "Junius" led to his resignation in January 1770. He became lord privy seal in Lord North's ministry (1771) but resigned in 1775, being in favour of conciliatory action towards the American colonists. In the Rockingham ministry of 1782 he was again lord privy seal. In later years he was a prominent Unitarian.

Besides his successor, the 4th duke (1760-1844), and numerous other children, he was the father of General Lord Charles Fitzroy (1764-1829), whose sons Sir Charles Fitzroy (1798-1858), governor of New South Wales, and Robert Fitzroy (*q.v.*), the hydrographer, were notable men. The 4th duke's son, who succeeded as 5th duke, was father of the 6th and 7th dukes.

The 3rd duke left in manuscript a *Memoir* of his public career, of which extracts have been printed in Stanhope's *History*, Walpole's *Memories of George III.* (Appendix, vol. iv.), and Campbell's *Lives of the Chancellors*.

GRAFTON, RICHARD (d. 1572). English printer and chronicler, was probably born about 1513. He received the freedom of the Grocers' Company in 1534. Miles Coverdale's version of the Bible had first been printed in 1535. Grafton was early brought into touch with the leaders of religious reform, and in 1537 he undertook, in conjunction with Edward Whitchurch, to produce a modified version of Coverdale's text, generally known as Matthew's Bible (Antwerp, 1537). He went to Paris to reprint Coverdale's revised edition (1538). There Whitchurch and he began to print the folio known as the Great Bible by special licence obtained by Henry VIII. from the French government. Suddenly, however, the work was officially stopped and the presses seized. Grafton fled, but Thomas Cromwell eventually bought the presses and type, and the printing was completed in England. The Great Bible was reprinted several times under his direction, the last occasion being 1553. In 1544 Grafton and Whitchurch secured the exclusive right of printing church service books, and on the accession of Edward VI. he was appointed king's printer, an office which he retained throughout the reign. In this capacity he produced *The Booke of the Common Praier and Administracion of the Sacramentes, and other Rites and Ceremonies of the Churche: after the Use of the Churche of Englande* (1549 fol.), and *Actes of Parliament* (1552 and 1553). In 1553 he printed Lady Jane Grey's proclamation and signed himself the queen's printer. For this he was imprisoned for a short time, and he seems thereafter to have retired from active business. His historical works include a continuation (1543) of Hardyng's Chronicle from the beginning of the reign of Edward IV. down to Grafton's own times. He is said to have taken considerable liberties with the original, and may practically be regarded as responsible for the whole work. He printed in 1548 Edward Hall's *Union of the ... Families of Lancastre and Yorke*, adding the history of the years from 1532 to 1547. After he retired from the printing business he published *An Abridgement of the Chronicles of England* (1562), *Manuell of the Chronicles of England* (1565), *Chronicle at large and meere Historye of the Affayres of England* (1568). In these books he chiefly adapted the work of his predecessors, but in some cases he gives detailed accounts of contemporary events. His name frequently appears in the records of St Bartholomew's and Christ's hospitals, and in 1553 he was treasurer-general of the hospitals of King Edward's foundation. In 1553-1554 and 1556-1557 he represented the City in Parliament, and in 1562-1563 he sat for Coventry.

An elaborate account of Grafton was written in 1901 by Mr J. A. Kingdon under the auspices of the Grocers' Company, with the title *Richard Grafton, Citizen and Grocer of London, &c.*, in continuation of *Incidents in the Lives of T. Poyntz and R. Grafton* (1895). His *Chronicle at large* was reprinted by Sir Henry Ellis in 1809.

GRAFTON, a city of Clarence county, New South Wales, lying on both sides of the Clarence river, at a distance of 45 m. from its mouth, 342 m. N.E. of Sydney by sea. Pop. (1901) 4174, South Grafton, 976. The two sections, North Grafton and South Grafton, form separate municipalities. The river is navigable from the sea to the town for ships of moderate burden, and for small vessels to a point 35 m. beyond it. The entrance to the river has been artificially improved. Grafton is the seat of the Anglican joint-bishopric of Grafton and Armidale, and of a Roman Catholic bishopric created in 1888, both of which have fine cathedrals. Dairy-farming and sugar-growing are important industries, and there are several sugar-mills in the neighbourhood; great numbers of horses, also, are bred for the Indian and colonial markets. Tobacco, cereals and fruits are also grown. Grafton has a large shipping trade with Sydney. There is rail-connexion with Brisbane, &c. The city became a municipality in 1859.

GRAFTON, a township in the S.E. part of Worcester county, Massachusetts, U.S.A. Pop. (1905) 5052; (1910) 5705. It is served by the New York, New Haven & Hartford, and the Boston & Albany railways, and by interurban electric lines. The township contains several villages (including Grafton, North Grafton, Saundersville, Fisherville and Farnumsville); the principal village, Grafton, is about 7 m. S.E. of Worcester. The villages are residential suburbs of Worcester, and attract many summer residents. In the village of Grafton there is a public library. There is ample water power from the Blackstone river and its tributaries, and among the manufactures of Grafton are cotton-goods, boots and shoes, &c. Within what is now Grafton stood the Nipmuck Indian village of Hassanamesit. John Eliot, the “apostle to the Indians,” visited it soon after 1651, and organized the third of his bands of “praying Indians” there; in 1671 he established a church for them, the second of the kind in New England, and also a school. In 1654 the Massachusetts General Court granted to the Indians, for their exclusive use, a tract of about 4 sq. m., of which they remained the sole proprietors until 1718, when they sold a small farm to Elisha Johnson, the first permanent white settler in the neighbourhood. In 1728 a group of residents of Marlboro, Sudbury, Concord and Stowe, with the permission of the General Court, bought from the Indians 7500 acres of their lands, and agreed to establish forty English families on the tract within three years, and to maintain a church and school of which the Indians should have free use. The township was incorporated in 1735, and was named in honour of the 2nd duke of Grafton. The last of the pure-blooded Indians died about 1825.

GRAFTON, a city and the county-seat of Taylor county, West Virginia, U.S.A., on Tygart river, about 100 m. by rail S.E. of Wheeling. Pop. (1890) 3159; (1900) 5650, including 226 foreign-born and 162 negroes; (1910) 7563. It is served by four divisions of the Baltimore & Ohio railway, which maintains extensive car shops here. The city is about 1000 ft. above sea-level. It has a small national cemetery, and about 4 m. W., at Pruntytown, is the West Virginia Reform School. Grafton is situated near large coal-fields, and is supplied with natural gas. Among its manufactures are machine-shop and foundry products, window glass and pressed glass ware, and grist mill and planing-mill products. The first settlement was made about 1852, and Grafton was incorporated in 1856 and chartered as a city in 1899. In 1903 the population and area of the city were increased by the annexation of the town of Fetterman (pop. in 1900, 796), of Beaumont (unincorporated), and of other territory.

GRAHAM, SIR GERALD (1831-1899), British general, was born on the 27th of June 1831 at Acton, Middlesex. He was educated at Dresden and Woolwich Academy, and entered the Royal Engineers in 1850. He served with distinction through the Russian War of 1854 to 1856, was present at the battles of the Alma and Inkerman, was twice wounded in the trenches before Sevastopol, and was awarded the Victoria Cross for gallantry at the attack on the Redan and for devoted heroism on numerous occasions. He also received the Legion of Honour, and was promoted to a brevet majority. In the China War of 1860 he took part in the actions of Sin-ho and Tang-ku, the storming of the Taku Forts, where he was severely wounded, and the entry into Peking (brevet lieutenant-colonelcy and C.B.). Promoted colonel in 1869, he was employed in routine duties until 1877, when he was appointed assistant-director of works for barracks at the war office, a position he held until his promotion to major-general in 1881. In command of the advanced force in Egypt in 1882, he bore the brunt of the fighting, was present at the action of Magfar, commanded at the first battle of Kassassin, took part in the second, and led his brigade at Tell-el-Kebir. For his services in the campaign he received the K.C.B. and thanks of parliament. In 1884 he commanded the expedition to the eastern Sudan, and fought the successful battles of El Teb and Tamai. On his return home he received the thanks of parliament and was made a lieutenant-general for distinguished service in the field. In 1885 he commanded the Suakin expedition, defeated the Arabs at Hashin and Tamai, and advanced the railway from Suakin to Otao, when the expedition was withdrawn (thanks of parliament and G.C.M.G.). In 1896 he was made G.C.B., and in 1899 colonel-commandant Royal Engineers. He died on the 17th of December 1899. He published in 1875 a translation of Goetze's *Operations of the German Engineers in 1870-1871*, and in 1887 *Last Words with Gordon*.

GRAHAM, SIR JAMES ROBERT GEORGE, Bart. (1792-1861), British statesman, son of a baronet, was born at Naworth, Cumberland, on the 1st of June 1792, and was educated at Westminster and Oxford. Shortly after quitting the university, while making the "grand tour" abroad, he became private secretary to the British minister in Sicily. Returning to England in 1818 he was elected to parliament as member for Hull in the Whig interest; but he was unseated at the election of 1820. In 1824 he succeeded to the baronetcy; and in 1826 he re-entered parliament as representative for Carlisle, a seat which he soon exchanged for the county of Cumberland. In the same year he published a pamphlet entitled "Corn and Currency," which brought him into prominence as a man of advanced Liberal opinions; and he became one of the most energetic advocates in parliament of the Reform Bill. On the formation of Earl Grey's administration he received the post of first lord of the admiralty, with a seat in the cabinet. From 1832 to 1837 he sat for the eastern division of the county of Cumberland. Dissensions on the Irish Church question led to his withdrawal from the ministry in 1834, and ultimately to his joining the Conservative party. Rejected by his former constituents in 1837, he was in 1838 elected for Pembroke, and in 1841 for Dorchester. In the latter year he took office under Sir Robert Peel as secretary of state for the home department, a post he retained until 1846. As home secretary he incurred considerable odium in Scotland, by his unconciliating policy on the church question prior to the "disruption" of 1843; and in 1844 the detention and opening of letters at the post-office by his warrant raised a storm of public indignation, which was hardly allayed by the favourable report of a parliamentary committee of investigation. From 1846 to 1852 he was out of office; but in the latter year he joined Lord Aberdeen's cabinet as first lord of the admiralty, in which capacity he acted also for a short time in the Palmerston ministry of 1855. The appointment of a select committee of inquiry into the conduct of the Russian war ultimately led to his withdrawal from official life. He continued as a private member to exercise a considerable influence on parliamentary opinion. He died at Netherby, Cumberland, on the 25th of October 1861.

His *Life*, by C. S. Parker, was published in 1907.

GRAHAM, SYLVESTER (1794-1851), American dietarian, was born in Suffield,

Connecticut, in 1794. He studied at Amherst College, and was ordained to the Presbyterian ministry in 1826, but he seems to have preached but little. He became an ardent advocate of temperance reform and of vegetarianism, having persuaded himself that a flesh diet was the cause of abnormal cravings. His last years were spent in retirement and he died at Northampton, Massachusetts, on the 11th of September 1851. His name is now remembered because of his advocacy of unbolted (Graham) flour, and as the originator of "Graham bread." But his reform was much broader than this. He urged, primarily, physiological education, and in his *Science of Human Life* (1836; republished, with biographical memoir, 1858) furnished an exhaustive text-book on the subject. He had carefully planned a complete regimen including many details besides a strict diet. A Temperance (or Graham) Boarding House was opened in New York City about 1832 by Mrs Asenath Nicholson, who published *Nature's Own Book* (2nd ed., 1835) giving Graham's rules for boarders; and in Boston a Graham House was opened in 1837 at 23 Brattle Street.

There were many Grahamites at Brook Farm, and the American Physiological Society published in Boston in 1837 and 1838 a weekly called *The Graham Journal of Health and Longevity, designed to illustrate by facts and sustain by reason and principles the science of human life as taught by Sylvester Graham*, edited by David Campbell. Graham wrote *Essay on Cholera* (1832); *The Esculapian Tablets of the Nineteenth Century* (1834); *Lectures to Young Men on Chastity* (2nd ed., 1837); and *Bread and Bread Making*; and projected a work designed to show that his system was not counter to the Holy Scriptures.

GRAHAM, THOMAS (1805-1869), British chemist, born at Glasgow on the 20th of December 1805, was the son of a merchant of that city. In 1819 he entered the university of Glasgow with the intention of becoming a minister of the Established Church. But under the influence of Thomas Thomson (1773-1852), the professor of chemistry, he developed a taste for experimental science and especially for molecular physics, a subject which formed his main preoccupation throughout his life. After graduating in 1824, he spent two years in the laboratory of Professor T. C. Hope at Edinburgh, and on returning to Glasgow gave lessons in mathematics, and subsequently chemistry, until the year 1829, when he was appointed lecturer in the Mechanics' Institute. In 1830 he succeeded Dr Andrew Ure (1778-1857) as professor of chemistry in the Andersonian Institution, and in 1837, on the death of Dr Edward Turner, he was transferred to the chair of chemistry in University College, London. There he remained till 1855, when he succeeded Sir John Herschel as Master of the Mint, a post he held until his death on the 16th of September 1869. The onerous duties his work at the Mint entailed severely tried his energies, and in quitting a purely scientific career he was subjected to the cares of official life, for which he was not fitted by temperament. The researches, however, which he conducted between 1861 and 1869 were as brilliant as any of those in which he engaged. Graham was elected a fellow of the Royal Society in 1836, and a corresponding member of the Institute of France in 1847, while Oxford made him a D. C. L. in 1855. He took a leading part in the foundation of the London Chemical and the Cavendish societies, and served as first president of both, in 1841 and 1846. Towards the close of his life the presidency of the Royal Society was offered him, but his failing health caused him to decline the honour.

Graham's work is remarkable at once for its originality and for the simplicity of the methods employed obtaining most important results. He communicated papers to the Philosophical Society of Glasgow before the work of that society was recorded in *Transactions*, but his first published paper, "On the Absorption of Gases by Liquids," appeared in the *Annals of Philosophy* for 1826. The subject with which his name is most prominently associated is the diffusion of gases. In his first paper on this subject (1829) he thus summarizes the knowledge experiment had afforded as to the laws which regulate the movement of gases. "Fruitful as the miscibility of gases has been in interesting speculations, the experimental information we possess on the subject amounts to little more than the well-established fact that gases of a different nature when brought into contact do not arrange themselves according to their density, but they spontaneously diffuse through each other so as to remain in an intimate state of mixture for any length of time." For the fissured jar of J. W. Döbereiner he substituted a glass tube closed by a plug of plaster of Paris, and with this simple appliance he developed the law now known by his name "that the diffusion rate of gases is inversely as the square root of their density." (See Diffusion.) He further studied the passage of gases by transpiration through fine tubes, and by effusion through a minute hole

in a platinum disk, and was enabled to show that gas may enter a vacuum in three different ways: (1) by the molecular movement of diffusion, in virtue of which a gas penetrates through the pores of a disk of compressed graphite; (2) by effusion through an orifice of sensible dimensions in a platinum disk the relative times of the effusion of gases in mass being similar to those of the molecular diffusion, although a gas is usually carried by the former kind of impulse with a velocity many thousand times as great as is demonstrable by the latter; and (3) by the peculiar rate of passage due to transpiration through fine tubes, in which the ratios appear to be in direct relation with no other known property of the same gases—thus hydrogen has exactly double the transpiration rate of nitrogen, the relation of those gases as to density being as 1 : 14. He subsequently examined the passage of gases through septa or partitions of india-rubber, unglazed earthenware and plates of metals such as palladium, and proved that gases pass through these septa neither by diffusion nor effusion nor by transpiration, but in virtue of a selective absorption which the septa appear to exert on the gases in contact with them. By this means ("atmolysis") he was enabled partially to separate oxygen from air.

His early work on the movements of gases led him to examine the spontaneous movements of liquids, and as a result of the experiments he divided bodies into two classes—crystalloids, such as common salt, and colloids, of which gum-arabic is a type—the former having high and the latter low diffusibility. He also proved that the process of liquid diffusion causes partial decomposition of certain chemical compounds, the potassium sulphate, for instance, being separated from the aluminium sulphate in alum by the higher diffusibility of the former salt. He also extended his work on the transpiration of gases to liquids, adopting the method of manipulation devised by J. L. M. Poiseuille. He found that dilution with water does not effect proportionate alteration in the transpiration velocities of different liquids, and a certain determinable degree of dilution retards the transpiration velocity.

With regard to Graham's more purely chemical work, in 1833 he showed that phosphoric anhydride and water form three distinct acids, and he thus established the existence of polybasic acids, in each of which one or more equivalents of hydrogen are replaceable by certain metals (see Acid). In 1835 he published the results of an examination of the properties of water of crystallization as a constituent of salts. Not the least interesting part of this inquiry was the discovery of certain definite salts with alcohol analogous to hydrates, to which the name of alcoholates was given. A brief paper entitled "Speculative Ideas on the Constitution of Matter" (1863) possesses special interest in connexion with work done since his death, because in it he expressed the view that the various kinds of matter now recognized as different elementary substances may possess one and the same ultimate or atomic molecule in different conditions of movement.

Graham's *Elements of Chemistry*, first published in 1833, went through several editions, and appeared also in German, remodelled under J. Otto's direction. His *Chemical and Physical Researches* were collected by Dr James Young and Dr Angus Smith, and printed "for presentation only" at Edinburgh in 1876, Dr Smith contributing to the volume a valuable preface and analysis of its contents. See also T. E. Thorpe, *Essays in Historical Chemistry* (1902).

GRAHAME, JAMES (1765-1811), Scottish poet, was born in Glasgow on the 22nd of April 1765, the son of a successful lawyer. After completing his literary course at Glasgow university, Grahame went in 1784 to Edinburgh, where he qualified as writer to the signet, and subsequently for the Scottish bar, of which he was elected a member in 1795. But his preferences had always been for the Church, and when he was forty-four he took Anglican orders, and became a curate first at Shipton, Gloucestershire, and then at Sedgefield, Durham. His works include a dramatic poem, *Mary Queen of Scots* (1801), *The Sabbath* (1804), *British Georgics* (1804), *The Birds of Scotland* (1806), and *Poems on the Abolition of the Slave Trade* (1810). His principal work, *The Sabbath*, a sacred and descriptive poem in blank verse, is characterized by devotional feeling and by happy delineation of Scottish scenery. In the notes to his poems he expresses enlightened views on popular education, the criminal law and other public questions. He was emphatically a friend of humanity—a philanthropist as well as a poet. He died in Glasgow on the 14th of September 1811.

GRAHAM'S DYKE (or SHEUGH = trench), a local name for the Roman fortified frontier, consisting of rampart, forts and road, which ran across the narrow isthmus of Scotland from the Forth to the Clyde (about 36 m.), and formed from A.D. 140 till about 185 the northern frontier of Roman Britain. The name is locally explained as recording a victorious assault on the defences by one Robert Graham and his men; it has also been connected with the Grampian Hills and the Latin surveying term *groma*. But, as is shown by its earliest recorded spelling, Grymisdyke (Fordun, A.D. 1385), it is the same as the term Grim's Ditch which occurs several times in England in connexion with early ramparts—for example, near Wallingford in south Oxfordshire or between Berkhampstead (Herts) and Bradenham (Bucks). Grim seems to be a Teutonic god or devil, who might be credited with the wish to build earthworks in unreasonably short periods of time. By antiquaries the Graham's Dyke is usually styled the Wall of Pius or the Antonine Vallum, after the emperor Antoninus Pius, in whose reign it was constructed. See further BRITAIN: *Roman*.

(F. J. H.)

GRAHAM'S TOWN, a city of South Africa, the administrative centre for the eastern part of the Cape province, 106 m. by rail N.E. of Port Elizabeth and 43 m. by rail N.N.W. of Port Alfred. Pop. (1904) 13,887, of whom 7283 were whites and 1837 were electors. The town is built in a basin of the grassy hills forming the spurs of the Zuurberg, 1760 ft. above sea-level. It is a pleasant place of residence, has a remarkably healthy climate, and is regarded as the most English-like town in the Cape. The streets are broad, and most of them lined with trees. In the High Street are the law courts, the Anglican cathedral of St George, built from designs by Sir Gilbert Scott, and Commemoration Chapel, the chief place of worship of the Wesleyans, erected by the British emigrants of 1820. The Roman Catholic cathedral of St Patrick, a Gothic building, is to the left of the High Street. The town hall, also in the Gothic style, has a square clock tower built on arches over the pavement. Graham's Town is one of the chief educational centres in the Cape province. Besides the public schools and the Rhodes University College (which in 1904 took over part of the work carried on since 1855 by St Andrew's College), scholastic institutions are maintained by religious bodies. The town possesses two large hospitals, which receive patients from all parts of South Africa, and the government bacteriological institute. It is the centre of trade for an extensive pastoral and agricultural district. Owing to the sour quality of the herbage in the surrounding *zuurveld*, stock-breeding and wool-growing have been, however, to some extent replaced by ostrich-farming, for which industry Graham's Town is the most important entrepôt. Dairy farming is much practised in the neighbourhood.

In 1812 the site of the town was chosen as the headquarters of the British troops engaged in protecting the frontier of Cape Colony from the inroads of the Kaffirs, and it was named after Colonel John Graham (1778-1821), then commanding the forces. (Graham had commanded the light infantry battalion at the taking of the Cape by the British in the action of the 6th of January 1806. He also took part in campaigns in Italy and Holland during the Napoleonic wars.) In 1819 an attempt was made by the Kaffirs to surprise Graham's Town, and 10,000 men attacked it, but they were repulsed by the garrison, which numbered not more than 320 men, infantry and artillery, under Lieut.-Colonel (afterwards General Sir) Thomas Willshire. In 1822 the town was chosen as the headquarters of the 4000 British immigrants who had reached Cape Colony in 1820. It has maintained its position as the most important inland town of the eastern part of the Cape province. In 1864 the Cape parliament met in Graham's Town, the only instance of the legislature sitting elsewhere than in Cape Town. It is governed by a municipality. The rateable value in 1906 was £891,536 and the rate levied 2½d. in the pound.

See T. Sheffield, *The Story of the Settlement ...* (2nd ed., Graham's Town, 1884); C. T. Campbell, *British South Africa ... with notices of some of the British Settlers of 1820* (London, 1897).

GRAIL, THE HOLY, the famous talisman of Arthurian romance, the object of quest on the

part of the knights of the Round Table. It is mainly, if not wholly, known to English readers through the medium of Malory's translation of the French *Quête du Saint Graal*, where it is the cup or chalice of the Last Supper, in which the blood which flowed from the wounds of the crucified Saviour has been miraculously preserved. Students of the original romances are aware that there is in these texts an extraordinary diversity of statement as to the nature and origin of the Grail, and that it is extremely difficult to determine the precise value of these differing versions.[1] Broadly speaking the Grail romances have been divided into two main classes: (1) those dealing with the search for the Grail, the *Quest*, and (2) those relating to its early history. These latter appear to be dependent on the former, for whereas we may have a *Quest* romance without any insistence on the previous history of the Grail, that history is never found without some allusion to the hero who is destined to bring the quest to its successful termination. The *Quest* versions again fall into three distinct classes, differentiated by the personality of the hero who is respectively Gawain, Perceval or Galahad. The most important and interesting group is that connected with Perceval, and he was regarded as the original Grail hero, Gawain being, as it were, his understudy. Recent discoveries, however, point to a different conclusion, and indicate that the *Gawain* stories represent an early tradition, and that we must seek in them rather than in the *Perceval* versions for indications as to the ultimate origin of the Grail.

The character of this talisman or relic varies greatly, as will be seen from the following summary.

1. Gawain, included in the continuation to Chrétien's *Perceval* by Wauchier de Denain, and attributed to Bleheris the Welshman, who is probably identical with the Bledhericus of Giraldus Cambrensis, and considerably earlier than Chrétien de Troyes. Here the Grail is a food-providing, self-acting talisman, the precise nature of which is not specified; it is designated as the "rich" Grail, and serves the king and his court *sans serjant et sans seneschal*, the butlers providing the guests with wine. In another version, given at an earlier point of the same continuation, but apparently deriving from a later source, the Grail is borne in procession by a weeping maiden, and is called the "holy" Grail, but no details as to its history or character are given. In a third version, that of *Diu Crône*, a long and confused romance, the origin of which has not been determined, the Grail appears as a reliquary, in which the Host is presented to the king, who once a year partakes alike of it and of the blood which flows from the lance. Another account is given in the prose *Lancelot*, but here Gawain has been deposed from his post as first hero of the court, and, as is to be expected from the treatment meted out to him in this romance, the visit ends in his complete discomfiture. The Grail is here surrounded with the atmosphere of awe and reverence familiar to us through the *Quête*, and is regarded as the chalice of the Last Supper. These are the *Gawain* versions.

2. Perceval.—The most important *Perceval* text is the *Conte del Grael*, or *Perceval le Galois* of Chrétien de Troyes. Here the Grail is wrought of gold richly set with precious stones; it is carried in solemn procession, and the light issuing from it extinguishes that of the candles. What it is is not explained, but inasmuch as it is the vehicle in which is conveyed the Host on which the father of the Fisher king depends for nutriment, it seems not improbable that here, as in *Diu Crône*, it is to be understood as a reliquary. In the *Parzival* of Wolfram von Eschenbach, the ultimate source of which is identical with that of Chrétien, on the contrary, the Grail is represented as a precious stone, brought to earth by angels, and committed to the guardianship of the Grail king and his descendants. It is guarded by a body of chosen knights, or templars, and acts alike as a life and youth preserving talisman—no man may die within eight days of beholding it, and the maiden who bears it retains perennial youth—and an oracle choosing its own servants, and indicating whom the Grail king shall wed. The sole link with the Christian tradition is the statement that its virtue is renewed every Good Friday by the agency of a dove from heaven. The discrepancy between this and the other Grail romances is most startling.

In the short prose romance known as the "Didot" *Perceval* we have, for the first time, the whole history of the relic logically set forth. The *Perceval* forms the third and concluding section of a group of short romances, the two preceding being the *Joseph of Arimathea* and the *Merlin*. In the first we have the precise history of the Grail, how it was the dish of the Last Supper, confided by our Lord to the care of Joseph, whom he miraculously visited in the prison to which he had been committed by the Jews. It was subsequently given by Joseph to his brother-in-law Brons, whose grandson Perceval is destined to be the final winner and guardian of the relic. The *Merlin* forms the connecting thread between this definitely ecclesiastical romance and the chivalric atmosphere of Arthur's court; and finally, in the *Perceval*, the hero, son of Alain and grandson to Brons, is warned by Merlin of the quest which awaits him and which he achieves after various adventures.

In the *Perlesvaus* the Grail is the same, but the working out of the scheme is much more complex; a son of Joseph of Arimathea, Josephe, is introduced, and we find a spiritual knighthood similar to that used so effectively in the *Parzival*.

3. Galahad.—The *Quête du Saint Graal*, the only romance of which Galahad is the hero, is dependent on and a completion of the *Lancelot* development of the Arthurian cycle. Lancelot, as lover of Guinevere, could not be permitted to achieve so spiritual an emprise, yet as leading knight of Arthur's court it was impossible to allow him to be surpassed by another. Hence the invention of Galahad, son to Lancelot by the Grail king's daughter; predestined by his lineage to achieve the quest, foredoomed, the quest achieved, to vanish, a sacrifice to his father's fame, which, enhanced by connexion with the Grail-winner, could not risk eclipse by his presence. Here the Grail, the chalice of the Last Supper, is at the same time, as in the *Gawain* stories, self-acting and food-supplying.

The last three romances unite, it will be seen, the quest and the early history. Introductory to the Galahad quest, and dealing only with the early history, is the *Grand Saint Graal*, a work of interminable length, based upon the *Joseph of Arimathea*, which has undergone numerous revisions and amplifications: its precise relation to the *Lancelot*, with which it has now much matter in common, is not easy to determine.

To be classed also under the head of early history are certain interpolations in the MSS. of the *Perceval*, where we find the *Joseph* tradition, but in a somewhat different form, *e.g.* he is said to have caused the Grail to be made for the purpose of receiving the holy blood. With this account is also connected the legend of the *Volto Santo* of Lucca, a crucifix said to have been carved by Nicodemus. In the conclusion to Chrétien's poem, composed by Manessier some fifty years later, the Grail is said to have *followed* Joseph to Britain, how, is not explained. Another continuation by Gerbert, interpolated between those of Wauchier and Manessier, relates how the Grail was brought to Britain by Perceval's mother in the companionship of Joseph.

It will be seen that with the exception of the *Grand Saint Graal*, which has now been practically converted into an introduction to the *Quête*, no two versions agree with each other; indeed, with the exception of the oldest *Gawain-Grail* visit, that due to Bleheris, they do not agree with themselves, but all show, more or less, the influence of different and discordant versions. Why should the vessel of the Last Supper, jealously guarded at Castle Corbenic, visit Arthur's court independently? Why does a sacred relic provide purely material food? What connexion can there be between a precious stone, a *baetylus*, as Dr Hagen has convincingly shown, and Good Friday? These, and such questions as these, suggest themselves at every turn.

Numerous attempts have been made to solve these problems, and to construct a theory of the origin of the Grail story, but so far the difficulty has been to find an hypothesis which would admit of the practically simultaneous existence of apparently contradictory features. At one time considered as an introduction from the East, the theory of the Grail as an Oriental talisman has now been discarded, and the expert opinion of the day may be said to fall into two groups: (1) those who hold the Grail to have been from the first a purely Christian vessel which has accidentally, and in a manner never clearly explained, acquired certain folk-lore characteristics; and (2) those who hold, on the contrary, that the Grail is *aborigine* folk-lore and Celtic, and that the Christian development is a later and accidental rather than an essential feature of the story. The first view is set forth in the work of Professor Birch-Hirschfeld, the second in that of Mr Alfred Nutt, the two constituting the only *travaux d'ensemble* which have yet appeared on the subject. It now seems probable that both are in a measure correct, and that the ultimate solution will be recognized to lie in a blending of two originally independent streams of tradition. The researches of Professor Mannhardt in Germany and of J. G. Frazer in England have amply demonstrated the enduring influence exercised on popular thought and custom by certain primitive forms of vegetation worship, of which the most noteworthy example is the so-called mysteries of Adonis. Here the ordinary processes of nature and progression of the seasons were symbolized under the figure of the death and resuscitation of the god. These rites are found all over the world, and in his monumental work, *The Golden Bough*, Dr Frazer has traced a host of extant beliefs and practices to this source. The earliest form of the Grail story, the *Gawain*-Bleheris version, exhibits a marked affinity with the characteristic features of the Adonis or Tammuz worship; we have a castle on the sea-shore, a dead body on a bier, the identity of which is never revealed, mourned over with solemn rites; a wasted country, whose desolation is mysteriously connected with the dead man, and which is restored to fruitfulness when the quester asks the meaning of the marvels he beholds (the two features of the weeping women and the wasted land being retained in versions where they have no

significance); finally the mysterious food-providing, self-acting talisman of a common feast—one and all of these features may be explained as survivals of the Adonis ritual. Professor Martin long since suggested that a key to the problems of the Arthurian cycle was to be found in a nature myth: Professor Rhys regards Arthur as an agricultural hero; Dr Lewis Mott has pointed out the correspondence between the so-called Round Table sites and the ritual of nature worship; but it is only with the discovery of the existence of Bleheris as reputed authority for Arthurian tradition, and the consequent recognition that the Grail story connected with his name is the earliest form of the legend, that we have secured a solid basis for such theories.

With regard to the religious form of the story, recent research has again aided us—we know now that a legend similar in all respects to the Joseph of Arimathea Grail story was widely current at least a century before our earliest Grail texts. The story with Nicodemus as protagonist is told of the *Saint-Sang* relic at Fécamp; and, as stated already, a similar origin is ascribed to the *Volto Santo* at Lucca. In this latter case the legend professes to date from the 8th century, and scholars who have examined the texts in their present form consider that there may be solid ground for this attribution. It is thus demonstrable that the material for our Grail legend, in its present form, existed long anterior to any extant text, and there is no improbability in holding that a confused tradition of pagan mysteries which had assumed the form of a popular folk-tale, became finally Christianized by combination with an equally popular ecclesiastical legend, the point of contact being the vessel of the common ritual feast. Nor can there be much doubt that in this process of combination the Fécamp legend played an important rôle. The best and fullest of the *Perceval* MSS. refer to a book written at Fécamp as source for certain *Perceval* adventures. What this book was we do not know, but in face of the fact that certain special Fécamp relics, silver knives, appear in the Grail procession of the *Parzival*, it seems most probable that it was a *Perceval*-Grail story. The relations between the famous Benedictine abbey and the English court both before and after the Conquest were of an intimate character. Legends of the part played by Joseph of Arimathea in the conversion of Britain are closely connected with Glastonbury, the monks of which foundation showed, in the 12th century, considerable literary activity, and it seems a by no means improbable hypothesis that the present form of the Grail legend may be due to a monk of Glastonbury elaborating ideas borrowed from Fécamp. This much is certain, that between the *Saint-Sang* of Fécamp, the *Volto Santo* of Lucca, and the Grail tradition, there exists a connecting link, the precise nature of which has yet to be determined. The two former were popular objects of pilgrimage; was the third originally intended to serve the same purpose by attracting attention to the reputed burial-place of the apostle of the Grail, Joseph of Arimathea?

BIBLIOGRAPHY.—For the Gawain Grail visits see the Potvin edition of the *Perceval*, which, however, only gives the Bleheris version; the second visit is found in the best and most complete MSS., such as 12,576 and 12,577 (*Fonds français*) of the Paris library. *Diu Crône*, edited by Scholl (Stuttgart, 1852). vol. vi. of *Arthurian Romances* (Nutt), gives a translation of the Bleheris, *Diu Crône* and *Prose Lancelot* visits.

The *Conte del Graal*, or *Perceval*, is only accessible in the edition of M. Potvin (6 vols., 1866-1871). The Mons MS., from which this has been printed, has proved to be an exceedingly poor and untrustworthy text. *Parzival*, by Wolfram von Eschenbach, has been frequently and well edited; the edition by Bartsch (1875-1877), in *Deutsche Classiker des Mittelalters*, contains full notes and a glossary. Suitable for the more advanced student are those by K. Lachmann (1891), Leitzmann (1902-1903) and E. Martin (1903). There are modern German translations by Simrock (very close to the original) and Hertz (excellent notes). English translation with notes and appendices by J. L. Weston. “Didot” *Perceval*, ed. Hucher, *Le Saint Graal* (1875-1878), vol. i. *Perlesvaus* was printed by Potvin, under the title of *Perceval le Gallois*, in vol. i. of the edition above referred to; a Welsh version from the Hengwert MS. was published with translation by Canon R. Williams (2 vols., 1876-1892). Under the title of *The High History of the Holy Grail* a fine version was published by Dr Sebastian Evans in the Temple Classics (2 vols., 1898). The *Grand Saint Graal* was published by Hucher as given above; this edition includes the *Joseph of Arimathea*. A 15th century metrical English adaptation by one Henry Lovelich, was printed by Dr Furnivall for the Roxburghe Club 1861-1863; a new edition was undertaken for the Early English Text Society. *Quête du Saint Graal* can best be studied in Malory’s somewhat abridged translation, books xiii.-xviii. of the *Morte Arthur*. It has also been printed by Dr Furnivall for the Roxburghe Club, from a MS. in the British Museum. Neither of these texts is, however, very good, and the student who can decipher old Dutch would do well to read it in the metrical translation published by Joenckbloet, *Roman van Lanceloet*, as the original here was considerably fuller.

For general treatment of the subject see *Legend of Sir Perceval*, by J. L. Weston, Grimm

Library, vol. xvii. (1906); *Studies on the Legend of the Holy Grail*, by A. Nutt (1888), and a more concise treatment of the subject by the same writer in No. 14 of *Popular Studies* (1902); Professor Birch-Hirschfeld's *Die Sage vom Gral* (1877). The late Professor Heinzel's *Die alt-französischen Gral-Romane* contains a mass of valuable matter, but is very confused and ill-arranged. For the Fécamp legend see Leroux de Lincey's *Essai sur l'abbaye de Fescamp* (1840); for the *Volto Santo* and kindred legends, Ernest von Dobschütz, *Christus-Bilder* (Leipzig, 1899).

(J. L. W.)

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1 The etymology of the O. Fr. *graal* or *greal*, of which "grail" is an adaptation, has been much discussed. The Low Lat. original, *gradale* or *grasale*, a flat dish or platter, has generally been taken to represent a diminutive *cratella* of *crater*, bowl, or a lost *cratale*, formed from the same word (see W. W. Skeat, Preface to *Joseph of Arimathie*, Early Eng. Text Soc).—Ed.

GRAIN (derived through the French from Lat. *granum*, seed, from an Aryan root meaning "to wear down," which also appears in the common Teutonic word "corn"), a word particularly applied to the seed, in botanical language the "fruit," of cereals, and hence applied, as a collective term to cereal plants generally, to which, in English, the term "corn" is also applied (see Grain Trade). Apart from this, the chief meaning, the word is used of the malt refuse of brewing and distilling, and of many hard rounded small particles, resembling the seeds of plants, such as "grains" of sand, salt, gold, gunpowder, &c. "Grain" is also the name of the smallest unit of weight, both in the United Kingdom and the United States of America. Its origin is supposed to be the weight of a grain of wheat, dried and gathered from the middle of the ear. The troy grain = 1/5760 of a ℔, the avoirdupois grain = 1/7000 of a ℔. In diamond weighing the grain = ¼ of the carat, = .7925 of the troy grain. The word "grains" was early used, as also in French, of the small seed-like insects supposed formerly to be the berries of trees, from which a scarlet dye was extracted (see Cochineal and Kermes). From the Fr. *en graine*, literally in dye, comes the French verb *engrainer*, Eng. "engrain" or "ingrain," meaning to dye in any fast colour. From the further use of "grain" for the texture of substances, such as wood, meat, &c., "engrained" or "ingrained" means ineradicable, impregnated, dyed through and through. The "grain" of leather is the side of a skin showing the fibre after the hair has been removed. The imitating in paint of the grain of different kinds of woods is known as "graining" (see Painter-Work). "Grain," or more commonly in the plural "grains," construed as a singular, is the name of an instrument with two or more barbed prongs, used for spearing fish. This word is Scandinavian in origin, and is connected with Dan. *green*, Swed. *gren*, branch, and means the fork of a tree, of the body, or the prongs of a fork, &c. It is not connected with "groin," the inguinal parts of the body, which in its earliest forms appears as *grynde*.

GRAINS OF PARADISE, Guinea Grains, or Melegueta Pepper (Ger. *Paradieskörner*, Fr. *graines de Paradis*, *maniguette*), the seeds of *Amomum Melegueta*, a reed-like plant of the natural order *Zingiberaceae*. It is a native of tropical western Africa, and of Prince's and St Thomas's islands in the Gulf of Guinea, is cultivated in other tropical countries, and may with ease be grown in hothouses in temperate climates. The plant has a branched horizontal rhizome; smooth, nearly sessile, narrowly lanceolate-oblong alternate leaves; large, white, pale pink or purplish flowers; and an ovate-oblong fruit, ensheathed in bracts, which is of a scarlet colour when fresh, and reaches under cultivation a length of 5 in. The seeds are contained in the acid pulp of the fruit, are commonly wedge-shaped and bluntly angular, are about 1¼ lines in diameter and have a glossy dark-brown husk, with a conical light-coloured membranous caruncle at the base and a white kernel. They contain, according to Flückiger and Hanbury, 0.3% of a faintly yellowish neutral essential oil, having an aromatic, not acrid taste, and a specific gravity at 15.5° C of 0.825, and giving on analysis the formula $C_{20}H_{32}O$, or $C_{10}H_{16} + C_{10}H_{16}O$; also 5.83% of an intensely pungent, viscid, brown resin.

Grains of paradise were formerly officinal in British pharmacopoeias, and in the 13th and

succeeding centuries were used as a drug and a spice, the wine known as hippocras being flavoured with them and with ginger and cinnamon. In 1629 they were employed among the ingredients of the twenty-four herring pies which were the ancient fee-favour of the city of Norwich, ordained to be carried to court by the lord of the manor of Carleton (Johnston and Church, *Chem. of Common Life*, p. 355, 1879). Grains of paradise were anciently brought overland from West Africa to the Mediterranean ports of the Barbary states, to be shipped for Italy. They are now exported almost exclusively from the Gold Coast. Grains of paradise are to some extent used illegally to give a fictitious strength to malt liquors, gin and cordials. By 56 Geo. III. c. 58, no brewer or dealer in beer shall have in his possession or use grains of paradise, under a penalty of £200 for each offence; and no druggist shall sell the same to a brewer under a penalty of £500. They are, however, devoid of any injurious physiological action, and are much esteemed as a spice by the natives of Guinea.

See Bentley and Trimen, *Medicinal Plants*, tab. 268; Lanessan, *Hist. des Drogues*, pp. 456-460 (1878).

GRAIN TRADE. The complexity of the conditions of life in the 20th century may be well illustrated from the grain trade of the world. The ordinary bread sold in Great Britain represents, for example, produce of nearly every country in the world outside the tropics.

General considerations.

Wheat has been cultivated from remote antiquity. In a wild state it is practically unknown. It is alleged to have been found growing wild between the Euphrates and the Tigris; but the discovery has never been authenticated, and, unless the plant be sedulously cared for, the species dies out in a surprisingly short space of time. Modern experiments in cross-fertilization in Lancashire by the Garton Brothers have evolved the most extraordinary "sports," showing, it is claimed, that the plant has probably passed through stages of which until the present day there had been no conception. The tales that grains of wheat found in the cerements of Egyptian mummies have been planted and come to maturity are no longer credited, for the vital principle in the wheat berry is extremely evanescent; indeed, it is doubtful whether wheat twenty years old is capable of reproduction. The Garton artificial fertilization experiments have shown endless deviations from the ordinary type, ranging from minute seeds with a closely adhering husk to big berries almost as large as sloes and about as worthless. It is conjectured that the wheat plant, as now known, is a degenerate form of something much finer which flourished thousands of years ago, and that possibly it may be restored to its pristine excellence, yielding an increase twice or thrice as large as it now does, thus postponing to a distant period the famine doom prophesied by Sir W. Crookes in his presidential address to the British Association in 1898. Wheat well repays careful attention; contrast the produce of a carelessly tilled Russian or Indian field and the bountiful yield on a good Lincolnshire farm, the former with its average yield of 8 bushels, the latter with its 50 bushels per acre; or compare the quality, as regards the quantity and flavour of the flour from a fine sample of British wheat, such as is on sale at almost every agricultural show in Great Britain, with the produce of an Egyptian or Syrian field; the difference is so great as to cause one to doubt whether the berries are of the same species.

It may be stated roundly that an average quartern loaf in Great Britain is made from wheat grown in the following countries in the proportions named:—

U.S.A.	U.K.	Russia.	Argentina.	British India.	Canada.	Rumania-Bulgaria.	Australia.	Other Countries.
Oz.	Oz.	Oz.	Oz.	Oz.	Oz.	Oz.	Oz.	Oz.
26	13	9	5	4	3	2	1	1
Or expressed in percentages as follows:—								
40	20	14	8	6	5	3	2	2

For details connected with grain and its handling see Agriculture, Corn Laws, Granaries, Flour, Baking, Wheat, &c.

Wheat occupies of all cereals the widest region of any food-stuff. Rice, which shares with millet the distinction of being the principal food-stuff of the greatest number of human beings, is not grown nearly as widely as is wheat, the staple food of the white races. Wheat grows as far south as Patagonia, and as far north as the edge of the Arctic Circle; it

flourishes throughout Europe, and across the whole of northern Asia and in Japan; it is cultivated in Persia, and raised largely in India, as far south as the Nizam's dominions. It is grown over nearly the whole of North America. In Canada a very fine wheat crop was raised in the autumn of 1898 as far north as the mission at Fort Providence, on the Mackenzie river, in a latitude above 62°—or less than 200 m. south of the latitude of Dawson City—the period between seed-time and harvest having been ninety-one days. In Africa it was an article of commerce in the days of Jacob, whose son Joseph may be said to have run the first and only successful "corner" in wheat. For many centuries Egypt was famous as a wheat raiser; it was a cargo of wheat from Alexandria which St Paul helped to jettison on one of his shipwrecks, as was also, in all probability, that of the "ship of Alexandria whose sign was Castor and Pollux," named in the same narrative. General Gordon is quoted as having stated that the Sudan if properly settled would be capable of feeding the whole of Europe. Along the north coast of Africa are areas which, if properly irrigated, as was done in the days of Carthage, could produce enough wheat to feed half of the Caucasian race. For instance, the vilayet of Tripoli, with an area of 400,000 sq. m., or three times the extent of Great Britain and Ireland, according to the opinion of a British consul, could raise millions of acres of wheat. The cereal flourishes on all the high plateaus of South Africa, from Cape Town to the Zambezi. Land is being extensively put under wheat in the pampas of South America and in the prairies of Siberia.

In the raising of the standard of farming to an English level the volume of the world's crop would be trebled, another fact which Sir William Crookes seems to have overlooked. The experiments of the late Sir J. B. Lawes in Hertfordshire have proved that the natural fruitfulness of the wheat plant can be increased threefold by the application of the proper fertilizer. The results of these experiments will be found in a compendium issued from the Rothamsted Agricultural Experimental Station.

It is by no means, however, the wheat which yields the greatest number of bushels per acre which is the most valuable from a miller's standpoint, for the thinness of the bran and the fineness and strength of the flour are with him important considerations, too often overlooked by the farmer when buying his seed. Nevertheless it is the deficient quantity of the wheat raised in the British Islands, and not the quality of the grain, which has been the cause of so much anxiety to economists and statesmen.

Freight rates.

Sir J. Caird, writing in the year 1880, expressed the opinion that arable land in Great Britain would always command a substantial rent of at least 30s. per acre. His figures were based on the assumption that wheat was imported duty free. He calculated that the cost of carriage from abroad of wheat, or the equivalent of the product of an acre of good wheat land in Great Britain, would not be less than 30s. per ton. But freights had come down by 1900 to half the rates predicated by Caird; indeed, during a portion of the interval they ruled very close to zero, as far as steamer freights from America were concerned. In 1900 an all-round freight rate for wheat might be taken at 15s. *per ton* (a ton representing approximately the produce of an acre of good wheat land in England), say from 10s. for Atlantic American and Russian, to 30s. for Pacific American and Australian; about midway between these two extremes we find Indian and Argentine, the greatest bulk coming at about the 15s. rate. Inferior land bearing less than 4½ quarters per acre would not be protected to the same extent, and moreover, seeing that a portion of the British wheat crop has to stand a charge as heavy for land carriage across a county as that borne by foreign wheat across a continent or an ocean, the protection is not nearly so substantial as Caird would make out. The compilation showing the changes in the rates of charges for the railway and other transportation services issued by the Division of Statistics, Department of Agriculture, U.S.A. (Miscellaneous series, Bulletin No. 15, 1898), is a valuable reference book. From its pages are culled the following facts relating to the changes in the rates of freight up to the year 1897.[1] In Table 3 the average rates per ton per mile in cents are shown since 1846. For the Fitchburg Railroad the rate for that year was 4.523 cents per ton per mile, since when a great and almost continuous fall has been taking place, until in 1897, the latest year given, the rate had declined to .870 of a cent per ton per mile. The railway which shows the greatest fall is the Chesapeake & Ohio, for the charge has fallen from over 7 cents in 1862 and 1863 to .419 of a cent in 1897, whereas the Erie rates have fallen only from 1.948 in 1852 to .609 in 1897. Putting the rates of the twelve returning railways together, we find the average freight in the two years 1859-1860 was 3.006 cents per ton per mile, and that in 1896-1897 the average rate had fallen to .797 of a cent per ton per mile. This difference is very large compared with the smallness of the unit. Coming to the rates on grain, we find (in Table 23) a record for the forty years 1858-1897 of the charge on wheat from Chicago to New York, via all rail from 1858, and via lake and rail since 1868, the authority being the secretary of the Chicago Board of Trade. From 1858 to 1862 the rate

varied between 42.37 and 34.80 cents per bushel for the whole trip of roundly 1000 m., the average rate in the quinquennium being 38.43. In the five years immediately prior to the time at which Sir J. Caird expressed the opinion that the cost of carriage from abroad would always protect the British grower, the average all-rail freight from Chicago to New York was 17.76 cents, while the summer rate (partly by water) was 13.17 cents. These rates in 1897, the last year shown on the table, had fallen to 12.50 and 7.42 respectively. The rates have been as follows in quinquennial periods, via all rail:—

Chicago to New York in Cents per Bushel.

1858-1862.	1863-1867.	1868-1872.	1873-1877.	1878-1882.	1883-1887.	1888-1892.	1893-1897.
38.43	31.42	27.91	21.29	16.77	14.67	14.52	12.88

Calculating roundly a cent as equal to a halfpenny, and eight bushels to the quarter, the above would appear in English currency as follows:—

Chicago to New York in Shillings and Pence per Quarter.

1858-1862.	1863-1867.	1868-1872.	1873-1877.	1878-1882.	1883-1887.	1888-1892.	1893-1897.
s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
12 8	10 6	9 3	7 1	5 7	4 10½	4 10	4 3

Another table (No. 38) shows the average rates from Chicago to New York by lakes, canal and river. These in their quinquennial periods are given for the season as follows:—

In Cents per Bushel of 60 lb.

1857-1861.	1876-1880.	1893-1897.
22.15	10.47	4.92

In Shillings and Pence per Quarter of 480 lb.

1857-1861.		1876-1880.		1893-1897.	
s.	d.	s.	d.	s.	d.
7	4	3	6	1	7

In Shillings and Pence per Ton of 2240 lb.

1857-1861.		1876-1880.		1893-1897.	
s.	d.	s.	d.	s.	d.
34	6	16	6	7	6

This latter mode is the cheapest by which grain can be carried to the eastern seaboard from the American prairies, and it can now be done at a cost of 7s. 6d. per ton. The ocean freight has to be added before the grain can be delivered free on the quay at Liverpool. A rate from New York to Liverpool of 2½d. per bushel, or 7s. 10d. per ton, a low rate, reached in Dec. 1900, is yet sufficiently high, it is claimed, to leave a profit; indeed, there have frequently been times when the rate was as low as 1d. per bushel, or 3s. 1d. per ton; and in periods of great trade depression wheat is carried from New York to Liverpool as ballast, being paid for by the ship-owner. Another route worked more cheaply than formerly is that by river, from the centre of the winter wheat belt, say at St Louis, to New Orleans, and thence by steamer to Liverpool. The river rate has fallen below five cents per bushel, or 7s. per ton, 2240 lb. In Table No. 71 the cost of transportation is compared year by year with the export price of the two leading cereals in the States as follows:—

Wheat and Corn—Export Prices and Transportation Rates compared.

	Wheat.			Corn.		
			Number			Number

Year.	Export Price per Bushel.	Rate, Chicago to New York by Lake and Canal, per Bushel.	of Bushels carried for Price of One Bushel.	Export Price per Bushel.	Rate, Chicago to New York by Lake and Canal, per Bushel.	of Bushels carried for Price of One Bushel.
		Cents.			Cents.	
1867	$0.92	15.95	5.77	$0.72	14.58	4.94
1868	1.36	16.23	8.38	.84.1	13.57	6.20
1869	1.05	17.20	6.10	.72.8	14.98	4.86
1870	1.12	14.85	7.54	.80.5	13.78	5.84
1871	1.18	17.75	6.65	.67.9	16.53	4.11
1872	1.31	21.55	6.08	.61.8	19.62	3.15
1873	1.15	16.89	6.81	.54.3	15.39	3.53
1874	1.29	12.75	10.12	.64.7	11.29	5.73
1875	.97	9.90	9.80	.73.8	8.93	8.26
1876	1.11	8.63	12.86	.60.3	7.93	7.60
1877	1.12	10.76	10.41	.56.0	9.41	5.95
1878	1.33	9.10	14.62	.55.8	8.27	6.75
1879	1.07	11.60	9.22	.47.1	10.43	4.52
1880	1.25	12.27	10.19	.54.3	11.14	4.87
1881	1.11	8.19	13.55	.55.2	7.26	7.60
1882	1.19	7.89	15.08	.66.8	7.23	9.24
1883	1.13	8.37	13.50	.68.4	7.66	8.93
1884	1.07	6.31	16.96	.61.1	5.64	10.83
1885	.86	5.87	14.65	.54.0	5.38	10.04
1886	.87	8.71	9.99	.49.8	7.98	6.24
1887	.89	8.51	10.46	.47.9	7.88	6.08
1888	.85	5.93	14.33	.55.0	5.41	10.17
1889	.90	6.89	13.06	.47.4	6.19	7.66
1890	.83	5.86	14.16	.41.8	5.10	8.20
1891	.93	5.96	15.60	.57.4	5.36	10.71
1892	1.03	5.61	18.36	.55	5.03	10.93
1893	.80	6.31	12.68	.53	5.71	9.28
1894	.67	4.44	15.09	.46	3.99	11.53
1895	.58	4.11	14.11	.53	3.71	14.29
1896	.65	5.38	12.08	.38	4.94	7.69
1897	.75	4.35	17.24	.31	3.79	8.18

The farmers of the United States have now to meet a greatly increased output from Canada—the cost of transport from that country to England being much the same as from the United States. So much improved is the position of the farmer in North America compared with what it was about 1870, that the transport companies in 1901 carried 17¼ bushels of his grain to the seaboard in exchange for the value of one bushel, whereas in 1867 he had to give up one bushel in every six in return for the service. As regards the British farmer, it does not appear as if he had improved his position; for he has to send his wheat to greater distances, owing to the collapse of many country millers or their removal to the seaboard, while railway rates have fallen only to a very small extent; again the farmer's wheat is worth only half of what it was formerly; it may be said that the British farmer has to give up one bushel in nine to the railway company for the purpose of transportation, whereas in the 'seventies he gave up one in eighteen only. Enough has been said to prove that the advantage of position claimed for the British farmer by Caird was somewhat illusory. Speaking broadly, the Kansas or Minnesota farmer's wheat does not have to pay for carriage to Liverpool more than 2s. 6d. to 7s. 6d. per ton in excess of the rate paid by a Yorkshire farmer; this, it will be admitted, does not go very far towards enabling the latter to pay rent, tithes and rates and taxes.

The subject of the rates of ocean carriage at different periods requires consideration if a proper understanding of the working of the foreign grain trade is to be obtained. Only a very small proportion of the decline in the price of wheat since 1880 is due to cheapened transport rates; for while the mileage rate has been falling, the length of haulage has been extending, until in 1900 the principal wheat fields of America were 2000 m. farther from the eastern seaboard than was the case in 1870, and consequently, notwithstanding the fall in the mileage rate of 50 to 75%, it still costs the United Kingdom nearly as much to have its quota of foreign wheat fetched from abroad as it did then. The difference in the cost of the operation is shown in the following tabular statement, both the cost in the aggregate on a year's imports and the cost per quarter:—

Quantity of Wheat and Wheaten Flour (as wheat) imported into the United Kingdom from various sources during the calendar year 1900, together with the average rate of freight.

1900.

Countries of Origin.	Quantities. Qrs. 480 lb.	Ocean Freight to United Kingdom. Per 480 lb.	Total Cost of Ocean Carriage.
		s. d.	£
Atlantic America	11,171,100	2 3	1,257,100
South Russia	569,000	2 2	62,000
Pacific America	2,389,900	8 1	966,000
Canada	1,877,100	2 8	250,000
Rumania	176,400	2 6	22,000
Argentina and Uruguay	4,322,300	4 10	1,045,000
France	251,900	1 3	16,000
Bulgaria and Rumelia	30,600	2 6	4,000
India	2,200	4 0	400
Austria-Hungary	389,300	1 9	34,000
Chile	600	..	..
North Russia	462,700	1 6	35,000
Germany	438,700	1 6	33,000
Australasia	883,900	6 5	284,000
Minor Countries	225,100	2 6	28,000
Total	23,190,800	Average 3s. 6d.	£4,036,500

Comparing these figures with a similar statement for the year 1872, the most remote year for which similar facts are available, it will be found that the actual total cost per quarter for ocean carriage has not much decreased.

Quantity of Wheat and Wheaten Flour (as wheat) imported into the United Kingdom from various sources during the calendar year 1872, together with the average rate of freight.

1872.

Countries of Origin.	Quantities. Qrs.	Ocean Freight to United Kingdom. Per qr.	Total Cost of Carriage.
		s. d.	£
South Russia	3,678,000	8 6	1,563,000
United States	2,030,000	6 6	659,000
Germany	910,000	2 0	91,000
France	660,000	3 0	99,000
Egypt	536,000	4 6	120,000
North Russia	490,000	2 0	49,000
Canada	400,000	7 6	150,000
Chile	330,000	12 0	198,000
Turkey	195,000	7 6	72,000
Spain	130,000	3 6	23,000
Scandinavia	160,000	2 0	16,000
Total, Chief Countries	9,519,000	Average 6s. 5d.	£3,040,000

N.B.—A trifling quantity of Californian and Australian wheat was imported in the period in question, but the Board of Trade records do not distinguish the quantities, therefore they cannot be given. The freight in that year from those countries averaged about 13s. per quarter.

The exact difference between the average freight for the years 1872 and 1900 amounts to about 2s. 11d. per quarter (480 lb), a trifle in comparison with the actual fall in the price of wheat during the same years.

The following data bearing upon the subject, for selected periods, are partly taken from the *Corn Trade Year-Book*:—

Year.	United Kingdom Annual Imports. Wheat and Flour. Qrs.	Ocean Freight to United ingdom. Per qr.	Aggregate Cost of Carriage.
		s. d.	£
1872	9,469,000	6 5	3,040,000
1882	14,850,000	7 4	5,420,000

1894	16,229,000	3 9	3,041,000
1895	25,197,000	3 0	3,825,000
1896	23,431,000	2 9	3,258,000
1900	23,196,000	3 6	4,036,000

In passing, it may be pointed out that for a period of four years, from 1871 to 1874, the price of wheat averaged 56s. per quarter (or 7s. per bushel), with the charge for ocean carriage at 6s. 5d. per quarter, whereas in 1901 wheat was sold in England at 28s. (or 3s. 6d. per bushel), and the charge for ocean carriage was 3s. 6d. per quarter; the ocean transport companies carried eight bushels of wheat across the seas in 1901 for the value of one bushel, or exactly at the same ratio as in 1872.

The contrast between the case of railway freight and ocean freight is to be explained by the greater length of the present ocean voyage, which now extends to 10,000 miles in the case of Europe’s importation of white wheat from the Pacific Coast of the United States and Australia, in contrast with the short voyage from the Black Sea or across the English Channel or German Ocean. It is largely due to the overlooking of this phase of the question that an American statistician has fallen into the error of stating that about 16s. per quarter of the fall in the price of wheat, which happened between 1880 and 1894, is attributable to the lessened cost of transport.

Wheat Prices

The following figures show the fluctuations from year to year of English wheat, chiefly according to a record published by Mr T. Smith, Melford, the period covered being from 1656 to 1905:

Price per Quarter

	s.	d.		s.	d.		s.	d.		s.	d.		s.	d.
1656	38	2	1706	23	1	1756	40	1	1806	79	1	1856	69	2
1657	41	5	1707	25	4	1757	53	4	1807	75	4	1857	56	4
1658	57	9	1708	36	10	1758	44	5	1808	84	4	1858	44	2
1659	58	8	1709	69	9	1759	35	3	1809	97	4	1859	43	9
1660	50	2	1710	69	4	1760	32	5	1810	106	5	1860	53	3
1661	62	2	1711	48	0	1761	26	9	1811	95	3	1861	55	4
1662	65	9	1712	41	2	1762	34	8	1812	126	6	1862	55	5
1663	50	8	1713	45	4	1763	36	1	1813	109	9	1863	44	9
1664	36	0	1714	44	9	1764	41	5	1814	74	4	1864	40	2
1665	43	10	1715	38	2	1765	48	0	1815	65	7	1865	41	10
1666	32	0	1716	42	8	1766	43	1	1816	78	6	1866	49	11
1667	32	0	1717	40	7	1767	57	4	1817	96	11	1867	64	5
1668	35	6	1718	34	6	1768	53	9	1818	86	3	1868	63	9
1669	39	5	1719	31	1	1769	40	7	1819	74	6	1869	48	2
1670	37	0	1720	32	10	1770	43	6	1820	67	10	1870	46	11
1671	37	4	1721	33	4	1771	47	2	1821	56	1	1871	56	8
1672	36	5	1722	32	0	1772	50	8	1822	44	7	1872	57	0
1673	41	5	1723	30	10	1773	51	0	1823	53	4	1873	58	8
1674	61	0	1724	32	10	1774	52	8	1824	63	11	1874	55	9
1675	57	5	1725	43	1	1775	48	4	1825	68	6	1875	45	2
1676	33	9	1726	40	10	1776	38	2	1826	58	8	1876	46	2
1677	37	4	1727	37	4	1777	45	6	1827	60	6	1877	56	9
1678	52	5	1728	48	5	1778	42	0	1828	60	5	1878	46	5
1679	53	4	1729	41	7	1779	33	8	1829	66	3	1879	43	10
1680	40	0	1730	32	5	1780	35	8	1830	64	3	1880	44	4
1681	41	5	1731	29	2	1781	44	8	1831	66	4	1881	45	4
1682	39	1	1732	23	8	1782	47	10	1832	58	8	1882	45	1
1683	35	6	1733	25	2	1783	52	8	1833	52	11	1883	41	7
1684	39	1	1734	34	6	1784	48	10	1834	46	2	1884	35	8
1685	41	5	1735	38	2	1785	51	10	1835	49	4	1885	32	10
1686	30	2	1736	35	10	1786	38	10	1836	48	6	1886	31	0
1687	22	4	1737	33	9	1787	41	2	1837	55	0	1887	32	6
1688	40	10	1738	31	6	1788	45	0	1838	64	7	1888	31	10
1689	26	8	1739	34	2	1789	51	2	1839	70	8	1889	29	9
1690	30	9	1740	45	1	1790	54	9	1840	66	4	1890	31	11
1691	30	2	1741	41	5	1791	48	7	1841	64	4	1891	37	0
1692	41	5	1742	30	2	1792	43	0	1842	57	3	1892	30	3

1693	60	1	1743	22	1	1793	49	3	1843	50	1	1893	26	4
1694	56	10	1744	22	1	1794	52	3	1844	51	3	1894	22	10
1695	47	1	1745	24	5	1795	75	2	1845	50	10	1895	23	1
1696	63	1	1746	34	8	1796	78	7	1846	54	8	1896	26	2
1697	53	4	1747	30	11	1797	53	9	1847	69	9	1897	30	2
1698	60	9	1748	32	10	1798	51	10	1848	50	6	1898	34	0
1699	56	10	1749	32	10	1799	69	0	1849	44	3	1899	25	8
1700	35	6	1750	28	10	1800	113	10	1850	40	3	1900	26	11
1701	33	5	1751	34	2	1801	119	6	1851	38	6	1901	26	9
1702	26	2	1752	37	2	1802	69	10	1852	40	9	1902	28	1
1703	32	0	1753	39	8	1803	58	10	1853	53	3	1903	26	9
1704	41	4	1754	30	9	1804	62	3	1854	72	5	1904	28	4
1705	26	8	1755	30	1	1805	89	9	1855	74	8	1905	29	8
Average 50 years	42	10		36	0		51	9		65	10		*42	7

* Average for 46 years only.

Thus, whatever the cause of the decline in the price of wheat may be, it cannot be attributed solely to the fall in the rate of rail or ocean freights. Incidental charges are lower than they were in 1870; handling charges, brokers' commissions and insurance premiums have been in many instances reduced, but all these economies when combined only amount to about 2s. per quarter. Now if we add together all these savings in the rate of rail and ocean freights and incidental expenses, we arrive at an aggregate economy of 8s. per quarter, or not one-third of the actual difference between the average price of wheat in 1872 and 1900. To what the remaining difference was due it is difficult to say with certitude; there are some who argue that the tendency of prices to fall is inherent, and that the constant whittling away of intermediaries' profits is sufficient explanation, while bi-metallists have maintained that the phenomenon is clearly to be traced to the action of the German government in demonetizing silver in 1872.

1 Valuable information will also be found in Bulletin No. 38 (1905), "Crop Export Movement and Port Facilities on the Atlantic and Gulf Coasts"; in Bulletin No. 49 (1907), "Cost of Hauling Crops from Farms to Shipping Points"; and in Bulletin No. 69 (1908), "European Grain Trade."

GRAM, or CHICK-PEA, called also Egyptian pea, or Bengal gram (from Port. *grão*, formerly *gram*, Lat. *granum*, Hindi *Chanā*, Bengali *Chholā*, Ital. *cece*, Span. *garbanzo*), the *Cicer arietinum* of Linnaeus, so named from the resemblance of its seed to a ram's head. It is a member of the natural order Leguminosae, largely cultivated as a pulse-food in the south of Europe, Egypt and western Asia as far as India, but is not known undoubtedly wild. The plant is an annual herb with flexuose branches, and alternately arranged pinnately compound leaves, with small, oval, serrated leaflets and small eared stipules. The flowers are borne singly in the leaf-axils on a stalk about half the length of the leaf and jointed and bent in the middle; the corolla is blue-purple. The inflated pod, 1 to 1½ in. long, contains two roundish seeds. It was cultivated by the Greeks in Homer's time under the name *erebinthos*, and is also referred to by Dioscorides as *krios* from the resemblance of the pea to the head of a ram. The Romans called it *cicer*, from which is derived the modern names given to it in the south of Europe. Names, more or less allied to one another, are in vogue among the peoples of the Caucasus, the Caspian Sea, Armenia and Persia, and there is a Sanskrit name and several others analogous or different in modern Indian languages. The plant has been cultivated in Egypt from the beginning of the Christian era, but there is no proof that it was known to the ancient Egyptians. Alphonse de Candolle (*Origin of Cultivated Plants*, p. 325) suggests that the plant originally grew wild in the countries to the south of the Caucasus and to the north of Persia. "The western Aryans (Pelasgians, Hellenes) perhaps introduced the plant into southern Europe, where, however, there is some probability that it was also indigenous. The western Aryans carried it to India." Gram is largely cultivated in the East, where the seeds are eaten raw or cooked in various ways, both in their ripe and unripe condition, and when roasted and ground subserve the same purposes as ordinary flour. In Europe the seeds are used as an ingredient in soups. They contain, in 100 parts without husks, nitrogenous substances 22.7, fat 3.76, starch 63.18, mineral matters 2.6 parts, with

water (Forbes Watson, quoted in Parkes's *Hygiene*). The liquid which exudes from the glandular hairs clothing the leaves and stems of the plant, more especially during the cold season when the seeds ripen, contains a notable proportion of oxalic acid. In Mysore the dew containing it is collected by means of cloths spread on the plant over night, and is used in domestic medicine. The steam of water in which the fresh plant is immersed is in the Deccan resorted to by the Portuguese for the treatment of dysmenorrhoea. The seed of *Phaseolus Mungo*, or green gram (Hind. and Beng. *moong*), a form of which plant with black seeds (*P. Max* of Roxburgh) is termed black gram, is an important article of diet among the labouring classes in India. The meal is an excellent substitute for soap, and is stated by Elliot to be an invariable concomitant of the Hindu bath. A variety, var. *radiatus* (*P. Roxburghii*, W. and Arn., or *P. radiatus*, Roxb.) (vern. *urid*, *māshkalāi*), also known as green gram, is perhaps the most esteemed of the leguminous plants of India, where the meal of its seed enters into the composition of the more delicate cakes and dishes. Horse gram, *Dolichos biflorus* (vern. *kulthi*), which supplies in Madras the place of the chick-pea, affords seed which, when boiled, is extensively employed as a food for horses and cattle in South India, where also it is eaten in curries.

See W. Elliot, "On the Farinaceous Grains and the various kinds of Pulses used in Southern India," *Edin. New Phil. Journ.* xvi. (1862) 16 sq.; H. Drury, *The Useful Plants of India* (1873); U. C. Dutt, *Materia Medica of the Hindus* (Calcutta, 1877); G. Watt, *Dictionary of the Economic Products of India* (1890).

GRAMMAR (from Lat. *grammatica*, sc. *ars*; Gr. γράμμα, letter, from γράφειν, to write). By the grammar of a language is meant either the relations borne by the words of a sentence and by sentences themselves one to another, or the systematized exposition of these. The exposition may be, and frequently is, incorrect; but it always presupposes the existence of certain customary uses of words when in combination. In what follows, therefore, grammar will be generally employed in its primary sense, as denoting the mode in which words are connected in order to express a complete thought, or, as it is termed in logic, a proposition.

Scope of grammar.

The object of language is to convey thought, and so long as this object is attained the machinery for attaining it is of comparatively slight importance. The way in which we combine our words and sentences matters little, provided that our meaning is clear to others. The expressions "horseflesh" and "flesh of a horse" are equally intelligible to an Englishman and therefore are equally recognized by English grammar. The Chinese manner of denoting a genitive is by placing the defining word before that which it defines, as in *koue jin*, "man of the kingdom," literally "kingdom man," and the only reason why it would be incorrect in French or Italian is that such a combination would be unintelligible to a Frenchman or an Italian. Hence it is evident that the grammatical correctness or incorrectness of an expression depends upon its intelligibility, that is to say, upon the ordinary use and custom of a particular language. Whatever is so unfamiliar as not to be generally understood is also ungrammatical. In other words, it is contrary to the habit of a language, as determined by common usage and consent.

In this way we can explain how it happens that the grammar of a cultivated dialect and that of a local dialect in the same country so frequently disagree. Thus, in the dialect of West Somerset, *thee* is the nominative of the second personal pronoun, while in cultivated English the plural accusative *you* (A.-S. *eow*) has come to represent a nominative singular. Both are grammatically correct within the sphere of their respective dialects, but no further. *You* would be as ungrammatical in West Somerset as *thee* is in classical English; and both *you* and *thee*, as nominatives singular, would have been equally ungrammatical in Early English. Grammatical propriety is nothing more than the established usage of a particular body of speakers at a particular time in their history.

It follows from this that the grammar of a people changes, like its pronunciation, from age to age. Anglo-Saxon or Early English grammar is not the grammar of Modern English, any more than Latin grammar is the grammar of modern Italian; and to defend an unusual construction or inflexion on the ground that it once existed in literary Anglo-Saxon is as wrong as to import a peculiarity of some local dialect into the grammar of the cultivated speech. It further follows that different languages will have different grammars, and that the

differences will be more or less according to the nearer or remoter relationship of the languages themselves and the modes of thought of those who speak them. Consequently, to force the grammatical framework of one language upon another is to misconceive the whole nature of the latter and seriously to mislead the learner. Chinese grammar, for instance, can never be understood until we discard, not only the terminology of European grammar, but the very conceptions which underlie it, while the polysynthetic idioms of America defy all attempts to discover in them "the parts of speech" and the various grammatical ideas which occupy so large a place in our school-grammars. The endeavour to find the distinctions of Latin grammar in that of English has only resulted in grotesque errors, and a total misapprehension of the usage of the English language.

Subdivision of grammar.

It is to the Latin grammarians—or, more correctly, to the Greek grammarians, upon whose labours those of the Latin writers were based—that we owe the classification of the subjects with which grammar is commonly supposed to deal. The grammar of Dionysius Thrax, which he wrote for Roman schoolboys in the time of Pompey, has formed the starting-point for the innumerable school-grammars which have since seen the light, and suggested that division of the matter treated of which they have followed. He defines grammar as a practical acquaintance with the language of literary men, and as divided into six parts—accentuation and phonology, explanation of figurative expressions, definition, etymology, general rules of flexion and critical canons. Of these, phonology and accentuation, or prosody, can properly be included in grammar only in so far as the construction of a sentence and the grammatical meaning of a word are determined by accent or letter-change; the accentual difference in English, for example, between *íncense* and *incénse* belongs to the province of grammar, since it indicates a difference between noun and verb; and the changes of vowel in the Semitic languages, by which various nominal and verbal forms are distinguished from one another, constitute a very important part of their grammatical machinery. But where accent and pronunciation do not serve to express the relations of words in a sentence, they fall into the domain of phonology, not of grammar. The explanation of figurative expressions, again, must be left to the rhetorician, and definition to the lexicographer; the grammarian has no more to do with them than he has with the canons of criticism.

In fact, the old subdivision of grammar, inherited from the grammarians of Rome and Alexandria, must be given up and a new one put in its place. What grammar really deals with are all those contrivances whereby the relations of words and sentences are pointed out. Sometimes it is position, sometimes phonetic symbolization, sometimes composition, sometimes flexion, sometimes the use of auxiliaries, which enables the speaker to combine his words in such a way that they shall be intelligible to another. Grammar may accordingly be divided into the three departments of composition or "word-building," syntax and accidence, by which is meant an exposition of the means adopted by language for expressing the relations of grammar when recourse is not had to composition or simple position.

Modes of treatment.

A systematized exposition of grammar may be intended for the purely practical purpose of teaching the mechanism of a foreign language. In this case all that is necessary is a correct and complete statement of the facts. But a correct and complete statement of the facts is by no means so easy a matter as might appear at first sight. The facts will be distorted by a false theory in regard to them, while they will certainly not be presented in a complete form if the grammarian is ignorant of the true theory they presuppose. The Semitic verb, for example, remains unintelligible so long as the explanation of its forms is sought in the conjugation of the Aryan verb, since it has no tenses in the Aryan sense of the word, but denotes relation and not time.

A good practical grammar of a language, therefore, should be based on a correct appreciation of the facts which it expounds, and a correct appreciation of the facts is only possible where they are examined and co-ordinated in accordance with the scientific method. A practical grammar ought, wherever it is possible, to be preceded by a scientific grammar.

Comparison is the instrument with which science works, and a scientific grammar, accordingly, is one in which the comparative method has been applied to the relations of speech. If we would understand the origin and real nature of grammatical forms, and of the relations which they represent, we must compare them with similar forms in kindred dialects and languages, as well as with the forms under which they appeared themselves at an earlier period of their history. We shall thus have a comparative grammar and an historical grammar, the latter being devoted to tracing the history of grammatical forms and usages in the same language. Of course, an historical grammar is only possible where a succession of

written records exists; where a language possesses no older literature we must be content with a comparative grammar only, and look to cognate idioms to throw light upon its grammatical peculiarities. In this case we have frequently to leave whole forms unexplained, or at most conjecturally interpreted, since the machinery by means of which the relations of grammar are symbolized is often changed so completely during the growth of a language as to cause its earlier shape and character to be unrecognizable. Moreover, our area of comparison must be as wide as possible; where we have but two or three languages to compare, we are in danger of building up conclusions on insufficient evidence. The grammatical errors of the classical philologists of the 18th century were in great measure due to the fact that their area of comparison was confined to Latin and Greek.

The historical grammar of a single language or dialect, which traces the grammatical forms and usages of the language as far back as documentary evidence allows, affords material to the comparative grammarian, whose task it is to compare the grammatical forms and usages of an allied group of tongues and thereby reduce them to their earliest forms and senses. The work thus carried out by the comparative grammarian within a particular family of languages is made use of by universal grammar, the object of which is to determine the ideas that underlie all grammar whatsoever, as distinct from those that are peculiar to special families of speech. Universal grammar is sometimes known as “the metaphysics of language,” and it has to decide such questions as the nature of gender or of the verb, the true purport of the genitive relation, or the origin of grammar itself. Such questions, it is clear, can only be answered by comparing the results gained by the comparative treatment of the grammars of various groups of language. What historical grammar is to comparative grammar, comparative grammar is to universal grammar.

Universal grammar.

Universal grammar, as founded on the results of the scientific study of speech, is thus essentially different from that “universal grammar” so much in vogue at the beginning of the 19th century, which consisted of a series of a priori assumptions based on the peculiarities of European grammar and illustrated from the same source. But universal grammar, as conceived by modern science, is as yet in its infancy; its materials are still in the process of being collected. The comparative grammar of the Indo-European languages is alone in an advanced state, those of the Semitic idioms, of the Finno-Ugrian tongues and of the Bantu dialects of southern Africa are still in a backward condition; and the other families of speech existing in the world, with the exception of the Malayo-Polynesian and the Sonorian of North America, have not as yet been treated scientifically. Chinese, it is true, possesses an historical grammar, and Van Eys, in his comparative grammar of Basque, endeavoured to solve the problems of that interesting language by a comparison of its various dialects; but in both cases the area of comparison is too small for more than a limited success to be attainable. Instead of attempting the questions of universal grammar, therefore, it will be better to confine our attention to three points—the fundamental differences in the grammatical conceptions of different groups of languages, the main results of a scientific investigation of Indo-European grammar, and the light thrown by comparative philology upon the grammar of our own tongue.

Differences in grammar of unallied languages.

The proposition or sentence is the unit and starting-point of speech, and grammar, as we have seen, consists in the relations of its several parts one to another, together with the expression of them. These relations may be regarded from various points of view. In the polysynthetic languages of America the sentence is conceived as a whole, not composed of independent words, but, like the thought which it expresses, one and indivisible. What we should denote by a series of words is consequently denoted by a single long compound—*kuligatchis* in Delaware, for instance, signifying “give me your pretty little paw,” and *aglekkigiartorasuarnipok* in Eskimo, “he goes away hastily and exerts himself to write.” Individual words can be, and often are, extracted from the sentence; but in this case they stand, as it were, outside it, being represented by a pronoun within the sentence itself. Thus, in Mexican, we can say not only *ni-sotsi-temoa*, “I look for flowers,” but also *ni-k-temoa sotsitl*, where the interpolated guttural is the objective pronoun. As a necessary result of this conception of the sentence the American languages possess no true verb, each act being expressed as a whole by a single word. In Cherokee, for example, while there is no verb signifying “to wash” in the abstract, no less than thirteen words are used to signify every conceivable mode and object of washing. In the incorporating languages, again, of which Basque may be taken as a type, the object cannot be conceived except as contained in the verbal action. Hence every verbal form embodies an objective pronoun, even though the object may be separately expressed. If we pass to an isolating language like Chinese, we find the exact converse of that which meets us in the polysynthetic tongues. Here each

proposition or thought is analysed into its several elements, and these are set over against one another as so many independent words. The relations of grammar are consequently denoted by position, the particular position of two or more words determining the relation they bear to each other. The analysis of the sentence has not been carried so far in agglutinative languages like Turkish. In these the relations of grammar are represented by individual words, which, however, are subordinated to the words expressing the main ideas intended to be in relation to one another. The defining words, or indices of grammatical relations, are, in a large number of instances, placed after the words which they define; in some cases, however, as, for example, in the Bantu languages of southern Africa, the relation is conceived from the opposite point of view, the defining words being prefixed. The inflexional languages call in the aid of a new principle. The relations of grammar are denoted symbolically either by a change of vowel or by a change of termination, more rarely by a change at the beginning of a word. Each idea, together with the relation which it bears to the other ideas of a proposition, is thus represented by a single word; that is to say, the ideas which make up the elements of a sentence are not conceived severally and independently, as in Chinese, but as always having a certain connexion with one another. Inflexional languages, however, tend to become analytical by the logical separation of the flexion from the idea to which it is attached, though the primitive point of view is never altogether discarded, and traces of flexion remain even in English and Persian. In fact, there is no example of a language which has wholly forsaken the conception of the sentence and the relation of its elements with which it started, although each class of languages occasionally trespasses on the grammatical usages of the others. In language, as elsewhere in nature, there are no sharp lines of division, no sudden leaps; species passes insensibly into species, class into class. At the same time the several types of speech—polysynthetic, isolating, agglutinative and inflexional—remain clear and fixed; and even where two languages belong to the same general type, as, for instance, an Indo-European and a Semitic language in the inflexional group, or a Bantu and a Turkish language in the agglutinative group, we find no certain example of grammatical interchange. A mixed grammar, in which the grammatical procedure of two distinct families of speech is intermingled, is almost, if not altogether, unknown.

It is obvious, therefore, that grammar constitutes the surest and most important basis for a classification of languages. Words may be borrowed freely by one dialect from another, or, though originally unrelated, may, by the action of phonetic decay, come to assume the same forms, while the limited number of articulate sounds and conceptions out of which language was first developed, and the similarity of the circumstances by which the first speakers were everywhere surrounded, naturally produce a resemblance between the roots of many unconnected tongues. Where, however, the fundamental conceptions of grammar and the machinery by which they are expressed are the same, we may have no hesitation in inferring a common origin.

Forms of Indo-European grammar.

The main results of scientific inquiry into the origin and primitive meaning of the forms of Indo-European grammar may be summed up as follows. We start with stems or themes, by which are meant words of two or more syllables which terminate in a limited number of sounds. These stems can be classed in groups of two kinds, one in which the groups consist of stems of similar meanings and similar initial syllables, and another in which the final syllables alone coincide. In the first case we have what are termed roots, the simplest elements into which words can be decomposed; in the second case stems proper, which may be described as consisting of suffixes attached to roots. Roots, therefore, are merely the materials out of which speech can be made, the embodiments of isolated conceptions with which the lexicographer alone has to deal, whereas stems present us with words already combined in a sentence and embodying the relations of grammar. If we would rightly understand primitive Indo-European grammar, we must conceive it as having been expressed or implied in the suffixes of the stems, and in the order according to which the stems were arranged in a sentence. In other words, the relations of grammar were denoted partly by juxtaposition or syntax, partly by the suffixes of stems.

These suffixes were probably at first unmeaning, or rather clothed with vague significations, which changed according to the place occupied in the sentence by the stem to which they were joined. Gradually this vagueness of signification disappeared, and particular suffixes came to be set apart to represent particular relations of grammar. What had hitherto been expressed by mere position now attached itself to the terminations or suffixes of stems, which accordingly became full-grown words. Some of the suffixes denoted purely grammatical ideas, that is to say, were flexions; others were classificatory, serving to distinguish nouns from verbs, presents from aorists, objects from agents and the like; while

others, again, remained unmeaning adjuncts of the root. This origin of the flexions explains the otherwise strange fact that the same suffix may symbolize wholly different grammatical relations. In Latin, for instance, the context and dictionary will alone tell us that *mus-as* is the accusative plural of a noun, and *am-as* the second person singular of a verb, or that *mus-a* is the nominative singular of a feminine substantive, *bon-a* the accusative plural of a neuter adjective. In short, the flexions were originally merely the terminations of stems which were adapted to express the various relations of words to each other in a sentence, as these gradually presented themselves to the consciousness and were extracted from what had been previously implied by position. Necessarily, the same suffix might be used sometimes in a classificatory, sometimes in a flexional sense, and sometimes without any definite sense at all. In the Greek dative-locative πόδ-εσ-σι, for example, the suffix -ες is classificatory; in the nominative πόδ-ες it is flexional.

When a particular termination or suffix once acquired a special sense, it would be separated in thought from the stem to which it belonged, and attached in the same sense to other stems and other terminations. Thus in modern English we can attach the suffix -ize to almost any word whatsoever, in order to give the latter a transitive meaning, and the Gr. πόδεσσι, quoted above, really contains no less than three suffixes, -ες, -συ and -ι, the last two both denoting the locative, and coalescing, through σϳι, into a single syllable -σι. The latter instance shows us how two or more suffixes denoting exactly the same idea may be tacked on one to another, if the original force and signification of the first of them comes to be forgotten. Thus, in O. Eng. *sang-estre* was the feminine of *sang-ere*, "singer," but the meaning of the termination has so entirely died out of the memory that we have to add the Romanic *-ess* to it if we would still distinguish it from the masculine *singer*. A familiar example of the way in which the full sense of the exponent of a grammatical idea fades from the mind and has to be supplied by a new exponent is afforded by the use of expletives in conversational English to denote the superlative. "Very warm" expresses little more than the positive, and to represent the intensity of his feelings the Englishman has recourse to such expressions as "awfully warm" like the Ger. "schrecklich warm."

Such words as "very," "awfully," "schrecklich," illustrate a second mode in which Indo-European grammar has found means of expression. Words may lose their true signification and become the mere exponents of grammatical ideas. Professor Earle divides all words into *presentive* and *symbolic*, the former denoting objects and conceptions, the latter the relations which exist between these. Symbolic words, therefore, are what the Chinese grammarians call "empty words"—words, that is, which have been divested of their proper signification and serve a grammatical purpose only. Many of the classificatory and some of the flexional suffixes of Indo-European speech can be shown to have had this origin. Thus the suffix *tar*, which denotes names of kinship and agency, seems to come from the same root as the Lat. *terminus* and *trans*, our *through*, the Sans. *tar-āmi*, "I pass over," and to have primarily signified "one that goes through" a thing. Thus, too, the Eng. *head* or *hood*, in words like *godhead* and *brotherhood*, is the A.-S. *hâd*, "character" or "rank"; *dom*, in kingdom, the A.-S. *dôm*, "judgment"; and *lock* or *ledge*, in *wedlock* and *knowledge*, the A.-S. *lâc*, "sport" or "gift." In all these cases the "empty words," after first losing every trace of their original significance, have followed the general analogy of the language and assumed the form and functions of the suffixes with which they had been confused.

A third mode of representing the relations of grammar is by the symbolic use of vowels and diphthongs. In Greek, for instance, the distinction between the reduplicated present δίδωμι and the reduplicated perfect δέδωκα is indicated by a distinction of vowel, and in primitive Aryan grammar the vowel *â* seems to have been set apart to denote the subjunctive mood just as *ya* or *i* was set apart to denote the potential. So, too, according to M. Hovelacque, the change of *a* into *i* or *u* in the parent Indo-European symbolized a change of meaning from passive to active. This symbolic use of the vowels, which is the purest application of the principle of flexion, is far less extensively carried out in the Indo-European than in the Semitic languages. The Semitic family of speech is therefore a much more characteristic type of the inflexional languages than is the Indo-European.

The primitive Indo-European noun possessed at least eight cases—nominative, accusative, vocative, instrumental, dative, genitive, ablative and locative. M. Bergaigne has attempted to show that the first three of these, the "strong cases" as they are termed, are really abstracts formed by the suffixes *-as* (*-s*), *-an, -m, -t, -i, -â* and *-ya* (*-i*), the plural being nothing more than an abstract singular, as may be readily seen by comparing words like the Gr. ἔπο-ς, and ὄπε-ς, which mean precisely the same. The remaining "weak" cases, formed by the suffixes *-sma, -sya, -syâ, -yâ, -i, -an, -t, -bhi, -su, -i, -a* and *-â*, are really adjectives and adverbs. No distinction, for example, can be drawn between "a cup of gold" and "a golden cup," and the

instrumental, the dative, the ablative and the locative are, when closely examined, merely adverbs attached to a verb. The terminations of the strong cases do not displace the accent of the stem to which they are suffixed; the suffixes of the weak cases, on the other hand, generally draw the accent upon themselves.

According to Hübschmann, the nominative, accusative and genitive cases are purely grammatical, distinguished from one another through the exigencies of the sentence only, whereas the locative, ablative and instrumental have a logical origin and determine the logical relation which the three other cases bear to each other and the verb. The nature of the dative is left undecided. The locative primarily denotes rest in a place, the ablative motion from a place, and the instrumental the means or concomitance of an action. The dative Hübschmann regards as "the case of the participant object." Like Hübschmann, Holzweissig divides the cases into two classes—the one grammatical and the other logical; and his analysis of their primitive meaning is the same as that of Hübschmann, except as regards the dative, the primary sense of which he thinks to have been motion towards a place. This is also the view of Delbrück, who makes it denote tendency towards an object. Delbrück, however, holds that the primary sense of the ablative was that of separation, the instrumental originally indicating concomitance, while there was a double locative, one used like the ablative absolute in Latin, the other being a locative of the object.

The dual was older than the plural, and after the development of the latter survived as a merely useless encumbrance, of which most of the Indo-European languages contrived in time to get rid. There are still many savage idioms in which the conception of plurality has not advanced beyond that of duality. In the Bushman dialects, for instance, the plural, or rather that which is more than one, is expressed by repeating the word; thus *tu* is "mouth," *tutu* "mouths." It may be shown that most of the suffixes of the Indo-European dual are the longer and more primitive forms of those of the plural which have grown out of them by the help of phonetic decay. The plural of the weak cases, on the other hand (the accusative alone excepted), was identical with the singular of abstract nouns; so far as both form and meaning are concerned, no distinction can be drawn between ὄπες and ἔπος. Similarly, *humanity* and *men* signify one and the same thing, and the use of English words like *sheep* or *fish* for both singular and plural shows to what an extent our appreciation of number is determined by the context rather than by the form of the noun. The so-called "broken plurals" of Arabic and Ethiopic are really singular collectives employed to denote the plural.

Gender is the product partly of analogy, partly of phonetic decay. In many languages, such as Eskimo and Choctaw, its place is taken by a division of objects into animate and inanimate, while in other languages they are separated into rational and irrational. There are many indications that the parent Indo-European in an early stage of its existence had no signs of gender at all. The terminations of the names of *father* and *mother*, *pater* and *mater*, for example, are exactly the same, and in Latin and Greek many diphthongal stems, as well as stems in *i* or *ya* and u (like ναῦς and νέκυς, πόλις and λῖς), may be indifferently masculine and feminine. Even stems in *o* and *a* (of the second and first declensions), though the first are generally masculine and the second generally feminine, by no means invariably maintain the rule; and feminines like *humus* and ὁδός, or masculines like *advena* and πολίτης, show that there was a time when these stems also indicated no particular gender, but owed their subsequent adaptation, the one to mark the masculine and the other to mark the feminine, to the influence of analogy. The idea of gender was first suggested by the difference between man and woman, male and female, and, as in so many languages at the present day, was represented not by any outward sign but by the meaning of the words themselves. When once arrived at, the conception of gender was extended to other objects besides those to which it properly belonged. The primitive Indo-European did not distinguish between subject and object, but personified objects by ascribing to them the motives and powers of living beings. Accordingly they were referred to by different pronouns, one class denoting the masculine and another class the feminine, and the distinction that existed between these two classes of pronouns was after a time transferred to the nouns. As soon as the preponderant number of stems in *o* in daily use had come to be regarded as masculine on account of their meaning, other stems in *o*, whatever might be their signification, were made to follow the general analogy and were similarly classed as masculines. In the same way, the suffix *i* or *ya* acquired a feminine sense, and was set apart to represent the feminine gender. Unlike the Semites, the Indo-Europeans were not satisfied with these two genders, masculine and feminine. As soon as object and subject, patient and agent, were clearly distinguished from each other, there arose a need for a third gender, which should be neither masculine nor feminine, but denote things without life. This third gender was fittingly expressed either by the objective case used as a nominative (*e.g. regnum*), or by a stem without any case ending at all (*e.g. virus*).

The adverbial meaning of so many of the cases explains the readiness with which they became crystallized into adverbs and prepositions. An adverb is the attribute of an attribute —"the rose smells sweetly," for example, being resolvable into "the rose has the attribute of scent with the further attribute of sweetness." In our own language *once*, *twice*, *needs*, are all genitives; *seldom* is a dative. The Latin and Greek *humi* and χαμαί are locatives, *facillime* (*facillumed*) and εὐτυχῶς ablatives, πάντη and ἅμα instrumentals, πάρος, ἐξῆς and τηλοῦ genitives. The frequency with which particular cases of particular nouns were used in a specifically attributive sense caused them to become, as it were, petrified, the other cases of the nouns in question passing out of use, and the original force of those that were retained being gradually forgotten. Prepositions are adverbs employed to define nouns instead of verbs and adjectives. Their appearance in the Indo-European languages is comparatively late, and the Homeric poems allow us to trace their growth in Greek. The adverb, originally intended to define the verb, came to be construed with the noun, and the government of the case with which it was construed was accordingly transferred from the verb to the noun. Thus when we read in the *Odyssey*(iv. 43), αὐτοὺς δ᾽ εἰσῆγον θεῖον δόμον, we see that εἰς is still an adverb, and that the accusative is governed by the verb; it is quite otherwise, however, with a line like Ἀτρείδης δὲ γέροντας ἀολλέας ἦγεν Ἀχαιῶν ἐς κλισίην (*Il.* i. 89) where the adverb has passed into a preposition. The same process of transformation is still going on in English, where we can say indifferently, "What are you looking at?" using "at" as an adverb, and governing the pronoun by the verb, and "At what are you looking?" where "at" has become a preposition. With the growth and increase of prepositions the need of the case-endings diminished, and in some languages the latter disappeared altogether.

Like prepositions, conjunctions also are primarily adverbs used in a demonstrative and relative sense. Hence most of the conjunctions are petrified cases of pronouns. The relation between two sentences was originally expressed by simply setting them side by side, afterwards by employing a demonstrative at the beginning of the second clause to refer to the whole preceding one. The relative pronoun can be shown to have been in the first instance a demonstrative; indeed, we can still use *that* in English in a relative sense. Since the demonstrative at the beginning of the second clause represented the first clause, and was consequently an attribute of the second, it had to stand in some case, and this case became a conjunction. How closely allied the adverb and the conjunction are may be seen from Greek and Latin, where ὡς or *quum* can be used as either the one or the other. Our own *and*, it may be observed, has probably the same root as the Greek locative adverb ἔτι, and originally signified "going further."

Another form of adverb is the infinitive, the adverbial force of which appears clearly in such a phrase as "A wonderful thing to see." Various cases, such as the locative, the dative or the instrumental, are employed in Vedic Sanskrit in the sense of the infinitive, besides the bare stem or neuter formed by the suffixes *man* and *van*. In Greek the neuter stem and the dative case were alone retained for the purpose. The first is found in infinitives like δόμεν and φέρειν (for an earlier φερε-ϝεν), the second in the infinitives in -αι. Thus the Gr. δοῦναι answers letter for letter to the Vedic dative *dāvāne*, "to give," and the form ψεύδεσθαι is explained by the Vedic *vayodhai*, for *vayās-dhai*, literally "to do living," *dhai* being the dative of a noun from the root *dhā*, "to place" or "do." When the form ψεύδεσθαι had once come into existence, analogy was ready to create such false imitations as γράψασθαι or γραφθήσεσθαι. The Latin infinitive in *-re* for *-se* has the same origin, *amare*, for instance, being the dative of an old stem *amas*. In *fieri* for *fierei* or *fiesei*, from the same root as our English *be*, the original length of the final syllable is preserved. The suffix in *-um* is an accusative, like the corresponding infinitive of classical Sanskrit. This origin of the infinitive explains the Latin construction of the accusative and infinitive. When the Roman said, "Miror te ad me nihil scribere," all that he meant at first was, "I wonder at you for writing nothing to me," where the infinitive was merely a dative case used adverbially.

The history of the infinitive makes it clear how little distinction must have been felt at the outset between the noun and the verb. Indeed, the growth of the verb was a slow process. There was a time in the history of Indo-European speech when it had not as yet risen to the consciousness of the speaker, and in the period when the noun did not possess a plural there was as yet also no verb. The attachment of the first and second personal pronouns, or of suffixes resembling them, to certain stems, was the first stage in the development of the latter. Like the Semitic verb, the Indo-European verb seems primarily to have denoted relation only, and to have been attached as an attribute to the subject. The idea of time, however, was soon put into it, and two tenses were created, the one expressing a present or continuous action, the other an aoristic or momentary one. The distinction of sense was symbolized by a distinction of pronunciation, the root-syllable of the aorist being an abbreviated form of that of the present. This abbreviation was due to a change in the

position of the accent (which was shifted from the stem-syllable to the termination), and this change again was probably occasioned by the prefixing of the so-called augment to the aorist, which survived into historical times only in Sanskrit, Zend and Greek, and the origin of which is still a mystery. The weight of the first syllable in the aorist further caused the person-endings to be shortened, and so two sets of person-endings, usually termed primary and secondary, sprang into existence. By reduplicating the root-syllable of the present tense a perfect was formed; but originally no distinction was made between present and perfect, and Greek verbs like δίδωμι and ἧκω are memorials of a time when the difference between "I am come" and "I have come" was not yet felt. Reduplication was further adapted to the expression of intensity and desire (in the so-called intensive and desiderative forms). By the side of the aorist stood the imperfect, which differed from the aorist, so far as outward form was concerned, only in possessing the longer and more original stem of the present. Indeed, as Benfey first saw, the aorist itself was primitively an imperfect, and the distinction between aorist and imperfect is not older than the period when the stem-syllables of certain imperfects were shortened through the influence of the accent, and this differentiation of forms appropriated to denote a difference between the sense of the aorist and the imperfect which was beginning to be felt. After the analogy of the imperfect, a pluperfect was created out of the perfect by prefixing the augment (of which the Greek ἐμέμηκον is an illustration); though the pluperfect, too, was originally an imperfect formed from the reduplicated present.

Besides time, mood was also expressed by the primitive Indo-European verb, recourse being had to symbolization for the purpose. The imperative was represented by the bare stem, like the vocative, the accent being drawn back to the first syllable, though other modes of denoting it soon came into vogue. Possibility was symbolized by the attachment of the suffix *-ya* to the stem, probability by the attachment of *-a* and *-ā*, and in this way the optative and conjunctive moods first arose. The creation of a future by the help of the suffix *-sya* seems to belong to the same period in the history of the verb. This suffix is probably identical with that used to form a large class of adjectives and genitives (like the Greek ἵππιο for ἱππόσιο); in this case future time will have been regarded as an attribute of the subject, no distinction being drawn, for instance, between "rising sun" and "the sun will rise." It is possible, however, that the auxiliary verb *as*, "to be," enters into the composition of the future; if so, the future will be the product of the second stage in the development of the Indo-European verb when new forms were created by means of composition. The sigmatic or first aorist is in favour of this view, as it certainly belongs to the age of Indo-European unity, and may be a compound of the verbal stem with the auxiliary *as*.

After the separation of the Indo-European languages, composition was largely employed in the formation of new tenses. Thus in Latin we have perfects like *scrip-si* and *ama-vi*, formed by the help of the auxiliaries *as* (*sum*) and *fuo*, while such forms as *amaveram* (*amavi-eram*) or *amarem* (*ama-sem*) bear their origin on their face. So, too, the future in Latin and Old Celtic (*amabo*, Irish *carub*) is based upon the substantive verb *fuo*, "to be," and the English preterite in *-ed* goes back to a suffixed *did*, the reduplicated perfect of *do*. New tenses and moods, however, were created by the aid of suffixes as well as by the aid of composition, or rather were formed from nouns whose stems terminated in the suffixes in question. Thus in Greek we have aorists and perfects in -κα, and the characteristics of the two passive aorists, *ye* and *the*, are more probably the suffixes of nominal stems than the roots of the two verbs *ya*, "to go," and *dhâ*, "to place," as Bopp supposed. How late some of these new formations were may be seen in Greek, where the Homeric poems are still ignorant of the weak future passive, the optative future, and the aspirated perfect, and where the strong future passive occurs but once and the desiderative but twice. On the other hand, many of the older tenses were disused and lost. In classical Sanskrit, for instance, of the modal aorist forms the precative and benedictive almost alone remain, while the pluperfect, of which Delbrück has found traces in the Veda, has wholly disappeared.

The passive voice did not exist in the parent Indo-European speech. No need for it had arisen, since such a sentence as "I am pleased" could be as well represented by "This pleases me," or "I please myself." It was long before the speaker was able to imagine an action without an object, and when he did so, it was a neuter or substantival rather than a passive verb that he formed. The passive, in fact, grew out of the middle or reflexive, and, except in the two aorists, continued to be represented by the middle in Greek. So, too, in Latin the second person plural is really the middle participle with *estis* understood, and the whole class of deponent or reflexive verbs proves that the characteristic *r* which Latin shares with Celtic could have had at the outset no passive force.

Much light has been thrown on the character and construction of the primitive Indo-

European sentence by comparative syntax. In contradistinction to Semitic, where the defining word follows that which is defined, the Indo-European languages place that which is defined after that which defines it; and Bergaigne has made it clear that the original order of the sentence was (1) object, (2) verb, and (3) subject. Greater complication of thought and its expression, the connexion of sentences by the aid of conjunctions, and rhetorical inversion caused that dislocation of the original order of the sentence which reaches its culminating point in the involved periods of Latin literature. Our own language still remains true, however, to the syntax of the parent Indo-European when it sets both adjective and genitive before the nouns which they define. In course of time a distinction came to be made between an attribute used as a mere qualificative and an attribute used predicatively, and this distinction was expressed by placing the predicate in opposition to the subject and accordingly after it. The opposition was of itself sufficient to indicate the logical copula or substantive verb; indeed, the word which afterwards commonly stood for the latter at first signified "existence," and it was only through the wear and tear of time that a phrase like *Deus bonus est*, "God exists as good," came to mean simply "God is good." It is needless to observe that neither of the two articles was known to the parent Indo-European; indeed, the definite article, which is merely a decayed demonstrative pronoun, has not yet been developed in several of the languages of the Indo-European family.

We must now glance briefly at the results of a scientific investigation of English grammar and the modifications they necessitate in our conception of it. The idea that the free use of speech is tied down by the rules of the grammarian must first be given up; all that the grammarian can do is to formulate the current uses of his time, which are determined by habit and custom, and are accordingly in a perpetual state of flux. We must next get rid of the notion that English grammar should be modelled after that of ancient Rome; until we do so we shall never understand even the elementary principles upon which it is based. We cannot speak of declensions, since English has no genders except in the pronouns of the third person, and no cases except the genitive and a few faint traces of an old dative. Its verbal conjugation is essentially different from that of an inflexional language like Latin, and cannot be compressed into the same categories. In English the syntax has been enlarged at the expense of the accidence; position has taken the place of forms. To speak of an adjective "agreeing" with its substantive is as misleading as to speak of a verb "governing" a case. In fact, the distinction between noun and adjective is inapplicable to English grammar, and should be replaced by a distinction between objective and attributive words. In a phrase like "this is a cannon," *cannon* is objective; in a phrase like "a cannon-ball," it is attributive; and to call it a substantive in the one case and an adjective in the other is only to introduce confusion. With the exception of the nominative, the various forms of the noun are all attributive; there is no difference, for example, between "doing a thing" and "doing badly." Apart from the personal pronouns, the accusative of the classical languages can be represented only by position; but if we were to say that a noun which follows a verb is in the accusative case we should have to define "king" as an accusative in such sentences as "he became king" or "he is king." In conversational English "it is me" is as correct as "c'est moi" in French, or "det er mig" in Danish; the literary "it is I" is due to the influence of classical grammar. The combination of noun or pronoun and preposition results in a compound attribute. As for the verb, Sweet has well said that "the really characteristic feature of the English finite verb is its inability to stand alone without a pronominal prefix." Thus "dream" by itself is a noun; "I dream" is a verb. The place of the pronominal prefix may be taken by a noun, though both poetry and vulgar English frequently insert the pronoun even when the noun precedes. The number of inflected verbal forms is but small, being confined to the third person singular and the special forms of the preterite and past participle, though the latter may with more justice be regarded as belonging to the province of the lexicographer rather than to that of the grammarian. The inflected subjunctive (*be, were, save* in "God save the King," &c.) is rapidly disappearing. New inflected forms, however, are coming into existence; at all events, we have as good a right to consider *wont, shant, cant* new inflected forms as the French *aimerai* (*amare habeo*), *aimerais* (*amare habebam*). If the ordinary grammars are correct in treating forms like "I am loving," "I was loving," "I did love," as separate tenses, they are strangely inconsistent in omitting to notice the equally important emphatic form "I do love" or the negative form "I do not love" ("I don't love"), as well as the semi-inflexional "I'll love," "he's loving." It is true that these latter contracted forms are heard only in conversation and not seen in books; but the grammar of a language, it must be remembered, is made by those who speak it and not by the printers.

Investigation of English grammar.

Our school grammars are the inheritance we have received from Greece and Rome. The necessities of rhetoric obliged the Sophists to investigate the structure of the Greek

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language, and to them was accordingly due the first analysis of Greek grammar. Protagoras distinguished the three genders and the verbal moods, while Prodicus busied himself with the definition of synonyms. Aristotle, taking the side of Democritus, who had held that the meaning of words is put into them by the speaker, and that there is no necessary connexion between sound and sense, laid down that words "symbolize" objects according to the will of those who use them, and added to the ὄνομα or "noun," and the ῥῆμα or "verb," the σύνδεσμος or "particle." He also introduced the term πτῶσις, "case," to denote any flexion whatsoever. He further divided nouns into simple and compound, invented for the neuter another name than that given by Protagoras, and starting from the termination of the nominative singular, endeavoured to ascertain the rules for indicating a difference of gender. Aristotle was followed by the Stoics, who separated the ἄρθρον or "article" from the particles, determined a fifth part of speech, πανδέκτης or "adverb," confined the term "case" to the flexions of the nouns, distinguishing the four principal cases by names, and divided the verb into its tenses, moods and classes. Meanwhile the Alexandrian critics were studying the language of Homer and the Attic writers, and comparing it with the language of their own day, the result being a minute examination of the facts and rules of grammar. Two schools of grammarians sprang up—the Analogists, headed by Aristarchus, who held that a strict law of analogy existed between idea and word, and refused to admit exceptions to the grammatical rules they laid down, and the Anomalists, who denied general rules of any kind, except in so far as they were consecrated by custom. Foremost among the Anomalists was Crates of Mallos, the leader of the Pergamenian school, to whom we owe the first formal Greek grammar and collection of the grammatical facts obtained by the labours of the Alexandrian critics, as well as an attempt to reform Greek orthography. The immediate cause of this grammar seems to have been a comparison of Latin with Greek, Crates having lectured on the subject while ambassador of Attalus at Rome in 159 B.C. The zeal with which the Romans threw themselves into the study of Greek resulted in the school grammar of Dionysius Thrax, a pupil of Aristarchus, which he published at Rome in the time of Pompey and which is still in existence. Latin grammars were soon modelled upon it, and the attempt to translate the technical terms of the Greek grammarians into Latin was productive of numerous blunders which have been perpetuated to our own day. Thus *tenues* is a mistranslation of the ψιλά, "unaspirated"; *genetivus* of γενική, the case "of the genus"; *accusativus* of αἰτιατική, the case "of the object"; *infinitivus* of ἀπαρέμφατος, "without a secondary meaning" of tense or person. New names were coined to denote forms possessed by Latin and not by Greek; *ablative*, for instance, was invented by Julius Caesar, who also wrote a treatise *De analogia*. By the 2nd century of the Christian era the dispute between the Anomalists and the Analogists was finally settled, analogy being recognized as the principle that underlies language, though every rule admits of exceptions. Two eminent grammarians of Alexandria, Apollonius Dyscolus and his son Herodian, summed up the labours and controversies of their predecessors, and upon their works were based the Latin grammar composed by Aelius Donatus in the 4th century, and the eighteen books on grammar compiled by Priscian in the age of Justinian. The grammar of Donatus dominated the schools of the middle ages, and, along with the productions of Priscian, formed the type and source of the Latin and Greek school-grammars of modern Europe.

A few words remain to be said, in conclusion, on the bearing of a scientific study of grammar upon the practical task of teaching and learning foreign languages. The grammar

Learning of grammar of foreign languages.

of a language is not to be confined within the rules laid down by grammarians, much less is it the creation of grammarians, and consequently the usual mode of making the pupil learn by heart certain fixed rules and paradigms not only gives a false idea of what grammar really is, but also throws obstacles in the way of acquiring it. The unit of speech is the sentence; and it is with the sentence therefore, and not with lists of words and forms, that the pupil should begin. When once a sufficient number of sentences has been, so to speak, assimilated, it will be easy to analyse them into their component parts, to show the relations that these bear to one another, and to indicate the nature and varieties of the latter. In this way the learner will be prevented from regarding grammar as a piece of dead mechanism or a Chinese puzzle, of which the parts must be fitted together in accordance with certain artificial rules, and will realize that it is a living organism which has a history and a reason of its own. The method of nature and science alike is analytic; and if we would learn a foreign language properly we must learn it as we did our mother-tongue, by first mastering the expression of a complete thought and then breaking up this expression into its several elements.

(A. H. S.)

See PHILOLOGY, and articles on the various languages. Also Steinthal, *Charakteristik der*

hauptsächlichsten Typen des Sprachbaues (Berlin, 1860); Schleicher, *Compendium of the Comparative Grammar of the Indo-European Languages*, translated by H. Bendall (London, 1874); Pezzi, *Aryan Philology according to the most recent Researches*, translated by E. S. Roberts (London, 1879); Sayce, *Introduction to the Science of Language* (London, 1879); Lersch, *Die Sprachphilosophie der Alten* (Bonn, 1838-1841); Steinthal, *Geschichte der Sprachwissenschaft bei den Griechen und Römern mit besonderer Rücksicht auf die Logik* (Berlin, 1863, 2nd ed. 1890); Delbrück, *Ablativ localis instrumentalis im Altindischen, Lateinischen, Griechischen, und Deutschen* (Berlin, 1864); Jolly, *Ein Kapitel vergleichender Syntax* (Munich, 1873); Hübschmann, *Zur Casuslehre* (Munich, 1875); Holzweissig, *Wahrheit und Irrthum der localistischen Casustheorie* (Leipzig, 1877); Draeger, *Historische Syntax der lateinischen Sprache* (Leipzig, 1874-1876); Sweet, *Words, Logic, and Grammar* (London, 1876); P. Giles, *Manual of Comp. Philology* (1901); C. Abel, *Ägypt.-indo-eur. Sprachverwandschaft* (1903); Brugmann and Delbrück, *Grundriss d. vergl. Gram. d. indogerm. Spr.* (1886-1900); Fritz Mauthner, *Beiträge zu einer Kritik der Sprache* vol. iii. (1902); T. G. Tucker, *Introd. to a Nat. Hist. of Language* (1908).

GRAMMICHELE, a town of Sicily, in the province of Catania, 55 m. S.W. of it by rail and 31 m. direct. Pop. (1901) 15,075. It was built in 1693, after the destruction by an earthquake of the old town of Occhialà to the north; the latter, on account of the similarity of name, is generally identified with Echetla, a frontier city between Syracusan and Carthaginian territory in the time of Hiero II., which appears to have been originally a Sicel city in which Greek civilization prevailed from the 5th century onwards. To the east of Grammichele a cave shrine of Demeter, with fine votive terra-cottas, has been discovered.

See *Mon. Lincei*, vii. (1897), 201; *Not. degli scavi* (1902), 223.

GRAMMONT (the Flemish name *Gheeraardsbergen* more clearly reveals its etymology *Gerardi-mons*), a town in East Flanders, Belgium, near the meeting point with the provinces of Brabant and Hainaut. It is on the Dender almost due south of Alost, and is chiefly famous because the charter of Grammont given by Baldwin VI., count of Flanders, in A.D. 1068 was the first of its kind. This charter has been styled “the most ancient written monument of civil and criminal laws in Flanders.” The modern town is a busy industrial centre. Pop. (1904) 12,835.

GRAMONT, ANTOINE AGÉNOR ALFRED, DUC DE, DUC DE GUICHE, PRINCE DE BIDACHE (1819-1880), French diplomatist and statesman, was born at Paris on the 14th of August 1819, of one of the most illustrious families of the old *noblesse*, a cadet branch of the viscounts of Aure, which took its name from the seigniory of Gramont in Navarre. His grandfather, Antoine Louis Marie, duc de Gramont (1755-1836), had emigrated during the Revolution, and his father, Antoine Héraclius Geneviève Agénor (1789-1855), duc de Gramont and de Guiche, fought under the British flag in the Peninsular War, became a lieutenant-general in the French army in 1823, and in 1830 accompanied Charles X. to Scotland. The younger generation, however, were Bonapartist in sympathy; Gramont’s cousin Antoine Louis Raymond, comte de Gramont (1787-1825), though also the son of an *émigré*, served with distinction in Napoleon’s armies, while Antoine Agénor, duc de Gramont, owed his career to his early friendship for Louis Napoleon.

Educated at the École Polytechnique, Gramont early gave up the army for diplomacy. It was not, however, till after the *coup d’état* of the 2nd of December 1851, which made Louis Napoleon supreme in France, that he became conspicuous as a diplomat. He was successively minister plenipotentiary at Cassel and Stuttgart (1852), at Turin (1853),

ambassador at Rome (1857) and at Vienna (1861). On the 15th of May 1870 he was appointed minister of foreign affairs in the Ollivier cabinet, and was thus largely, though not entirely, responsible for the bungling of the negotiations between France and Prussia arising out of the candidature of Prince Leopold of Hohenzollern for the throne of Spain, which led to the disastrous war of 1870-71. The exact share of Gramont in this responsibility has been the subject of much controversy. The last word may be said to have been uttered by M. Émile Ollivier himself in his *L'Empire libéral* (tome xii., 1909, *passim*). The famous declaration read by Gramont in the Chamber on the 6th of July, the "threat with the hand on the sword-hilt," as Bismarck called it, was the joint work of the whole cabinet; the original draft presented by Gramont was judged to be too "elliptical" in its conclusion and not sufficiently vigorous; the reference to a revival of the empire of Charles V. was suggested by Ollivier; the paragraph asserting that France would not allow a foreign power to disturb to her own detriment the actual equilibrium of Europe was inserted by the emperor. So far, then, as this declaration is concerned, it is clear that Gramont's responsibility must be shared with his sovereign and his colleagues (Ollivier *op. cit.* xii. 107; see also the two *projets de déclaration* given on p. 570). It is clear, however that he did not share the "passion" of his colleagues for "peace with honour," clear also that he wholly misread the intentions of the European powers in the event of war. That he reckoned upon the active alliance of Austria was due, according to M. Ollivier, to the fact that for nine years he had been a *persona grata* in the aristocratic society of Vienna, where the necessity for revenging the humiliation of 1866 was an article of faith. This confidence made him less disposed than many of his colleagues to make the best of the renunciation of the candidature made, on behalf of his son, by the prince of Hohenzollern-Sigmaringen. It was Gramont who pointed out to the emperor, on the evening of the 12th, the dubious circumstances of the act of renunciation, and on the same night, without informing M. Ollivier, despatched to Benedetti at Ems the fatal telegram demanding the king of Prussia's guarantee that the candidature would not be revived. The supreme responsibility for this act must rest with the emperor, "who imposed it by an exercise of personal power on the only one of his ministers who could have lent himself to such a forgetfulness of the safeguards of a parliamentary régime." As for Gramont, he had "no conception of the exigencies of this régime; he remained an ambassador accustomed to obey the orders of his sovereign; in all good faith he had no idea that this was not correct, and that, himself a parliamentary minister, he had associated himself with an act destructive of the authority of parliament."[1] "On his part," adds M. Ollivier, "it was the result only of obedience, not of warlike premeditation" (*op. cit.* p. 262). The apology may be taken for what it is worth. To France and to the world Gramont was responsible for the policy which put his country definitely into the wrong in the eyes of Europe, and enabled Bismarck to administer to her the "slap in the face" (*soufflet*)—as Gramont called it in the Chamber—by means of the mutilated "Ems telegram," which was the immediate cause of the French declaration of war on the 15th.

After the defeat of Weissenburg (August 4) Gramont resigned office with the rest of the Ollivier ministry (August 9), and after the revolution of September he went to England, returning after the war to Paris, where he died on the 18th of January 1880. His marriage in 1848 with Miss Mackinnon, a Scottish lady, remained without issue. During his retirement he published various apologies for his policy in 1870, notably *La France et la Prusse avant la guerre* (Paris, 1872).

Besides M. Ollivier's work quoted in the text, see L. Thouvenel, *Le Secret de l'empereur, correspondance ... échangée entre M. Thouvenel, le duc de Gramont, et le général comte de Flahaut 1860-1863* (2nd ed., 2 vols., 1889). A small pamphlet containing his *Souvenirs 1848-1850* was published in 1901 by his brother Antoine Léon Philibert Auguste de Gramont, duc de Lesparre.

1 Compare with this Bismarck's remarks to Hohenlohe (Hohenlohe, *Denkwürdigkeiten*, ii. 71): "When Gramont was made minister, Bismarck said to Benedetti that this indicated that the emperor was meditating something evil, otherwise he would not have made so stupid a person minister. Benedetti replied that the emperor knew too little of him, whereupon Bismarck said that the emperor had once described Gramont to him as 'un ancien bellâtre.'"

GRAMONT, PHILIBERT, Comte de (1621-1707), the subject of the famous *Memoirs*, came of a noble Gascón family, said to have been of Basque origin. His grandmother, Diane

d'Andouins, comtesse de Gramont, was "la belle Corisande," one of the mistresses of Henry IV. The grandson assumed that his father Antoine II. de Gramont, viceroy of Navarre, was the son of Henry IV., and regretted that he had not claimed the privileges of royal birth. Philibert de Gramont was the son of Antoine II. by his second marriage with Claude de Montmorency, and was born in 1621, probably at the family seat of Bidache. He was destined for the church, and was educated at the *collège* of Pau, in Béarn. He refused the ecclesiastical life, however, and joined the army of Prince Thomas of Savoy, then besieging Trino in Piedmont. He afterwards served under his elder half-brother, Antoine, marshal de Gramont, and the prince of Condé. He was present at Fribourg and Nordlingen, and also served with distinction in Spain and Flanders in 1647 and 1648. He favoured Condé's party at the beginning of the Fronde, but changed sides before he was too severely compromised. In spite of his record in the army he never received any important commission either military or diplomatic, perhaps because of an incurable levity in his outlook, He was, however, made a governor of the Pays d'Aunis and lieutenant of Béarn. During the Commonwealth he visited England, and in 1662 he was exiled from Paris for paying court to Mademoiselle de la Motte Houdancourt, one of the king's mistresses. He went to London, where he found at the court of Charles II. an atmosphere congenial to his talents for intrigue, gallantry and pleasure. He married in London, under pressure from her two brothers, Elizabeth Hamilton, the sister of his future biographer. She was one of the great beauties of the English court, and was, according to her brother's optimistic account, able to fix the count's affections. She was a woman of considerable wit, and held her own at the court of Louis XIV., but her husband pursued his gallant exploits to the close of a long life, being, said Ninon de l'Enclos, the only old man who could affect the follies of youth without being ridiculous. In 1664 he was allowed to return to France. He revisited England in 1670 in connexion with the sale of Dunkirk, and again in 1671 and 1676. In 1688 he was sent by Louis XIV. to congratulate James II. on the birth of an heir. From all these small diplomatic missions he succeeded in obtaining considerable profits, being destitute of scruples whenever money was in question. At the age of seventy-five he had a dangerous illness, during which he became reconciled to the church. His penitence does not seem to have survived his recovery. He was eighty years old when he supplied his brother-in-law, Anthony Hamilton (*q.v.*), with the materials for his *Mémoires*. Hamilton said that they had been dictated to him, but there is no doubt that he was the real author. The account of Gramont's early career was doubtless provided by himself, but Hamilton was probably more familiar with the history of the court of Charles II., which forms the most interesting section of the book. Moreover Gramont, though he had a reputation for wit, was no writer, and there is no reason to suppose that he was capable of producing a work which remains a masterpiece of style and of witty portraiture. When the *Mémoires* were finished it is said that Gramont sold the MS. for 1500 francs, and kept most of the money himself. Fontenelle, then censor of the press, refused to license the book from considerations of respect to the strange old man, whose gambling, cheating and meannesses were so ruthlessly exposed. But Gramont himself appealed to the chancellor and the prohibition was removed. He died on the 10th of January 1707, and the *Mémoires* appeared six years later.

Hamilton was far superior to the comte de Gramont, but he relates the story of his hero without comment, and no condemnation of the prevalent code of morals is allowed to appear, unless in an occasional touch of irony. The portrait is drawn with such skill that the count, in spite of his biographer's candour, imposes by his grand air on the reader much as he appears to have done on his contemporaries. The book is the most entertaining of contemporary memoirs, and in no other book is there a description so vivid, truthful, and graceful of the licentious court of Charles II. There are other and less flattering accounts of the count. His scandalous tongue knew no restraint, and he was a privileged person who was allowed to state even the most unpleasing truths to Louis XIV. Saint-Simon in his memoirs describes the relief that was felt at court when the old man's death was announced.

Mémoires de la vie du comte de Grammont contenant particulièrement l'histoire amoureuse de la cour d'Angleterre sous le règne de Charles II was printed in Holland with the inscription Cologne, 1713. Other editions followed in 1715 and 1716. *Memoirs of the Life of Count de Grammont ... translated out of the French by Mr* [*Abel*] *Boyer* (1714), was supplemented by a "compleat key" in 1719. The *Mémoires* "augmentées de notes et d'éclaircissemens" was edited by Horace Walpole in 1772. In 1793 appeared in London an edition adorned with portraits engraved after originals in the royal collection. An English edition by Sir Walter Scott was published by H. G. Bohn (1846), and this with additions was reprinted in 1889, 1890, 1896, &c. Among other modern editions are an excellent one in the *Bibliothèque Charpentier* edited by M. Gustave Brunet (1859); *Mémoires ...* (Paris, 1888) with etchings by L. Boisson after C. Delort and an introduction by H. Gausseron; *Memoirs ...* (1889), edited by Mr H. Vizetelly; and *Memoirs ...* (1903), edited by Mr Gordon Goodwin.

GRAMOPHONE (an invented word, formed on an inversion of “phonogram”; φωνή, sound, γράμμα, letter), an instrument for recording and reproducing sounds. It depends on the same general principles as the phonograph (*q.v.*), but it differs in certain details of construction, especially in having the sound-record cut spirally on a flat disk instead of round a cylinder.

GRAMPIANS, THE, a mass of mountains in central Scotland. Owing to the number of ramifications and ridges it is difficult to assign their precise limits, but they may be described as occupying the area between a line drawn from Dumbartonshire to the North Sea at Stonehaven, and the valley of the Spey or even Glenmore (the Caledonian Canal). Their trend is from south-west to north-east, the southern face forming the natural division between the Lowlands and Highlands. They lie in the shires of Argyll, Dumbarton, Stirling, Perth, Forfar, Kincardine, Aberdeen, Banff and Inverness. Among the highest summits are Ben Nevis, Ben Macdhui, and Cairngorms, Ben Lawers, Ben More, Ben Alder, Ben Cruachan and Ben Lomond. The principal rivers flowing from the watershed northward are the Findhorn, Spey, Don, Dee and their tributaries, and southward the South Esk, Tay and Forth with their affluents. On the north the mass is wild and rugged; on the south the slope is often gentle, affording excellent pasture in many places, but both sections contain some of the finest deer-forests in Scotland. They are crossed by the Highland, West Highland and Callander to Oban railways, and present some of the finest scenery in the kingdom. The rocks consist chiefly of granite, gneiss, schists, quartzite, porphyry and diorite. Their fastnesses were originally inhabited by the northern Picts, the Caledonians who, under Galgacus, were defeated by Agricola in A.D. 84 at Mons Graupius—the false reading of which, Grampius, has been perpetuated in the name of the mountains—the site of which has not been ascertained. Some authorities place it at Ardoch; others near the junction of the Tay and Isla, or at Dalginross near Comrie; while some, contending for a position nearer the east coast, refer it to a site in west Forfarshire or to Raedykes near Stonehaven.

GRAMPOUND, a small market town in the mid-parliamentary division of Cornwall, England, 9 m. E.N.E. of Truro, and 2 m. from its station (Grampound Road) on the Great Western railway. It is situated on the river Fal, and has some industry in tanning. It retains an ancient town hall; there is a good market cross; and in the neighbourhood, along the Fal, are several early earthworks.

Grampound (Ponsmure, Graundpont, Grauntpount, Graundpond) and the hundred, manor and vill of Tibeste were formerly so closely associated that in 1400 the former is found styled the vill of Grauntpond called Tibeste. At the time of the Domesday Survey Tibeste was amongst the most valuable of the manors granted to the count of Mortain. The burgensic character of Ponsmure first appears in 1299. Thirty-five years later John of Eltham granted to the burgesses the whole town of Grauntpount. This grant was confirmed in 1378 when its extent and jurisdiction were defined. It was provided that the hundred court of Powdershire should always be held there and two fairs at the feasts of St Peter in Cathedra and St Barnabas, both of which are still held, and a Tuesday market (now held on Friday) and that it should be a free borough rendering a yearly rent to the earl of Cornwall. Two members were summoned to parliament by Edward VI. in 1553. The electors consisted of an indefinite number of freemen, about 50 in all, indirectly nominated by the mayor and corporation, which existed by prescription. The venality of the electors became notorious. In 1780 £3000 was paid for a seat: in 1812 each supporter of one of the candidates received £100. The defeat of this candidate in 1818 led to a parliamentary inquiry which disclosed a system of wholesale corruption, and in 1821 the borough was disfranchised. A former woollen trade is

extinct.

GRAMPUS (*Orca gladiator*, or *Orca orca*), a cetacean belonging to the *Delphinidae* or dolphin family, characterized by its rounded head without distinct beak, high dorsal fin and large conical teeth. The upper parts are nearly uniform glossy black, and the under parts white, with a strip of the same colour over each eye. The O. Fr. word was *grapois*, *graspeis* or *craspeis*, from Med. Lat. *crassus piscis*, fat fish. This was adapted into English as *grapeys*, *graspeys*, &c., and in the 16th century becomes *grannie pose* as if from *grand poisson*. The final corruption to "grampus" appears in the 18th century and was probably nautical in origin. The animal is also known as the "killer," in allusion to its ferocity in attacking its prey, which consists largely of seals, porpoises and the smaller dolphins. Its fierceness is only equalled by its voracity, which is such that in a specimen measuring 21 ft. in length, the remains of thirteen seals and thirteen porpoises were found, in a more or less digested state, while the animal appeared to have been choked in the endeavour to swallow another seal, the skin of which was found entangled in its teeth. These cetaceans sometimes hunt in packs or schools, and commit great havoc among the belugas or white whales, which occasionally throw themselves ashore to escape their persecutors. The grampus is an inhabitant of northern seas, occurring on the shores of Greenland, and having been caught, although rarely, as far south as the Mediterranean. There are numerous instances of its capture on the British coasts. (See CETACEA.)

GRANADA, LUIS DE (1504-1588), Spanish preacher and ascetic writer, born of poor parents named Sarriá at Granada. He lost his father at an early age and his widowed mother was supported by the charity of the Dominicans. A child of the Alhambra, he entered the service of the alcalde as page, and, his ability being discovered, received his education with the sons of the house. When nineteen he entered the Dominican convent and in 1525 took the vows; and, with the leave of his prior, shared his daily allowance of food with his mother. He was sent to Valladolid to continue his studies and then was appointed procurator at Granada. Seven years after he was elected prior of the convent of Scala Caeli in the mountains of Cordova, which after eight years he succeeded in restoring from its ruinous state, and there he began his work as a zealous reformer. His preaching gifts were developed by the orator Juan de Avila, and he became one of the most famous of Spanish preachers. He was invited to Portugal in 1555 and became provincial of his order, declining the offer of the archbishopric of Braga but accepting the position of confessor and counsellor to Catherine, the queen regent. At the expiration of his tenure of the provincialship, he retired to the Dominican convent at Lisbon, where he lived till his death on the last day of 1588. Aiming, both in his sermons and ascetical writings, at development of the religious view, the danger of the times as he saw it was not so much in the Protestant reformation, which was an outside influence, but in the direction that religion had taken among the masses. He held that in Spain the Catholic faith was not understood by the people, and that their ignorance was the pressing danger. He fell under the suspicion of the Inquisition; his mystical teaching was said to be heretical, and his most famous book, the *Guia de Peccadores*, still a favourite treatise and one that has been translated into nearly every European tongue, was put on the Index of the Spanish Inquisition, together with his book on prayer, in 1559. His great opponent was the restless and ambitious Melchior Cano, who stigmatized the second book as containing grave errors smacking of the heresy of the Alumbrados and manifestly contradicting Catholic faith and teaching. But in 1576 the prohibition was removed and the works of Luis de Granada, so prized by St Francis de Sales, have never lost their value. The friend of St Teresa, St Peter of Alcantara, and of all the noble minds of Spain of his day, no one among the three hundred Spanish mystics excels Luis de Granada in the beauty of a didactic style, variety of illustration and soberness of statement.

The last collected edition of his works is that published in 9 vols. at Antwerp in 1578. A biography by L. Monoz, *La Vida y virtudes de Luis de Granada* (Madrid, 1639); a study of his

system by P. Rousselot in *Mystiques espagnoles* (Paris, 1867); Ticknor, *History of Spanish Literature* (vol. iii.), and Fitzmaurice Kelly, *History of Spanish Literature*, pp. 200-202 (London, 1898), may also be consulted.

GRANADA, the capital of the department of Granada, Nicaragua; 32 m. by rail S.E. of Managua, the capital of the republic. Pop. (1900) about 25,000. Granada is built on the north-western shore of Lake Nicaragua, of which it is the principal port. Its houses are of the usual central American type, constructed of adobe, rarely more than one storey high, and surrounded by courtyards with ornamental gateways. The suburbs, scattered over a large area, consist chiefly of cane huts occupied by Indians and half-castes. There are several ancient churches and convents, in one of which the interior of the chancel roof is inlaid with mother-of-pearl. An electric tramway connects the railway station and the adjacent wharves with the market, about 1 m. distant. Ice, cigars, hats, boots and shoes are manufactured, but the characteristic local industry is the production of “Panama chains,” ornaments made of thin gold wire. In the neighbourhood there are large cocoa plantations; and the city has a thriving trade in cocoa, coffee, hides, cotton, native tobacco and indigo.

Granada was founded in 1523 by Francisco Fernandez de Córdoba. It became one of the wealthiest of central American cities, although it had always a keen commercial rival in Leon, which now surpasses it in size and importance. In the 17th century it was often raided by buccaneers, notably in 1606, when it was completely sacked. In 1855 it was captured and partly burned by the adventurer William Walker (see Central America: *History*).

GRANADA, a maritime province of southern Spain, formed in 1833 of districts belonging to Andalusia, and coinciding with the central parts of the ancient kingdom of Granada. Pop. (1900) 492,460; area, 4928 sq. m. Granada is bounded on the N. by Cordova, Jaen and Albacete, E. by Murcia and Almería, S. by the Mediterranean Sea, and W. by Malaga. It includes the western and loftier portion of the Sierra Nevada (*q.v.*), a vast ridge rising parallel to the sea and attaining its greatest altitudes in the Cerro de Mulhacen (11,421 ft.) and Picacho de la Veleta (11,148), which overlook the city of Granada. Lesser ranges, such as the Sierras of Parapanda, Alhama, Almijara or Harana, adjoin the main ridge. From this central watershed the three principal rivers of the province take their rise, viz.: the Guadiana Menor, which, flowing past Guadix in a northerly direction, falls into the Guadalquivir in the neighbourhood of Ubeda; the Genil which, after traversing the Vega, or Plain of Granada, leaves the province a little to the westward of Loja and joins the Guadalquivir between Cordova and Seville; and the Rio Grande or Guadalféo, which falls into the Mediterranean at Motril. The coast is little indented and none of its three harbours, Almuñécar, Albuñol and Motril, ranks high in commercial importance. The climate in the lower valleys and the narrow fringe along the coast is warm, but on the higher grounds of the interior is somewhat severe; and the vegetation varies accordingly from the subtropical to the alpine. The soil of the plains is very productive, and that of the Vega of Granada is considered the richest in the whole peninsula; from the days of the Moors it has been systematically irrigated, and it continues to yield in great abundance and in good quality wheat, barley, maize, wine, oil, sugar, flax, cotton, silk and almost every variety of fruit. In the mountains immediately surrounding the city of Granada occur many kinds of alabaster, some very fine; there are also quantities of jasper and other precious stones. Mineral waters chiefly chalybeate and sulphurous, are abundant, the most important springs being those of Alhama, which have a temperature of 112° F. There are valuable iron mines, and small quantities of zinc, lead and mercury are obtained. The cane and beet sugar industries, for which there are factories at Loja, at Motril, and in the Vega, developed rapidly after the loss of the Spanish West Indies and the Philippine Islands in 1898, with the consequent decrease in competition. There are also tanneries, foundries and manufactories of woollen, linen, cotton, and rough frieze stuffs, cards, soap, spirits, gunpowder and machinery. Apart from the great highways traversing the province, which are excellent, the roads are few and ill-kept. The railway from Madrid enters the province on the north and bifurcates north-west of

Guadix; one branch going eastward to Almería, the other westward to Loja, Malaga and Algeciras. Baza is the terminus of a railway from Lorca. The chief towns include Granada, the capital (pop. 1900, 75,900) with Alhama de Granada (7697), Baza (12,770), Guadix (12,652), Loja (19,143), Montefrío (10,725), and Motril (18,528). These are described in separate articles. Other towns with upwards of 7000 inhabitants are Albuñol (8646), Almuñécar (8022), Cúllar de Baza (8007), Huéscar (7763), Illora (9496) and Puebla de Don Fadrique (7420). The history of the ancient kingdom is inseparable from that of the city of Granada (*q.v.*).

GRANADA, the capital of the province, and formerly of the kingdom of Granada, in southern Spain; on the Madrid-Granada-Algeciras railway. Pop. (1900) 75,900. Granada is magnificently situated, 2195 ft. above the sea, on the north-western slope of the Sierra Nevada, overlooking the fertile lowlands known as the Vega de Granada on the west and overshadowed by the peaks of Veleta (11,148 ft.) and Mulhacen (11,421 ft.) on the south-east. The southern limit of the city is the river Genil, the Roman *Singilis* and Moorish *Shenil*, a swift stream flowing westward from the Sierra Nevada, with a considerable volume of water in summer, when the snows have thawed. Its tributary the Darro, the Roman *Salon* and Moorish *Hadarro*, enters Granada on the east, flows for upwards of a mile from east to west, and then turns sharply southward to join the main river, which is spanned by a bridge just above the point of confluence. The waters of the Darro are much reduced by irrigation works along its lower course, and within the city it has been canalized and partly covered with a roof.

Granada comprises three main divisions, the Antequeruela, the Albaicin (or Albaycin), and Granada properly so-called. The first division, founded by refugees from Antequera in 1410, consists of the districts enclosed by the Darro, besides a small area on its right, or western bank. It is bounded on the east by the gardens and hill of the Alhambra (*q.v.*), the most celebrated of all the monuments left by the Moors. The Albaicin (Moorish *Rabad al Bayazin*, “Falconers’ Quarter”) lies north-west of the Antequeruela. Its name is sometimes associated with that of Baeza, since, according to one tradition, it was colonized by citizens of Baeza, who fled hither in 1246, after the capture of their town by the Christians. It was long the favourite abode of the Moorish nobles, but is now mainly inhabited by gipsies and artisans. Granada, properly so-called, is north of the Antequeruela, and west of the Albaicin. The origin of its name is obscure; it has been sometimes, though with little probability, derived from *granada*, a pomegranate, in allusion to the abundance of pomegranate trees in the neighbourhood. A pomegranate appears on the city arms. The Moors, however, called Granada *Karnattah* or *Karnattah-al-Yahud*, and possibly the name is composed of the Arabic words *kurn*, “a hill,” and *nattah*, “stranger,”—the “city” or “hill of strangers.”

Although the city has been to some extent modernized, the architecture of its more ancient quarters has many Moorish characteristics. The streets are, as a rule, ill-lighted, ill-paved and irregular; but there are several fine squares and avenues, such as the Bibarrambla, where tournaments were held by the Moors; the spacious Plaza del Trionfo, adjoining the bull-ring, on the north; the Alameda, planted with plane trees, and the Paseo del Salon. The business centre of the city is the Puerta Real, a square named after a gate now demolished.

Granada is the see of an archbishop. Its cathedral, which commemorates the reconquest of southern Spain from the Moors, is a somewhat heavy classical building, begun in 1529 by Diego de Siloe, and only finished in 1703. It is profusely ornamented with jasper and coloured marbles, and surmounted by a dome. The interior contains many paintings and sculptures by Alonso Cano (1601-1667), the architect of the fine west façade, and other artists. In one of the numerous chapels, known as the Chapel Royal (*Capilla Real*), is the monument of Philip I. of Castile (1478-1506), and his queen Joanna; with the tomb of Ferdinand and Isabella, the first rulers of united Spain (1452-1516). The church of Santa Maria (1705-1759), which may be regarded as an annexe of the cathedral, occupies the site of the chief mosque of Granada. This was used as a church until 1661. Santa Ana (1541) also replaced a mosque; Nuestra Señora de las Angustias (1664-1671) is noteworthy for its fine towers, and the rich decoration of its high altar. The convent of San Geronimo (or Jeronimo), founded in 1492 by Ferdinand and Isabella, was converted into barracks in 1810; its church contains the tomb of the famous captain Gonsalvo or Gonzalo de Cordova (1453-1515). The Cartuja, or Carthusian monastery north of the city, was built in 1516 on Gonzalo’s estate,

and in his memory. It contains several fine paintings, and an interesting church of the 17th and 18th centuries.

After the Alhambra, and such adjacent buildings as the Generalife and Torres Bermejas, which are more fitly described in connexion with it, the principal Moorish antiquities of Granada are the 13th-century villa known as the Cuarto Real de San Domingo, admirably preserved, and surrounded by beautiful gardens; the Alcázar de Genil, built in the middle of the 14th century as a palace for the Moorish queens; and the Casa del Cabildo, a university of the same period, converted into a warehouse in the 19th century. Few Spanish cities possess a greater number of educational and charitable establishments. The university was founded by Charles V. in 1531, and transferred to its present buildings in 1769. It is attended by about 600 students. In 1900, the primary schools of Granada numbered 22, in addition to an ecclesiastical seminary, a training-school for teachers, schools of art and jurisprudence, and museums of art and archaeology. There were twelve hospitals and orphanages for both sexes, including a leper hospital in one of the convents. Granada has an active trade in the agricultural produce of the Vega, and manufactures liqueurs, soap, paper and coarse linen and woollen fabrics. Silk-weaving was once extensively carried on, and large quantities of silk were exported to Italy, France, Germany and even America, but this industry died during the 19th century.

History.—The identity of Granada with the Iberian city of *Iliberris* or *Iliberri*, which afterwards became a flourishing Roman colony, has never been fully established; but Roman tombs, coins, inscriptions, &c., have been discovered in the neighbourhood. With the rest of Andalusia, as a result of the great invasion from the north in the 5th century, Granada fell to the lot of the Vandals. Under the caliphs of Cordova, onwards from the 8th century, it rapidly gained in importance, and ultimately became the seat of a provincial government, which, after the fall of the Omayyad dynasty in 1031, or, according to some authorities, 1038, ranked with Seville, Jaen and others as an independent principality. The family of the Zeri, Ziri or Zeiri maintained itself as the ruling dynasty until 1090; it was then displaced by the Almohades, who were in turn overthrown by the Almoravides, in 1154. The dominion of the Almoravides continued unbroken, save for an interval of one year (1160-1161), until 1229. From 1229 to 1238 Granada formed part of the kingdom of Murcia; but in the last-named year it passed into the hands of Abu Abdullah Mahommed Ibn Al Ahmar, prince of Jaen and founder of the dynasty of the Nasrides. Al Ahmar was deprived of Jaen in 1246, but united Granada, Almería and Malaga under his sceptre, and, as the fervour of the Christian crusade against the Moors had temporarily abated, he made peace with Castile, and even aided the Christians to vanquish the Moslem princes of Seville. At the same time he offered asylum to refugees from Valencia, Murcia and other territories in which the Moors had been overcome. Al Ahmar and his successors ruled over Granada until 1492, in an unbroken line of twenty-five sovereigns who maintained their independence partly by force, and partly by payment of tribute to their stronger neighbours. Their encouragement of commerce—notably the silk trade with Italy—rendered Granada the wealthiest of Spanish cities; their patronage of art, literature and science attracted many learned Moslems, such as the historian Ibn Khaldun and the geographer Ibn Batuta, to their court, and resulted in a brilliant civilization, of which the Alhambra is the supreme monument.

The kingdom of Granada, which outlasted all the other Moorish states in Spain, fell at last through dynastic rivalries and a harem intrigue. The two noble families of the Zegri and the Beni Serraj (better known in history and legend as the *Abencerrages*) encroached greatly upon the royal prerogatives during the middle years of the 15th century. A crisis arose in 1462, when an endeavour to control the Abencerrages resulted in the dethronement of Abu Nasr Saad, and the accession of his son, Muley Abu’l Hassan, whose name is preserved in that of Mulhacen, the loftiest peak of the Sierra Nevada, and in a score of legends. Muley Hassan weakened his position by resigning Malaga to his brother Ez Zagal, and incurred the enmity of his first wife Aisha by marrying a beautiful Spanish slave, Isabella de Solis, who had adopted the creed of Islam and taken the name of Zorayah, “morning star.” Aisha or Ayesha, who thus saw her sons Abu Abdullah Mahommed (Boabdil) and Yusuf in danger of being supplanted, appealed to the Abencerrages, whose leaders, according to tradition, paid for their sympathy with their lives (see Alhambra). In 1482 Boabdil succeeded in deposing his father, who fled to Malaga, but the gradual advance of the Christians under Ferdinand and Isabella forced him to resign the task of defence into the more warlike hands of Muley Hassan and Ez Zagal (1483-1486). In 1491 after the loss of these leaders, the Moors were decisively beaten; Boabdil, who had already been twice captured and liberated by the Spaniards, was compelled to sign away his kingdom; and on the 2nd of January 1492 the Spanish army entered Granada, and the Moorish power in Spain was ended. The campaign had aroused intense interest throughout Christendom; when the news reached London a

special thanksgiving service was held in St Paul's Cathedral by order of Henry VII.

GRANADILLA, the name applied to *Passiflora quadrangularis*, Linn., a plant of the natural order *Passifloreae*, a native of tropical America, having smooth, cordate, ovate or acuminate leaves; petioles bearing from 4 to 6 glands; an emetic and narcotic root; scented flowers; and a large, oblong fruit, containing numerous seeds, imbedded in a subacid edible pulp. The granadilla is sometimes grown in British hothouses. The fruits of several other species of *Passiflora* are eaten. *P. laurifolia* is the "water lemon," and *P. maliformis* the "sweet calabash" of the West Indies.

GRANARIES. From ancient times grain has been stored in greater or lesser bulk. The ancient Egyptians made a practice of preserving grain in years of plenty against years of scarcity, and probably Joseph only carried out on a large scale an habitual practice. The climate of Egypt being very dry, grain could be stored in pits for a long time without sensible loss of quality. The silo pit, as it has been termed, has been a favourite way of storing grain from time immemorial in all oriental lands. In Turkey and Persia usurers used to buy up wheat or barley when comparatively cheap, and store it in hidden pits against seasons of dearth. Probably that custom is not yet dead. In Malta a relatively large stock of wheat is always preserved in some hundreds of pits (silos) cut in the rock. A single silo will store from 60 to 80 tons of wheat, which, with proper precautions, will keep in good condition for four years or more. The silos are shaped like a cylinder resting on a truncated cone, and surmounted by the same figure. The mouth of the pit is round and small and covered by a stone slab, and the inside is lined with barley straw and kept very dry. Samples are occasionally taken from the wheat as from the hold of a ship, and at any signs of fermentation the granary is cleared and the wheat turned over, but such is the dryness of these silos that little trouble of this kind is experienced.

Towards the close of the 19th century warehouses specially intended for holding grain began to multiply in Great Britain, but America is the home of great granaries, known there as elevators. There are climatic difficulties in the way of storing grain in Great Britain on a large scale, but these difficulties have been largely overcome. To preserve grain in good condition it must be kept as much as possible from moisture and heat. New grain when brought into a warehouse has a tendency to sweat, and in this condition will easily heat. If the heating is allowed to continue the quality of the grain suffers. An effectual remedy is to turn out the grain in layers, not too thick, on a floor, and to keep turning it over so as to aerate it thoroughly. Grain can thus be conditioned for storage in silos. There is reason to think that grain in a sound and dry condition can be better stored in bins or dry pits than in the open air; from a series of experiments carried out on behalf of the French government it would seem that grain exposed to the air is decomposed at 3½ times the rate of grain stored in silo or other bins.

In comparing the grain-storage system of Great Britain with that of North America it must be borne in mind that whereas Great Britain raises a comparatively small amount of grain, which is more or less rapidly consumed, grain-growing is one of the greatest industries of the United States and of Canada. The enormous surplus of wheat and maize produced in America can only be profitably dealt with by such a system of storage as has grown up there since the middle of the 19th century. The American farmer can store his wheat or maize at a moderate rate, and can get an advance on his warrant if he is in need of money. A holder of wheat in Chicago can withdraw a similar grade of wheat from a New York elevator.

Modern granaries are all built on much the same plan. The mechanical equipment for receiving and discharging grain is very similar in all modern warehouses. A granary is usually erected on a quay at which large vessels can lie and discharge. On the land side railway sidings connect the warehouse with the chief lines in its district; accessibility to a canal is an advantage. Ships are usually cleared by bucket elevators which are dipped into the cargo, though in some cases pneumatic elevators are substituted (see Conveyors). A

travelling band with throw-off carriage will speedily distribute a heavy load of grain. Band conveyors serve equally well for charging or discharging the bins. Bins are invariably provided with hopper bottoms, and any bin can be effectively cleared by the band, which runs underneath, either in a cellar or in a specially constructed tunnel. All granaries should be provided with a sufficient plant of cleaning machinery to take from the grain impurities as would be likely to be detrimental to its storing qualities. Chief among such machines are the warehouse separators which work by sieves and air currents (see Flour and Flour Manufacture).

The typical grain warehouse is furnished with a number of chambers for grain storage which are known as silos, and may be built of wood, brick, iron or ferro-concrete. Wood silos are usually square, made of flat strips of wood nailed one on top of the other, and so overlapping each other at the corners that alternately a longitudinal and a transverse batten extends past the corner. The gaps are filled by short pieces of timber securely nailed, and the whole silo wall is thus solid. This type of bin was formerly in great favour, but it has certain drawbacks, such as the possibility of dry rot, while weevils are apt to harbour in the interstices unless lime washing is practised. Bricks and cement are good materials for constructing silos of hexagonal form, but necessitate deep foundations and substantial walls. Iron silos of circular form are used to some extent in Great Britain, but are more common in North and South America. In their case the walls are much thinner than with any other material, but the condensation against the inner wall in wet weather is a drawback in damp climates. Cylindrical tank silos have also been made of fire-proof tiles. Ferro-concrete silos have been built on both the Monier and the Hennebique systems. In the earlier type the bin was made of an iron or steel framework filled in with concrete, but more recent structures are composed entirely of steel rods embedded in cement. Granaries built of this material have the great advantage, if properly constructed, of being free from any risk of failure even in case of uneven expansion of the material. With brick silos collapses through pressure of the stored material are not unknown.

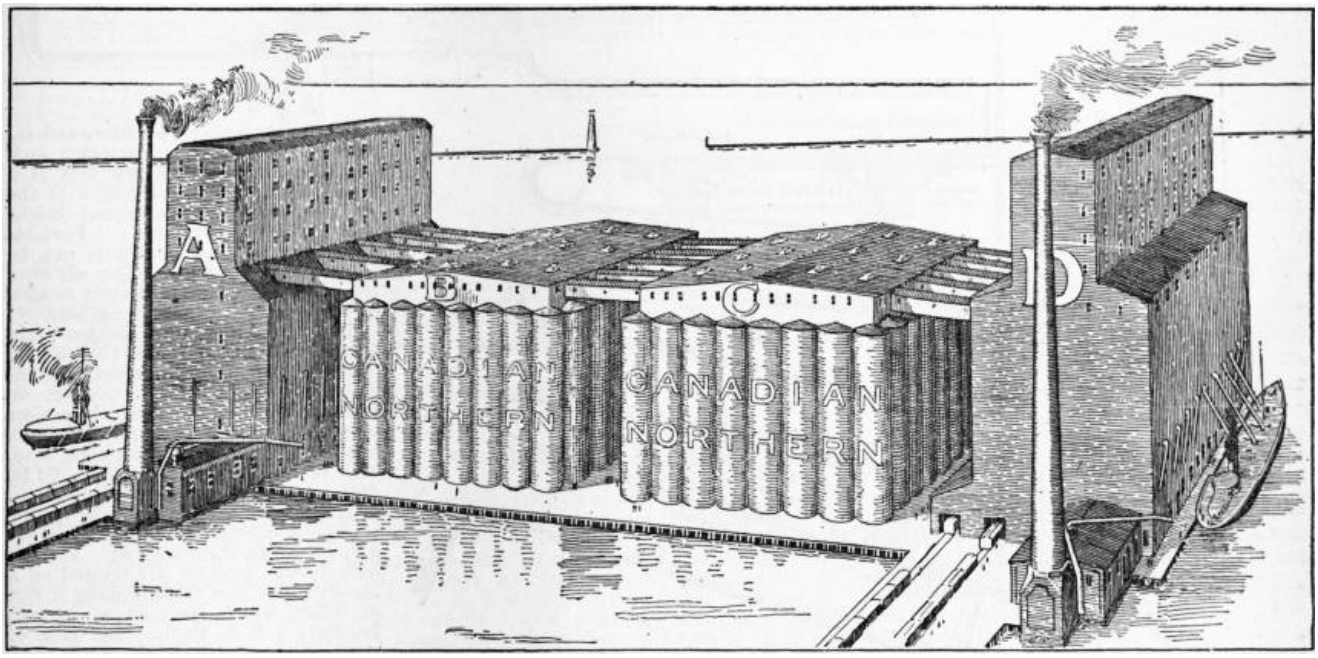

Fig. 1.

Port Arthur, Canada.

One of the largest and most complete grain elevators or warehouses in the world belongs to the Canadian Northern Railway Company, and was erected at Port Arthur, Canada, in 1901-1904. It has a total storage capacity of 7,000,000 bushels, or 875,000 qrs. of 480 lb. The range of buildings and bins forms an oblong, and consists of two storage houses, B and C, placed between two working or receiving houses A and D (fig. 1). The receiving houses are fed by railway sidings. House A, for example, has two sidings, one running through it and the other beside it. Each siding serves five receiving pits, and a receiving elevator of 10,000 lb capacity per minute, or 60,000 bushels per hour, can draw grain from either of two pits. Five elevators of 12,000 bushels per hour on the other side of the house serve five warehouse separators, and all the grain received or discharged is weighed, there being ten sets of automatic scales in the upper part of the house, known as the cupola. The hopper of each weigher can take a charge of 1400 bushels (84,000 lb). Grain can be conveyed either vertically or horizontally to any part of the house, into any of the bins in the annex B, or into any truck or lake steamer. This house is constructed of timber and roofed with corrugated iron. The conveyor belts are

36 in. wide; those at the top of the house are provided with throw-off carriages. The dust from the cleaning machinery is carefully collected and spouted to the furnace under the boiler house, where it is consumed. The cylindrical silo bins in the storage houses consist of hollow tiles of burned clay which, it is claimed, are fire-proof. The tiles are laid on end and are about 12 in. by 12 in. and from 4 in. to 6 in. in thickness according to the size of the bin. Each alternate course consists of grooved blocks of channel tile forming a continuous groove or belt round the bin. This groove receives a steel band acting as a tension member and resisting the lateral pressure of the grain. The steel bands once in position, the groove is completely filled with cement grout by which the steel is encased and protected. Usually the bottoms of the bins are furnished with self-discharging hoppers of weak cinder or gravel concrete finished with cement mortar. For the foundation or supporting floor reinforced concrete is frequently used. The tiles already described are faced with tiles ½ to 1 in. thick, which are laid solid in cement mortar covering the whole exterior of the bin. Any damage to the facing tiles can easily be repaired since they can be removed and replaced without affecting the main bin walls. It is claimed that these facers constitute the best possible protection against fire. A steel framework, covered with tiles, crowns these circular bins and contains the conveyors and spouts which are used to fill the bins. Five tunnels in the concrete bedding that supports the bins carry the belt conveyors which bring back the grain to the working house for cleaning or shipment. There are altogether in each of the storage houses 80 circular bins, each 21 ft. in diameter, and so grouped as to form 63 smaller interspace bins, or 143 bins in all. Each bin will store grain in a column 85 ft. deep, and the whole group has a capacity of 2,500,000 bushels. These bins were all constructed by the Barnett & Record Company of Minneapolis, Minnesota, U.S.A., in accordance with the Johnson & Record patent system of fire-proof tile grain storage construction. In case one of the working houses is attacked by fire the fire-proof storage houses protect not only their own contents but also the other working house, and in the event of its disablement or destruction the remaining one can be easily connected with both the storage houses and handle their contents.

Barrow-in-Furness.

Circular tank silos have not been extensively adopted in Great Britain, but a typical silo tank installation exists at the Walmsley & Smith flour mills which stand beside the Devonshire dock at Barrow-in-Furness. There four circular bins, built of riveted steel plates, stand in a group on a quadrangle close to the mill warehouse. A covered gantry, through which passes a band conveyor, runs from the mill warehouse to the working silo house which stands in the central space amid the four steel tanks. The tanks are 70 ft. high, with a diameter of 45 ft., and rest on foundations of concrete and steel. Each has a separate conical roof and they are flat-bottomed, the grain resting directly on the steel and concrete foundation bed. As the load of the full tank is very heavy its even distribution on the bed is considered a point of importance. Each tank can hold about 2500 tons of wheat, which gives a total storage capacity for the four bins of over 45,000 qrs. of 480 lb. Attached to the mill warehouse is a skip elevator with a discharging capacity of 75 tons an hour. The grain is cleared by this elevator from the hold or holds of the vessel to be unloaded, and is delivered to the basement of the warehouse. Thence it is elevated to an upper storey and passed through an automatic weigher capable of taking a charge of 1 ton. From the weighing machine it can be taken, with or without a preliminary cleaning, to any floor of the warehouse, which has a total storing capacity of 8000 tons, or it can be carried by the band conveyor through the gantry to the working house of the silo installation and distributed to any one of the four tank silos. There is also a connexion by a band conveyor running through a covered gantry into the mill, which stands immediately in the rear. It is perfectly easy to turn over the contents of any tank into any other tank. The whole intake and wheat handling plant is moved by two electro-motors of 35 H.P. each, one installed in the warehouse and the other in the silo working house. Steel silo tanks have the advantage of storing a heavy stock of wheat at comparatively small capital outlay. On an average an ordinary silo bin will not hold more than 500 to 1000 qrs., but each of the bins at Barrow will contain 2500 tons or over 1100 qrs. The steel construction also reduces the risk of fire and consequently lessens the fire premium.

Liverpool.

The important granaries at the Liverpool docks date from 1868, but have since been brought up to modern requirements. The warehouses on the Waterloo docks have an aggregate storage area of 11¾ acres, while the sister warehouses on the Birkenhead side, which stand on the margin of the great float, have an area of 11 acres. The total capacity of these warehouses is about 200,000 qrs.

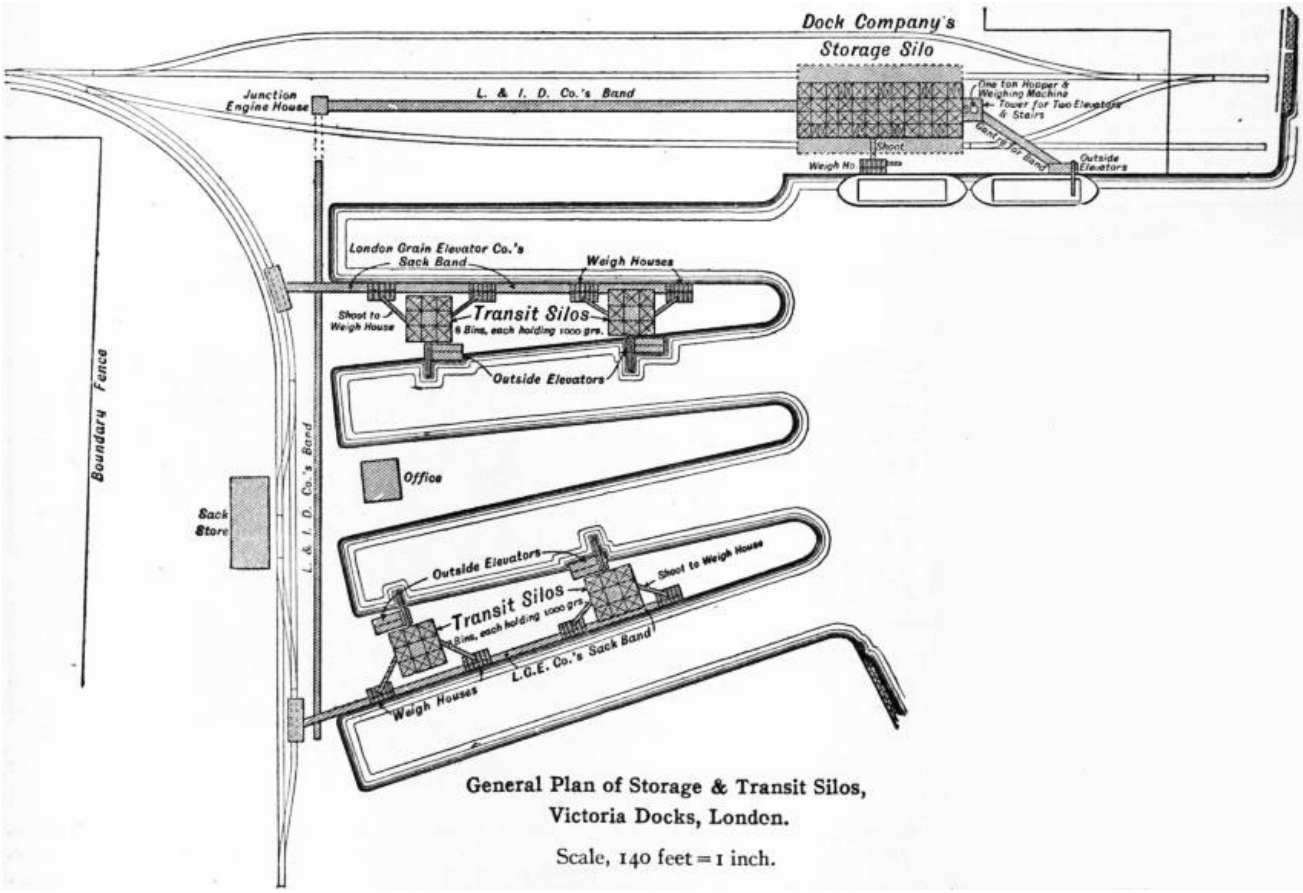

FIG. 2.

Manchester.

The grain warehouse of the Manchester docks at Trafford wharf is locally known as the grain elevator, because it was built to a great extent on the model of an American elevator. Some of the mechanical equipment was supplied by a Chicago firm. The total capacity is 1,500,000 bushels or 40,000 tons of grain, which is stored in 226 separate bins. The granary proper stands about 340 ft. from the side of the dock, but is directly connected with the receiving tower, which rises at the water's edge, by a band conveyor protected by a gantry. The main building is 448 ft. long by 80 ft. wide; the whole of the superstructure was constructed of wood with an external casing of brickwork and tiles. The receiving tower is fitted with a bucket elevator capable, within fairly wide limits, of adjustment to the level of the hold to be unloaded. The elevator has the large unloading capacity of 350 tons per hour, assuming it to be working in a full hold. It is supplemented by a pneumatic elevator (Duckham system) which can raise 200 tons per hour and is used chiefly in dealing with parcels of grain or in clearing grain out of holds which the ordinary elevator cannot reach. The power required to work the large elevator as well as the various band conveyors is supplied by two sets of horizontal Corliss compound engines of 500 H.P. jointly, which are fed by two Galloway boilers working at 100 lb pressure. The pneumatic elevator is driven by two sets of triple expansion vertical engines of 600 H.P. fed by three boilers working at a pressure of 160 lb. The grain received in the tower is automatically weighed. From the receiving tower the grain is conveyed into the warehouse where it is at once elevated to the top of a central tower, and is thence distributed to any of the bins by band conveyors in the usual way. The mechanical equipment of this warehouse is very complete, and the following several operations can be simultaneously effected: discharging grain from vessels in the dock at the rate of 350 tons per hour; weighing in the tower; conveying grain into the warehouse and distributing it into any of the 226 bins; moving grain from bin to bin either for aerating or delivery, and simultaneously weighing in bulk at the rate of 500 tons per hour; sacking grain, weighing and loading the sacks into 40 railway trucks and 10 carts simultaneously; loading grain from the warehouse into barges or coasting craft at the rate of 150 tons per hour in bulk or of 250 sacks per hour. This warehouse is equipped with a dryer of American construction, which can deal with 50 tons of damp grain at one time, and is connected with the whole bin system so that grain can be readily moved from any bin to the dryer or conversely.

London.

A grain warehouse at the Victoria docks, London, belonging to the London and India Docks Company (fig. 2) has a storing capacity of about 25,000 qrs. or 200,000 bushels. It is over 100 ft. high, and is built on the American plan of interlaced timbers resting on iron columns. The walls are externally cased with steel plates. The grain is stored in 56 silos, most of which are about 10 ft. square by 50 ft. deep. The intake plant has a capacity of 100 tons of wheat an hour, and includes six automatic

grain scales, each of which can weigh off one sack at a time. The main delivery floor of the warehouse is at a convenient height above the ground level. Portable automatic weighing machines can be placed under any bin. The whole of the plant is driven by electric motors, one being allotted to each machine.

The transit silos of the London Grain Elevator Company, also at the Victoria docks, consist of four complete and independent installations standing on three tongues of land which project into the water (figs. 2 and 3). Each silo house is furnished with eight bins, each of which, 12 ft. square by 80 ft. deep, has a capacity of 1000 qrs. of grain. A kind of well in the middle of each silo house contains the necessary elevators, staircases, &c. The silo bins in each granary are erected on a massive cast iron tank forming a sort of cellar, which rests on a concrete foundation 6 ft. thick. The base of the tank is 30 ft. below the water level. The silos are formed of wooden battens nailed one on top of the other, the pieces interlacing. Rolled steel girders resting on cast iron columns support the silos. To ensure a clean discharge the hopper bottoms were designed so as to avoid joints and thus to be free from rivets or similar protuberances. The exterior of each silo house is covered with corrugated iron, and the same material is used for the roofing. No conveyors serve the silo bins, as the elevators which rise above the tops of the silos can feed any one of them by gravity. There are three delivery elevators to each granary, one with a capacity of 120 tons and the other two of 100 tons each an hour. Each silo house is served by a large elevator with a capacity of 120 tons per hour, which discharges into the elevator well inside the house. The delivery elevators discharge into a receiving shed in which there is a large hopper feeding six automatic weighing machines. Each charge as it is weighed empties itself automatically into sacks, which are then ready for loading. Each pair of warehouses is provided with a conveyor band 308 ft. long, used either for carrying sacks from the weighing sheds to railway trucks or for carrying grain in bulk to barges or trucks. Each silo house has an identical mechanical equipment apart from the delivery band it shares with its fellow warehouse. All operations in connexion with the silo houses are effected under cover. The silos are normally fed by a fleet of twenty-six of Philip’s patent self-discharging lighters. These craft are hopper-bottomed and fitted with band conveyors of the ordinary type, running between the double keelson of the lighter and delivering into an elevator erected at the stern of the lighter. By this means little trimming is required after the barge, which holds about 200 tons of grain, has been cleared. Ocean steamers of such draft as to preclude their entry into any of the up river docks are cleared at Tilbury by these lighters. It is said that grain loaded at Tilbury into these lighters can be delivered from the transit silos to railway trucks or barges in about six hours. The total storage capacity of the silos amounts to 32,000 qrs. The motive power is furnished by 14 gas engines of a total capacity of 366 H.P.

Rumania.

Two of the largest granaries on the continent of Europe are situated at the mouth of the Danube, at Braila and Galatz, in Rumania, and serve for both the reception and discharge of grain. At the edge of the quay on which these warehouses are built there are rails with a gauge of 11½ ft., upon which run two mechanical loading and unloading appliances. The first consists of a telescopic elevator which raises the grain and delivers it to one of the two band conveyors at the head of the apparatus. Each of these bands feeds automatic weighing machines with an hourly capacity of 75 tons. From these weighers the grain is either discharged through a manhole in the ground to a band conveyor running in a tunnel parallel to the quay wall, or it is raised by a second elevator (part of the same unloading apparatus), set at an inclined angle, which delivers at a sufficient height to load railway trucks on the siding running parallel to the quay. A turning gear is provided so as to reverse, if required, the operation of the whole apparatus, that the portion overhanging the water can be turned to the land side. The unloading capacity is 150 tons of grain per hour. If it be desired to load a ship the telescopic elevator has only to be turned round and dipped into any one of 15 wells, which can be filled up with grain from the land side. The capacity of each granary is 233,333 qrs.

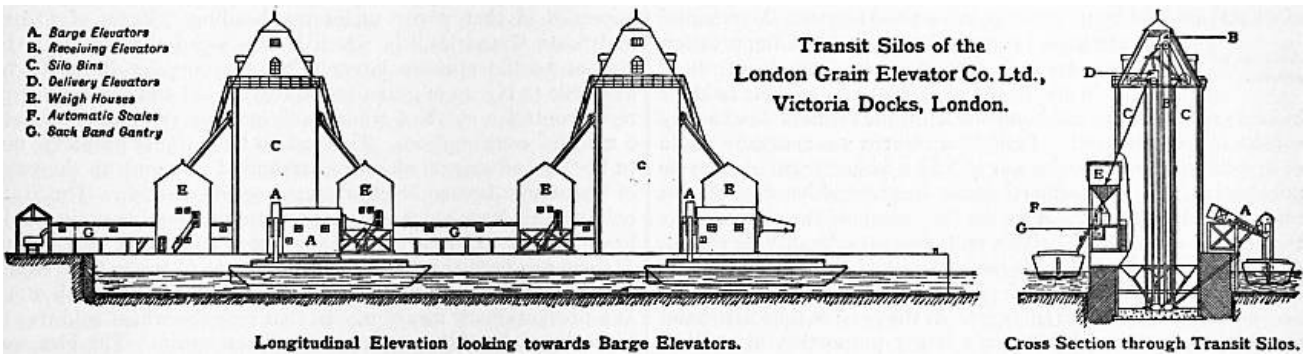

FIG. 3.

Many large granaries have been built, in which grain is stored on open floors, in bulk or in sacks. A notable instance is the warehouse of the city of Stuttgart. This is a structure of seven floors, including a basement and entresol. An engine house accommodates two gas engines as well as an hydraulic installation for the lifts. The grain is received by an elevator from the railway trucks, and is delivered to a weighing machine from which it is carried by a second elevator to the top storey, where it is fed to a band running the length of the building. A system of pipes runs from floor to floor, and by means of the band conveyor with its movable throw-off carriage grain can be shot to any floor. A second band conveyor is installed in the entresol floor, and serves to convey grain either to the elevator, if it is desired to elevate it to the top floor, or to the loading shed. A second elevator runs through the centre of the building, and is provided with a spout by means of which grain can be delivered into the hopper feeding the cleaning machine, whence the grain passes into a second hopper under which is an automatic weigher; directly under this weigher the grain is sacked.

Stuttgart.

A good example of a grain warehouse on the combined silo bin and floor storage system is afforded by the granary at Mannheim on the Rhine, which has the storage capacity of 2100 tons. The building is 370 ft. in length, 78 ft. wide and 78 ft. high, and by means of transverse walls it is divided into three sections; of these one contains silos, in another section grain is stored on open floors, while the third, which is situated between the other two, is the grain-cleaning department. This granary stands by the quay side, and a ship elevator of great capacity, which serves the cleaning department, can rapidly clear any ship or barge beneath. The central or screening house section contains machinery specially designed for cleaning barley as well as wheat. The barley plant has a capacity of 5 tons per hour. There are four main elevators in this warehouse, while two more serve the screen house. The usual band conveyors fitted with throw-off carriages are provided, and are supplemented by an elaborate system of pipes which receive grain from the elevators and bands and distribute it at any required point. The plant is operated by electric motors. If desired the floors of the non-silo section can be utilized for storing other goods than grain, and to this end a lift with a capacity of 1 ton runs from the basement to the top storey. The combined capacity of the elevators and conveyors is 100 tons of grain per hour. The mechanical equipment is so complete that four distinct operations are claimed as possible. A ship may be unloaded into silos or into the granary floors, and may simultaneously be loaded either from silos or floors with different kinds of grain. Again, a cargo may be discharged either into silos or upon the floors, and simultaneously the grain may be cleaned. Grain may also be cleared from a vessel, mixed with other grain already received, and then distributed to any desired point. With equal facility grain may be cleaned, blended with other varieties, re-stored in any section of the granary, and transferred from one ship to another.

Mannheim.

A granary with special features of interest, erected on the quay at Dortmund, Germany, by a co-operative society, is built of brick on a base of hewn stone, with beams and supports of timber. It is 78 ft. high and consists of seven floors, including basement and attic. Here again there are two sections, the larger being devoted to the storage of grain in low bins, while the smaller section consists of an ordinary silo house. Grain in sacks may be stored in the basement of the larger section which has a capacity of 1675 tons as compared with 825 tons in the silo department. Thus the total storage capacity is 2500 tons. In the silo house the bins, constructed of planks nailed one over the other, are of varying size and are capable of storing grain to a depth of 42 to 47 ft. Some of the bins have been specially adapted for receiving damp grain by being provided internally with transverse wooden arms which form square or lozenge-shaped sections. The object of this arrangement is to break up and aerate the stored grain. The arms are of triangular section and are slightly hollowed at the base so as to bring a current of air into direct contact with the grain. The air can be warmed if necessary. The other and larger section of the granary is provided with 105 bins of moderate height arranged in groups of 21 on the five floors between the basement and attic. On the intermediate floors and the bottom floor each bin lies exactly under the bin above. Grain is not stored in these bins to a greater depth than 5 ft. The bins are fitted with removable side walls, and damp grain is only stored in certain bins aerated for half the area of their side walls through a wire mesh. The arrangements for distributing grain in this warehouse are very complete. The uncleaned grain is taken by the receiving elevator, with a lifting capacity of 20 tons per hour, to a warehouse separator, whence it is passed through an automatic weigher and is then either sacked or spouted to the main elevator (capacity 25 tons per hour) and elevated to the attic. From the head of this main elevator the grain can either be fed to a bin in one or other of the main granary floors, or shot to one of the bins in the silo house. In the attic the grain is carried by a spout and belt conveyor to one or other of the turntables, as the appliances may be termed, which serve to distribute through spouts the grain to any one of the floor or silo bins. Alternatively, the grain may be shot into the basement and there fed back into the main elevator by a band conveyor. In this way the grain may be turned over as often as it is

Dortmund.

deemed necessary. At the bottom of each bin are four apertures connected by spouts, both with the bin below and with the central vertical pipe which passes down through the centre of each group of bins. To regulate the course of the grain from bin to bin or from bin to central pipe, the connecting spouts are fitted with valves of ingenious yet simple construction which deflect the grain in any desired direction, so that the contents of two or more bins may be blended, or grain may be transferred from a bin on one floor to a bin on a lower floor, missing the bin on the floor between. The valves are controlled by chains from the basement.

With reference to the floor bins used at Dortmund, it may be observed that there are granaries built on a similar principle in the United Kingdom. It is probable that bins of moderate height are more suitable for storing grain containing a considerable amount of moisture than deep silos, whether made of wood, ferro-concrete or other material. For one thing floor bins of the Dortmund pattern can be more effectually aerated than deep silos. German wheat has many characteristics in common with British, and, especially in north Germany, is not infrequently harvested in a more or less damp condition. In the United Kingdom, Messrs Spencer & Co., of Melksham, have erected several granaries on the floor-bin principle, and have adopted an ingenious system of "telescopic" spouting, by means of which grain may be discharged from one bin to another or at any desired point. This spouting can be applied to bins either with level floors or with hoppered bottoms, if they are arranged one above the other on the different floors, and is so constructed that an opening can be effected at certain points by simply sliding upwards a section of the spout.

National Granaries.—Wheat forms the staple food of a large proportion of the population of the British Isles, and of the total amount consumed about four-fifths is sea-borne. The stocks normally held in the country being limited, serious consequences might result from any interruption of the supply, such as might occur were Great Britain involved in war with a power or powers commanding a strong fleet. To meet this contingency it has been suggested that the State should establish granaries containing a national reserve of wheat for use in emergency, or should adopt measures calculated to induce merchants, millers, &c., to hold larger stocks than at present and to stimulate the production of home-grown wheat.

Amount of stocks.

Stocks of wheat (and of flour expressed in its equivalent weight of wheat) are held by merchants, millers and farmers. Merchants' stocks are kept in granaries at ports of importation and are known as first-hand stocks. Stocks of wheat and flour in the hands of millers and of flour held by bakers are termed second-hand stocks, while farmers' stocks only consist of native wheat. Periodical returns are generally made of first-hand or port stocks, nor should a wide margin of error be possible in the case of farmers' stocks, but second-hand stocks are more difficult to gauge. Since the last decade of the 19th century the storage capacity of British mills has considerably increased. As the number of small mills has diminished the capacity of the bigger ones has increased, and proportionately their warehousing accommodation has been enlarged. At the present time first-hand stocks tend to diminish because a larger proportion of millers' holdings are in mill granaries and silo houses. The immense preponderance of steamers over sailing vessels in the grain trade has also had the effect of greatly diminishing stocks. With his cargo or parcel on a steamer a corn merchant can tell almost to a day when it will be due. In fact foreign wheat owned by British merchants is to a great extent stored in foreign granaries in preference to British warehouses. The merchant's risk is thereby lessened to a certain extent. When his wheat has been brought into a British port, to send it farther afield means extra expense. But wheat in an American or Argentine elevator may be ordered wherever the best price can be obtained for it. Options or "futures," too, have helped to restrict the size of wheat stocks in the United Kingdom. A merchant buys a cargo of wheat on passage for arrival at a definite time, and, lest the market value of grain should have depreciated by the time it arrives, he sells an option against it. In this way he hedges his deal, the option serving as insurance against loss. This is why the British corn trade finds it less risky to limit purchases to bare needs, protecting itself by option deals, than to store large quantities which may depreciate and involve their owners in loss.

Varying estimates have been made of the number of weeks' supply of breadstuffs (wheat and flour) held by millers at various seasons of the year. A table compiled by the secretary of the National Association of British and Irish Millers from returns for 1902 made by 170 milling firms showed 4.7, 4.9, 4.9 and 5 weeks' supply at the end of March, June, September and December respectively. These 170 mills were said to represent 46% of the milling capacity of the United Kingdom, and claimed to have ground 12,000,000 qrs. out of 25,349,000 qrs. milled in 1902. These were obviously large mills; it is probable that the other mills would not have shown anything like such a proportion of stock of either raw or finished material. A fair estimate of the stocks normally held by millers and bakers

throughout the United Kingdom would be about four weeks' supply. First-hand stocks vary considerably, but the limits are definite, ranging from 1,000,000 to 3,500,000 qrs., the latter being a high figure. The tendency is for first-hand stocks to decline, but two weeks' supply must be a minimum. Farmers' stocks necessarily vary with the size of the crop and the period of the year; they will range from 9 or 10 weeks on the 1st of September to a half week on the 1st of August. Taking all the stocks together, it is very exceptional for the stock of breadstuffs to fall below 7 weeks' supply. Between the cereal years 1893-1894 and 1903-1904, a period of 570 weeks, the stocks of all kinds fell below 7 weeks' supply in only 9 weeks; of these 9 weeks 7 were between the beginning of June and the end of August 1898. This was immediately after the Leiter collapse. In seven of these eleven years there is no instance of stocks falling below 8 weeks' supply. In 21 out of these 570 weeks and in 39 weeks during the same period stocks dropped below 7½ and 8 weeks' supply respectively. Roughly speaking the stock of wheat available for bread-making varies from a two to four months' supply and is at times well above the latter figure.

National reserve.

The formation of a national reserve of wheat, to be held at the disposal of the state in case of urgent need during war, is beset by many practical difficulties. The father of the scheme was probably *The Miller*, a well-known trade journal. In March and April 1886 two articles appeared in that paper under the heading "Years of Plenty and State Granaries," in which it was urged that to meet the risk of hostile cruisers interrupting the supplies it would be desirable to lay up in granaries on British soil and under government control a stock of wheat sufficient for 12 or alternatively 6 months' consumption. This was to be national property, not to be touched except when the fortune of war sent up the price of wheat to a famine level or caused severe distress. The State holding this large stock—a year's supply of foreign grain would have meant at least 15,000,000 qrs., and have cost about £25,000,000 exclusive of warehousing—was in peace time to sell no wheat except when it became necessary to part with stock as a precautionary measure. In that case the wheat sold was to be replaced by the same amount of new grain. The idea was to provide the country with a supply of wheat until sufficient wheat-growing soil could be broken up to make it practically self-sufficing in respect of wheat. The original suggestion fell quite flat. Two years later Captain Warren, R.N., read a paper on "Great Britain's Corn Supplies in War," before the London Chamber of Commerce, and accepted national granaries as the only practicable safeguard against what appeared to him a great peril. The representatives of the shipping interest opposed the scheme, probably because it appeared to them likely to divert the public from insisting on an all-powerful navy. The corn trade opposed the project on account of its great practical difficulties. But constant contraction of the British wheat acreage kept the question alive, and during the earlier half of the 'nineties it was a favourite theme with agriculturists. Some influential members of parliament pressed the matter on the government, who, acting, no doubt, on the advice of their military and naval experts, refused either a royal commission or a departmental committee. While the then technical advisers of the government were divided on the advisability of establishing national granaries as a defensive measure, the balance of expert opinion was adverse to the scheme. Lord Wolseley, then commander-in-chief, publicly stigmatized the theory that Great Britain might in war be starved into submission as "unmitigated humbug."

Yerburgh committee.

In spite of official discouragement the agitation continued, and early in 1897 the council of the Central and Associated Chambers of Agriculture, at the suggestion to a great extent of Mr R. A. Yerburgh, M.P., nominated a committee to examine the question of national wheat stores. This committee held thirteen sittings and examined fifty-four witnesses. Its report, which was published (L. G. Newman & Co., 12 Finsbury Square, London, E.C.) with minutes of the evidence taken, practically recommended that a national reserve of wheat on the lines already sketched should be formed and administered by the State, and that the government should be strongly urged to obtain the appointment of a royal commission, comprising representatives of agriculture, the corn trade, shipping, and the army and navy, to conduct an exhaustive inquiry into the whole subject of the national food-supply in case of war. This recommendation was ultimately carried into effect, but not till nearly five years had elapsed. Of two schemes for national granaries put before the Yerburgh committee, one was formulated by Mr Seth Taylor, a London miller and corn merchant, who reckoned that a store of 10,000,000 qrs. of wheat might be accumulated at an average cost of 40s. per qr.—this was in the Leiter year of high prices—and distributed in six specially constructed granaries to be erected at London, Liverpool, Hull, Bristol, Glasgow and Dublin. The cost of the granaries was put at £7,500,000. Mr Taylor's scheme, all charges included, such as 2½% interest on capital, cost of storage (at 6d. per qr.), and 2s. per qr. for cost of replacing

wheat, involved an annual expenditure of £1,250,000. The Yerburgh committee also considered a proposal to stimulate the home supply of wheat by offering a bounty to farmers for every quarter of wheat grown. This proposal has taken different shapes; some have suggested that a bounty should be given on every acre of land covered with wheat, while others would only allow the bounty on wheat raised and kept in good condition up to a certain date, say the beginning of the following harvest. It is obvious that a bounty on the area of land covered by wheat, irrespective of yield, would be a premium on poor farming, and might divert to wheat-growing land unsuitable for that purpose. The suggestion to pay a bounty of say 3s. to 5s. per qr. for all wheat grown and stacked for a certain time stands on a different basis; it is conceivable that a bounty of 5s. might expand the British production of wheat from say 7,000,000 to 9,000,000 qrs., which would mean that a bounty of £2,250,000 per annum, plus costs of administration, had secured an extra home production of 2,000,000 qrs. Whether such a price would be worth paying is another matter; the Yerburgh committee's conclusion was decidedly in the negative. It has also been suggested that the State might subsidize millers to the extent of 2s. 6d. per sack of 280 lb. per annum on condition that each maintained a minimum supply of two months' flour. This may be taken to mean that for keeping a special stock of flour over and above his usual output a miller would be entitled to an annual subsidy of 2s. 6d. per sack. An extra stock of 10,000,000 sacks might be thus kept up at an annual cost of £1,250,000, plus the expenditure of administration, which would probably be heavy. With regard to this suggestion, it is very probable that a few large mills which have plenty of warehouse accommodation and depots all over the country would be ready to keep up a permanent extra stock of 100,000 sacks. Thus a mill of 10,000 sacks' capacity per week, which habitually maintains a total stock of 50,000 sacks, might bring up its stock to 150,000 sacks. Such a mill, being a good customer to railways, could get from them the storage it required for little or nothing. But the bulk of the mills have no such advantages. They have little or no spare warehousing room, and are not accustomed to keep any stock, sending their flour out almost as fast as it is milled. It is doubtful therefore if a bounty of 2s. 6d. per sack would have the desired effect of keeping up a stock of 10,000,000 sacks, sufficient for two to three months' bread consumption.

Royal commission, 1903-1905.

The controversy reached a climax in the royal commission appointed in 1903, to which was also referred the importation of raw material in war time. Its report appeared in 1905. To the question whether the unquestioned dependence of the United Kingdom on an uninterrupted supply of sea-borne breadstuffs renders it advisable or not to maintain at all times a six months' stock of wheat and flour, it returned no decided answer, or perhaps it would be more correct to say that the commission was hopelessly divided. The main report was distinctly optimistic so far as the liability of the country to harass and distress at the hands of a hostile naval power or combination of powers was concerned. But there were several dissentients, and there was hardly any portion of the report in chief which did not provoke some reservation or another. That a maritime war would cause freights and insurance to rise in a high degree was freely admitted, and it was also admitted that the price of bread must also rise very appreciably. But, provided the navy did not break down, the risk of starvation was dismissed. Therefore all the proposals for providing national granaries or inducing merchants and millers to carry bigger stocks were put aside as unpractical and unnecessary. The commission was, however, inclined to consider more favourably a suggestion for providing free storage for wheat at the expense of the State. The idea was that if the State would subsidize any large granary company to the extent of 6d. or 5d. per qr., grain now warehoused in foreign lands would be attracted to the British Isles. But on the whole the commission held that the main effect of the scheme would be to saddle the government with the rent of all grain stored in public warehouses in the United Kingdom without materially increasing stocks. The proposal to offer bounties to farmers to hold stocks for a longer period and to grow more wheat met with equally little favour.

To sum up the advantages of national granaries, assuming any sort of disaster to the navy, the possession of a reserve of even six months' wheat-supply in addition to ordinary stocks would prevent panic prices. On the other hand, the difficulties in the way of forming and administering such a reserve are very great. The world grows no great surplus of wheat, and to form a six months', much more a twelve months', stock would be the work of years. The government in buying up the wheat would have to go carefully if they would avoid sending up prices with a rush. They would have to buy dearly, and when they let go a certain amount of stock they would be bound to sell cheaply. A stock once formed might be held by the State with little or no disturbance of the corn market, although the existence of such an emergency stock would hardly encourage British farmers to grow more wheat. The cost of erecting, equipping and keeping in good order the necessary warehouses would be,

probably, much heavier than the most liberal estimate hitherto made by advocates of national granaries.

(G. F. Z.)

GRANBY, JOHN MANNERS, Marquess of (1721-1770), British soldier, was the eldest son of the third duke of Rutland. He was born in 1721 and educated at Eton and Trinity College, Cambridge, and was returned as member of parliament for Grantham in 1741. Four years later he received a commission as colonel of a regiment raised by the Rutland interest in and about Leicester to assist in quelling the Highland revolt of 1745. This corps never got beyond Newcastle, but young Granby went to the front as a volunteer on the duke of Cumberland's staff, and saw active service in the last stages of the insurrection. Very soon his regiment was disbanded. He continued in parliament, combining with it military duties, making the campaign of Flanders (1747). Promoted major-general in 1755, three years later he was appointed colonel of the Royal Horse Guards (Blues). Meanwhile he had married the daughter of the duke of Somerset, and in 1754 had begun his parliamentary connexion with Cambridgeshire, for which county he sat until his death. The same year that saw Granby made colonel of the Blues, saw also the despatch of a considerable British contingent to Germany. Minden was Granby's first great battle. At the head of the Blues he was one of the cavalry leaders halted at the critical moment by Sackville, and when in consequence that officer was sent home in disgrace, Lieut.-General Lord Granby succeeded to the command of the British contingent in Ferdinand's army, having 32,000 men under his orders at the beginning of 1760. In the remaining campaigns of the Seven Years' War the English contingent was more conspicuous by its conduct than the Prussians themselves. On the 31st of July 1760 Granby brilliantly stormed Warburg at the head of the British cavalry, capturing 1500 men and ten pieces of artillery. A year later (15th of July 1761) the British defended the heights of Vellinghausen with what Ferdinand himself styled "indescribable bravery." In the last campaign, at Gravenstein und Wilhelmsthal, Homburg and Cassel, Granby's men bore the brunt of the fighting and earned the greatest share of the glory.

Returning to England in 1763 the marquess found himself the popular hero of the war. It is said that couriers awaited his arrival at all the home ports to offer him the choice of the Ordnance or the Horse Guards. His appointment to the Ordnance bore the date of the 1st of July 1763, and three years later he became commander-in-chief. In this position he was attacked by "Junius," and a heated discussion arose, as the writer had taken the greatest pains in assailing the most popular member of the Grafton ministry. In 1770 Granby, worn out by political and financial trouble, resigned all his offices, except the colonelcy of the Blues. He died at Scarborough on the 18th of October 1770. He had been made a privy councillor in 1760, lord lieutenant of Derbyshire in 1762, and LL.D. of Cambridge in 1769.

Two portraits of Granby were painted by Sir Joshua Reynolds, one of which is now in the National Gallery. His contemporary popularity is indicated by the number of inns and public-houses which took his name and had his portrait as sign-board.

GRAN CHACO, an extensive region in the heart of South America belonging to the La Plata basin, stretching from 20° to 29° S. lat., and divided between the republics of Argentine, Bolivia and Paraguay, with a small district of south-western Matto Grosso (Brazil). Its area is estimated at from 250,000 to 425,000 sq. m., but the true Chaco region probably does not exceed 300,000 sq. m. The greater part is covered with marshes, lagoons and dense tropical jungle and forest, and is still unexplored. On its southern and western borders there are extensive tracts of open woodland, intermingled with grassy plains, while on the northern side in Bolivia are large areas of open country subject to inundations in the rainy season. In general terms the Gran Chaco may be described as a great plain sloping gently to the S.E., traversed in the same direction by two great rivers, the Pilcomayo and Bermejo, whose sluggish courses are not navigable because of sand-banks, barriers of overturned trees and floating vegetation, and confusing channels. This excludes that part of eastern Bolivia belonging to the Amazon basin, which is sometimes described as part of the

Chaco. The greater part of its territory is occupied by nomadic tribes of Indians, some of whom are still unsubdued, while others, like the Matacos, are sometimes to be found on neighbouring sugar estates and estancias as labourers during the busy season. The forest wealth of the Chaco region is incalculable and apparently inexhaustible, consisting of a great variety of palms and valuable cabinet woods, building timber, &c. Its extensive tracts of "quebracho Colorado" (*Loxopterygium Lorentzii*) are of very great value because of its use in tanning leather. Both the wood and its extract are largely exported. Civilization is slowly gaining footholds in this region along the southern and eastern borders.

GRAND ALLIANCE, WAR OF THE (alternatively called the War of the League of Augsburg), the third[1] of the great aggressive wars waged by Louis XIV. of France against Spain, the Empire, Great Britain, Holland and other states. The two earlier wars, which are redeemed from oblivion by the fact that in them three great captains, Turenne, Condé and Montecucculi, played leading parts, are described in the article Dutch Wars. In the third war the leading figures are: Henri de Montmorency-Boutteville, duke of Luxemburg, the former aide-de-camp of Condé and heir to his daring method of warfare; William of Orange, who had fought against both Condé and Luxemburg in the earlier wars, and was now king of England; Vauban, the founder of the sciences of fortification and siegecraft, and Catinat, the follower of Turenne's cautious and systematic strategy, who was the first commoner to receive high command in the army of Louis XIV. But as soldiers, these men—except Vauban—are overshadowed by the great figures of the preceding generation, and except for a half-dozen outstanding episodes, the war of 1689-97 was an affair of positions and manœuvres.

It was within these years that the art and practice of war began to crystallize into the form called "linear" in its strategic and tactical aspect, and "cabinet-war" in its political and moral aspect. In the Dutch wars, and in the minor wars that preceded the formation of the League of Augsburg, there were still survivals of the loose organization, violence and wasteful barbarity typical of the Thirty Years' War; and even in the War of the Grand Alliance (in its earlier years) occasional brutalities and devastations showed that the old spirit died hard. But outrages that would have been borne in dumb misery in the old days now provoked loud indignation, and when the fierce Louvois disappeared from the scene it became generally understood that barbarity was impolitic, not only as alienating popular sympathies, but also as rendering operations a physical impossibility for want of supplies.

Thus in 1700, so far from terrorizing the country people into submission, armies systematically conciliated them by paying cash and bringing trade into the country.

Character of the war.

Formerly, wars had been fought to compel a people to abjure their faith or to change sides in some personal or dynastic quarrel. But since 1648 this had no longer been the case. The Peace of Westphalia established the general relationship of kings, priests and peoples on a basis that was not really shaken until the French Revolution, and in the intervening hundred and forty years the peoples at large, except at the highest and gravest moments (as in Germany in 1689, France In 1709 and Prussia in 1757) held aloof from active participation in politics and war. This was the beginning of the theory that war was an affair of the regular forces only, and that intervention in it by the civil population was a punishable offence. Thus wars became the business of the professional soldiers in the king's own service, and the scarcity and costliness of these soldiers combined with the purely political character of the quarrels that arose to reduce a campaign from an "intense and passionate drama" to a humdrum affair, to which only rarely a few men of genius imparted some degree of vigour, and which in the main was an attempt to gain small ends by a small expenditure of force and with the minimum of risk. As between a prince and his subjects there were still quarrels that stirred the average man—the Dragonnades, for instance, or the English Revolution—but foreign wars were "a stronger form of diplomatic notes," as Clausewitz called them, and were waged with the object of adding a codicil to the treaty of peace that had closed the last incident.

Other causes contributed to stifle the former ardour of war. Campaigns were no longer conducted by armies of ten to thirty thousand men. Large regular armies had come into fashion, and, as Guibert points out, instead of small armies charged with grand operations we find grand armies charged with small operations. The average general, under the prevailing conditions of supply and armament, was not equal to the task of commanding such armies. Any real concentration of the great forces that Louis XIV. had created was

therefore out of the question, and the field armies split into six or eight independent fractions, each charged with operations on a particular theatre of war. From such a policy nothing remotely resembling the crushing of a great power could be expected to be gained. The one tangible asset, in view of future peace negotiations, was therefore a fortress, and it was on the preservation or capture of fortresses that operations in all these wars chiefly turned. The idea of the decisive battle for its own sake, as a settlement of the quarrel, was far distant; for, strictly speaking, there was no quarrel, and to use up highly trained and exceedingly expensive soldiers in gaining by brute force an advantage that might equally well be obtained by chicanery was regarded as foolish.

The fortress was, moreover, of immediate as well as contingent value to a state at war. A century of constant warfare had impoverished middle Europe, and armies had to spread over a large area if they desired to "live on the country." This was dangerous in the face of the enemy (cf. the Peninsular War), and it was also uneconomical. The only way to prevent the country people from sending their produce into the fortresses for safety was to announce beforehand that cash would be paid, at a high rate, for whatever the army needed. But even promises rarely brought this about, and to live at all, whether on supplies brought up from the home country and stored in magazines (which had to be guarded) or on local resources, an army had as a rule to maintain or to capture a large fortress. Sieges, therefore, and manœuvres are the features of this form of war, wherein armies progressed not with the giant strides of modern war, but in a succession of short hops from one foothold to the next. This was the procedure of the average commander, and even when a more intense spirit of conflict was evoked by the Luxemburgs and Marlboroughs it was but momentary and spasmodic.

The general character of the war being borne in mind, nine-tenths of its marches and manœuvres can be almost "taken as read"; the remaining tenth, the exceptional and abnormal part of it, alone possesses an interest for modern readers.

In pursuance of a new aggressive policy in Germany Louis XIV. sent his troops, as a diplomatic menace rather than for conquest, into that country in the autumn of 1688. Some of their raiding parties plundered the country as far south as Augsburg, for the political intent of their advance suggested terrorism rather than conciliation as the best method. The league of Augsburg at once took up the challenge, and the addition of new members (Treaty of Vienna, May 1689) converted it into the "Grand Alliance" of Spain, Holland, Sweden, Savoy and certain Italian states, Great Britain, the emperor, the elector of Brandenburg, &c.

"Those who condemned the king for raising up so many enemies, admired him for having so fully prepared to defend himself and even to forestall them," says Voltaire. Louvois had in fact completed the work of organizing the French army on a regular and permanent basis, and had made it not merely the best, but also by far the most numerous in Europe, for Louis disposed in 1688 of no fewer than 375,000 soldiers and 60,000 sailors. The infantry was uniformed and drilled, and the socket bayonet and the flint-lock musket had been introduced. The only relic of the old armament was the pike, which was retained for one-quarter of the foot, though it had been discarded by the Imperialists in the course of the Turkish wars described below. The first artillery regiment was created in 1684, to replace the former semi-civilian organization by a body of artillerymen susceptible of uniform training and amenable to discipline and orders.

In 1689 Louis had six armies on foot. That in Germany, which had executed the raid of the previous autumn, was not in a position to resist the principal army of the coalition so far from support. Louvois therefore ordered it to lay waste the Palatinate, and the devastation of the country around Heidelberg, Mannheim, Spires, Oppenheim and Worms was pitilessly and methodically carried into effect in January and February. There had been devastations in previous wars, even the high-minded Turenne had used the argument of fire and sword to terrify a population or a prince, while the whole story of the last ten years of the great war had been one of incendiary armies leaving traces of their passage that it took a century to remove. But here the devastation was a purely military measure, executed systematically over a given strategic front for no other purpose than to delay the advance of the enemy's army. It differed from the method of Turenne or Cromwell in that the sufferers were not those people whom it was the purpose of the war to reduce to submission, but others who had no interest in the quarrel. It differed from Wellington's laying waste of Portugal in 1810 in that it was not done for the defence of the Palatinate against a national enemy, but because the Palatinate was where it was. The feudal theory that every subject of a prince at war was an armed vassal, and therefore an enemy of the prince's enemy, had in practice been obsolete for two centuries past; by 1690 the organization of war, its causes, its

Devastation of the Palatinate, 1689.

methods and its instruments had passed out of touch with the people at large, and it had become thoroughly understood that the army alone was concerned with the army's business. Thus it was that this devastation excited universal reprobation; and that, in the words of a modern French writer, the "idea of Germany came to birth in the flames of the Palatinate."

As a military measure this crime was, moreover, quite unprofitable; for it became impossible for Marshal Duras, the French commander, to hold out on the east side of the middle Rhine, and he could think of nothing better to do than to go farther south and to ravage Baden and the Breisgau, which was not even a military necessity. The grand army of the Allies, coming farther north, was practically unopposed. Charles of Lorraine and the elector of Bavaria—lately comrades in the Turkish war (see below)—invested Mainz, the elector of Brandenburg Bonn. The latter, following the evil precedent of his enemies, shelled the town uselessly instead of making a breach in its walls and overpowering its French garrison, an incident not calculated to advance the nascent idea of German unity. Mainz, valiantly defended by Nicolas du Blé, marquis d'Uxelles, had to surrender on the 8th of September. The governor of Bonn, baron d'Asfeld, not in the least intimidated by the bombardment, held out till the army that had taken Mainz reinforced the elector of Brandenburg, and then, rejecting the hard terms of surrender offered him by the latter, he fell in resisting a last assault on the 12th of October. Only 850 men out of his 6000 were left to surrender on the 16th, and the duke of Lorraine, less truculent than the elector, escorted them safely to Thionville. Boufflers, with another of Louis's armies, operated from Luxemburg (captured by the French in 1684 and since held) and Trarbach towards the Rhine, but in spite of a minor victory at Kochheim on the 21st of August, he was unable to relieve either Mainz or Bonn.

In the Low Countries the French marshal d'Humières, being in superior force, had obtained *special permission* to offer battle to the Allies. Leaving the garrison of Lille and Tournay to amuse the Spaniards, he hurried from Maubeuge to oppose the Dutch, who from Namur had advanced slowly on Philippeville. Coming upon their army (which was commanded by the prince of Waldeck) in position behind the river Heure, with an advanced post in the little walled town of Walcourt, he flung his advanced guard against the bridge and fortifications of this place to clear the way for his deployment beyond the river Heure (27th August). After wasting a thousand brave men in this attempt, he drew back. For a few days the two armies remained face to face, cannonading one another at intervals, but no further fighting occurred. Humières returned to the region of the Scheldt fortresses, and Waldeck to Brussels. For the others of Louis' six armies the year's campaign passed off quite uneventfully.

The war in Ireland, 1689-1691.

Simultaneously with these operations, the Jacobite cause was being fought to an issue in Ireland. War began early in 1689 with desultory engagements between the Orangemen of the north and the Irish regular army, most of which the earl of Tyrconnel had induced to declare for King James. The northern struggle after a time condensed itself into the defence of Derry and Enniskillen. The siege of the former place, begun by James himself and carried on by the French general Rosen, lasted 105 days. In marked contrast to the sieges of the continent, this was resisted by the townsmen themselves, under the leadership of the clergyman George Walker. But the relieving force (consisting of two frigates, a supply ship and a force under Major-general Percy Kirke) was dilatory, and it was not until the defenders were in the last extremity that Kirke actually broke through the blockade (July 31st). Enniskillen was less closely invested, and its inhabitants, organized by Colonel Wolseley and other officers sent by Kirke, actually kept the open field and defeated the Jacobites at Newtown Butler (July 31st). A few days later the Jacobite army withdrew from the north. But it was long before an adequate army could be sent over from England to deal with it. Marshal Schomberg (*q.v.*), one of the most distinguished soldiers of the time, who had been expelled from the French service as a Huguenot, was indeed sent over in August, but the army he brought, some 10,000 strong, was composed of raw recruits, and when it was assembled in camp at Dundalk to be trained for its work, it was quickly ruined by an epidemic of fever. But James failed to take advantage of his opportunity to renew the war in the north, and the relics of Schomberg's army wintered in security, covered by the Enniskillen troops. In the spring of 1690, however, more troops, this time experienced regiments from Holland, Denmark and Brandenburg, were sent, and in June, Schomberg in Ireland and Major-general Scravemore in Chester having thoroughly organized and equipped the field army, King William assumed the command himself. Five days after his arrival he began his advance from Loughbrickland near Newry, and on the 1st of July he engaged James's main army on the river Boyne, close to Drogheda. Schomberg was killed and William himself wounded, but the Irish army was routed.

No stand was made by the defeated party either in the Dublin or in the Waterford district.

Lauzun, the commander of the French auxiliary corps in James's army, and Tyrconnel both discountenanced any attempt to defend Limerick, where the Jacobite forces had reassembled; but Patrick Sarsfield (earl of Lucan), as the spokesman of the younger and more ardent of the Irish officers, pleaded for its retention. He was left, therefore, to hold Limerick, while Tyrconnel and Lauzun moved northward into Galway. Here, as in the north, the quarrel enlisted the active sympathies of the people against the invader, and Sarsfield not only surprised and destroyed the artillery train of William's army, but repulsed every assault made on the walls that Lauzun had said "could be battered down by rotten apples." William gave up the siege on the 30th of August. The failure was, however, compensated in a measure by the arrival in Ireland of an expedition under Lord Marlborough, which captured Cork and Kinsale, and next year (1691) the Jacobite cause was finally crushed by William's general Ginckell (afterwards earl of Athlone) in the battle of Aughrim in Galway (July 12th), in which St Ruth, the French commander, was killed and the Jacobite army dissipated. Ginckell, following up his victory, besieged Limerick afresh. Tyrconnel died of apoplexy while organizing the defence, and this time the town was invested by sea as well as by land. After six weeks' resistance the defenders offered to capitulate, and with the signing of the treaty of Limerick on the 1st of October the Irish war came to an end. Sarsfield and the most energetic of King James's supporters retired to France and were there formed into the famous "Irish brigade." Sarsfield was killed at the battle of Neerwinden two years later.

The campaign of 1690 on the continent of Europe is marked by two battles, one of which, Luxemburg's victory of Fleurus, belongs to the category of the world's great battles. It is described under Fleurus, and the present article only deals summarily with the conditions in which it was fought. These, though they in fact led to an encounter that could, in itself, fairly be called decisive, were in closer accord with the general spirit of the war than was the decision that arose out of them.

Luxemburg had a powerful enemy in Louvois, and he had consequently been allotted only an insignificant part in the first campaign. But after the disasters of 1689 Louis re-arranged the commands on the north-east frontier so as to allow Humières, Luxemburg and Boufflers to combine for united action. "I will take care that Louvois plays fair," Louis said to the duke when he gave him his letters of service. Though apparently Luxemburg was not authorized to order such a combination himself, as senior officer he would automatically take command if it came about. The whole force available was probably close on 100,000, but not half of these were present at the decisive battle, though Luxemburg certainly practised the utmost "economy of force" as this was understood in those days (see also Neerwinden). On the remaining theatres of war, the dauphin, assisted by the duc de Lorge, held the middle Rhine, and Catinat the Alps, while other forces were in Roussillon, &c., as before. Catinat's operations are briefly described below. Those of the others need no description, for though the Allies formed a plan for a grand concentric advance on Paris, the preliminaries to this advance were so numerous and so closely interdependent that on the most favourable estimate the winter would necessarily find the Allied armies many leagues short of Paris. In fact, the Rhine offensive collapsed when Charles of Lorraine died (17th April), and the reconquest of his lost duchy ceased to be a direct object of the war.

Fleurus, 1690.

Luxemburg began operations by drawing in from the Sambre country, where he had hitherto been stationed, to the Scheldt and "eating up" the country between Oudenarde and Ghent in the face of a Spanish army concentrated at the latter place (15th May-12th June). He then left Humières with a containing force in the Scheldt region and hurried back to the Sambre to interpose between the Allied army under Waldeck and the fortress of Dinant which Waldeck was credited with the intention of besieging. His march from Tournay to Gerpinnes was counted a model of skill—the *locus classicus* for the maxim that ruled till the advent of Napoleon —"march always in the order in which you encamp, or purpose to encamp, or fight." For four days the army marched across country in close order, covered in all directions by reconnoitring cavalry and advanced, flank and rear guards. Under these conditions eleven miles a day was practically forced marching, and on arriving at Jeumont-sur-Sambre the army was given three days' rest. Then followed a few leisurely marches in the direction of Charleroi, during which a detachment of Boufflers's army came in, and the cavalry explored the country to the north. On news of the enemy's army being at Trazegnies, Luxemburg hurried across a ford of the Sambre above Charleroi, but this proved to be a detachment only, and soon information came in that Waldeck was encamped near Fleurus. Thereupon Luxemburg, without consulting his subordinate generals, took his army to Velaine. He knew that the enemy was marking time till the troops of Liége and the Brandenburgers from the Rhine were near enough to co-operate in the Dinant enterprise, and he was determined to fight a battle at once. From Velaine, therefore, on the morning of the 1st of July, the army moved forward to Fleurus and there won one of the most brilliant victories in the history of

the Royal army. But Luxemburg was not allowed to pursue his advantage. He was ordered to hold his army in readiness to besiege either Namur, Mons, Charleroi or Ath, according as later orders dictated; and to send back the borrowed regiments to Boufflers, who was being pressed back by the Brandenburg and Liége troops. Thus Waldeck reformed his army in peace at Brussels, where William III. of England soon afterwards assumed command of the Allied forces in the Netherlands, and Luxemburg and the other marshals stood fast for the rest of the campaign, being forbidden to advance until Catinat—in Italy—should have won a battle.

Staffarda.

In this quarter the armed neutrality of the duke of Savoy had long disquieted the French court. His personal connexions with the imperial family and his resentment against Louvois, who had on some occasion treated him with his usual patronizing arrogance, inclined him to join the Allies, while on the other hand he could hope for extensions of his scanty territory only by siding with Louis. In view of this doubtful condition of affairs the French army under Catinat had for some time been maintained on the Alpine frontier, and in the summer of 1690 Louis XIV. sent an ultimatum to Victor Amadeus to compel him to take one side or the other actively and openly. The result was that Victor Emmanuel threw in his lot with the Allies and obtained help from the Spaniards and Austrians in the Milanese. Catinat thereupon advanced into Piedmont, and won, principally by virtue of his own watchfulness and the high efficiency of his troops, the important victory of Staffarda (August 18th, 1690). This did not, however, enable him to overrun Piedmont, and as the duke was soon reinforced, he had to be content with the methodical conquest of a few frontier districts. On the side of Spain, a small French army under the duc de Noailles passed into Catalonia and there lived at the enemy's expense for the duration of the campaign.

In these theatres of war, and on the Rhine, where the disunion of the German princes prevented vigorous action, the following year, 1691, was uneventful. But in the Netherlands there were a siege, a war of manœuvres and a cavalry combat, each in its way somewhat remarkable. The siege was that of Mons, which was, like many sieges in the former wars, conducted with much pomp by Louis XIV. himself, with Boufflers and Vauban under him. On the surrender of the place, which was hastened by red-hot shot (April 8th), Louis returned to Versailles and divided his army between Boufflers and Luxemburg, the former of whom departed to the Meuse. There he attempted by bombardment to enforce the surrender of Liége, but had to desist when the elector of Brandenburg threatened Dinant. The principal armies on either side faced one another under the command respectively of William III. and of Luxemburg. The Allies were first concentrated to the south of Namur, and Luxemburg hurried thither, but neither party found any tempting opportunity for battle, and when the cavalry had consumed all the forage available in the district, the two armies edged away gradually towards Flanders. The war of manœuvre continued, with a slight balance of advantage on Luxemburg's side, until September, when William returned to England, leaving Waldeck in command of the Allied army, with orders to distribute it in winter quarters amongst the garrison towns. This gave the momentary opportunity for which Luxemburg had been watching, and at Leuze (20th Sept.) he fell upon the cavalry of Waldeck's rearguard and drove it back in disorder with heavy losses until the pursuit was checked by the Allied infantry.

In 1692[2] the Rhine campaign was no more decisive than before, although Lorge made a successful raid into Württemberg in September and foraged his cavalry in German territory till the approach of winter. The Spanish campaign was unimportant, but on the Alpine side the Allies under the duke of Savoy drove back Catinat into Dauphiné, which they ravaged with fire and sword. But the French peasantry were quicker to take arms than the Germans, and, inspired by the local gentry—amongst whom figured the heroine, Philis de la Tour du Pin (1645-1708), daughter of the marquis de la Charce—they beset every road with such success that the small regular army of the invaders was powerless. Brought practically to a standstill, the Allies soon consumed the provisions that could be gathered in, and then, fearing lest the snow should close the passes behind them, they retreated.

Siege of Namur, 1692.

In the Low Countries the campaign as before began with a great siege. Louis and Vauban invested Namur on the 26th of May. The place was defended by the prince de Barbançon (who had been governor of Luxemburg when that place was besieged in 1684) and Coehoorn (*q.v.*), Vauban's rival in the science of fortification. Luxemburg, with a small army, manœuvred to cover the siege against William III.'s army at Louvain. The place fell on the 5th of June,[3] after a very few days of Vauban's "regular" attack, but the citadel held out until the 23rd. Then, as before, Louis returned to Versailles, giving injunctions to Luxemburg to "preserve the strong

places and the country, while opposing the enemy's enterprises and subsisting the army at his expense." This negative policy, contrary to expectation, led to a hard-fought battle. William, employing a common device, announced his intention of retaking Namur, but set his army in motion for Flanders and the sea-coast fortresses held by the French. Luxemburg, warned in time, hurried towards the Scheldt, and the two armies were soon face to face again, Luxemburg about Steenkirk, William in front of Hal. William then formed the plan of surprising Luxemburg's right wing before it could be supported by the rest of his army, relying chiefly on false information that a detected spy at his headquarters was forced to send, to mislead the duke. But Luxemburg had the material protection of a widespread net of outposts as well as a secret service, and although ill in bed when William's advance was reported, he shook off his apathy, mounted his horse and, enabled by his outpost reports to divine his opponent's plan, he met it (3rd August) by a swift concentration of his army, against which the Allies, whose advance and deployment had been mismanaged, were powerless (see Steenkirk). In this almost accidental battle both sides suffered enormous losses, and neither attempted to bring about, or even to risk, a second resultless trial of strength. Boufflers's army returned to the Sambre and Luxemburg and William established themselves for the rest of the season at Lessines and Ninove respectively, 13 m. apart. After both armies had broken up into their winter quarters, Louis ordered Boufflers to attempt the capture of Charleroi. But a bombardment failed to intimidate the garrison, and when the Allies began to re-assemble, the attempt was given up (19th-21st Oct.). This failure was, however, compensated by the siege and capture of Furnes (28th Dec. 1692-7th Jan. 1693).

Steenkirk.

In 1693, the culminating point of the war was reached. It began, as mentioned above, with a winter enterprise that at least indicated the aggressive spirit of the French generals. The king promoted his admiral, Tourville, and Catinat, the *roturier*, to the marshalship, and founded the military order of St Louis on the 10th of April. The grand army in the Netherlands this year numbered 120,000, to oppose whom William III. had only some 40,000 at hand. But at the very beginning of operations Louis, after reviewing this large force at Gembloux, broke it up, in order to send 30,000 under the dauphin to Germany, where Lorge had captured Heidelberg and seemed able, if reinforced, to overrun south Germany. But the imperial general Prince Louis of Baden took up a position near Heilbronn so strong that the dauphin and Lorge did not venture to attack him. Thus King Louis sacrificed a reality to a dream, and for the third time lost the opportunity, for which he always longed, of commanding in chief in a great battle. He himself, to judge by his letter to Monsieur on the 8th of June, regarded his action as a sacrifice of personal dreams to tangible realities. And, before the event falsified predictions, there was much to be said for the course he took, which accorded better with the prevailing system of war than a Fleurus or a Neerwinden. In this system of war the rival armies, as armies, were almost in a state of equilibrium, and more was to be expected from an army dealing with something dissimilar to itself—a fortress or a patch of land or a convoy—than from its collision with another army of equal force.

Thus Luxemburg obtained his last and greatest opportunity. He was still superior in numbers, but William at Louvain had the advantage of position. The former, authorized by his master this year "*non seulement d'empêcher les ennemis de rien entreprendre, mais d'emporter quelques avantages sur eux*," threatened Liége, drew William over to its defence and then advanced to attack him. The Allies, however, retired to another position, between the Great and Little Geete rivers, and there, in a strongly entrenched position around Neerwinden, they were attacked by Luxemburg on the 29th of July. The long and doubtful battle, one of the greatest victories ever won by the French army, is briefly described under Neerwinden. It ended in a brilliant victory for the assailant, but Luxemburg's exhausted army did not pursue; William was as unshaken and determined as ever; and the campaign closed, not with a treaty of peace, but with a few manœuvres which, by inducing William to believe in an attack on Ath, enabled Luxemburg to besiege and capture Charleroi (October).

Neerwinden.

Neerwinden was not the only French victory of the year. Catinat, advancing from Fenestrelle and Susa to the relief of Pinerolo (Pignerol), which the duke of Savoy was besieging, took up a position in formal order of battle north of the village of Marsaglia. Here on the 4th of October the duke of Savoy attacked him with his whole army, front to front. But the greatly superior regimental efficiency of the French, and Catinat's minute attention to details[4] in arraying them, gave the new marshal a victory that was a not unworthy pendant to Neerwinden. The Piedmontese and their allies lost, it is said, 10,000 killed, wounded and prisoners, as against Catinat's 1800. But here, too, the results were trifling, and this year of victory is remembered chiefly as the year in which "people perished of want to the accompaniment of *Te Deums*."

Marsaglia.

In 1694 (late in the season owing to the prevailing distress and famine) Louis opened a fresh campaign in the Netherlands. The armies were larger and more ineffective than ever, and William offered no further opportunities to his formidable opponent. In September, after inducing William to desist from his intention of besieging Dunkirk by appearing on his flank with a mass of cavalry,[5] which had ridden from the Meuse, 100 m., in 4 days, Luxemburg gave up his command. He died on the 4th of January following, and with him the tradition of the Condé school of warfare disappeared from Europe. In Catalonia the marshal de Noailles won a victory (27th May) over the Spaniards at the ford of the Ter (Torroella, 5 m. above the mouth of the river), and in consequence captured a number of walled towns.

In 1695 William found Marshal Villeroi a far less formidable opponent than Luxemburg had been, and easily succeeded in keeping him in Flanders while a corps of the Allies invested Namur. Coehoorn directed the siege-works, and Boufflers the defence. Gradually, as in 1692, the defenders were dislodged from the town, the citadel outworks and the citadel itself, the last being assaulted with success by the "British grenadiers," as the song commemorates, on the 30th of August. Boufflers was rewarded for his sixty-seven days' defence by the grade of marshal.

Later campaigns of the war.

By 1696 necessity had compelled Louis to renounce his vague and indefinite offensive policy, and he now frankly restricted his efforts to the maintenance of what he had won in the preceding campaigns. In this new policy he met with much success. Boufflers, Lorge, Noailles and even the incompetent Villeroi held the field in their various spheres of operations without allowing the Allies to inflict any material injury, and also (by having recourse again to the policy of living by plunder) preserving French soil from the burden of their own maintenance. In this, as before, they were powerfully assisted by the disunion and divided counsels of their heterogeneous enemies. In Piedmont, Catinat crowned his work by making peace and alliance with the duke of Savoy, and the two late enemies having joined forces captured one of the fortresses of the Milanese. The last campaign was in 1697. Catinat and Vauban besieged Ath. This siege was perhaps the most regular and methodical of the great engineer's career. It lasted 23 days and cost the assailants only 50 men. King William did not stir from his entrenched position at Brussels, nor did Villeroi dare to attack him there. Lastly, in August 1697 Vendôme, Noailles' successor, captured Barcelona. The peace of Ryswijk, signed on the 30th of October, closed this war by practically restoring the *status quo ante*; but neither the ambitions of Louis nor the Grand Alliance that opposed them ceased to have force, and three years later the struggle began anew (see Spanish Succession, War of the).

Concurrently with these campaigns, the emperor had been engaged in a much more serious war on his eastern marches against the old enemy, the Turks. This war arose in 1682 out of internal disturbances in Hungary. The campaign of the following year is memorable for all time as the last great wave of Turkish invasion. Mahommed IV. advanced from Belgrade in May, with 200,000 men, drove back the small imperial army of Prince Charles of Lorraine, and early in July invested Vienna itself. The two months' defence of Vienna by Count Rüdiger Starhemberg (1635-1701) and the brilliant victory of the relieving army led by John Sobieski, king of Poland, and Prince Charles on the 12th of September 1683, were events which, besides their intrinsic importance, possess the romantic interest of an old knightly crusade against the heathen.

Austro-Turkish wars, 1682-1699.

But the course of the war, after the tide of invasion had ebbed, differed little from the wars of contemporary western Europe. Turkey figured rather as a factor in the balance of power than as the "infidel," and although the battles and sieges in Hungary were characterized by the bitter personal hostility of Christian to Turk which had no counterpart in the West, the war as a whole was as methodical and tedious as any Rhine or Low Countries campaign. In 1684 Charles of Lorraine gained a victory at Waitzen on the 27th of June and another at Eperies on the 18th of September, and unsuccessfully besieged Budapest.

In 1685 the Germans were uniformly successful, though a victory at Gran (August 16th) and the storming of Neuhaüsel (August 19th) were the only outstanding incidents. In 1686 Charles, assisted by the elector Max Emanuel of Bavaria, besieged and stormed Budapest (Sept. 2nd). In 1687 they followed up their success by a great victory at Mohacz (Aug. 12th). In 1688 the Austrians advanced still further, took Belgrade, threatened Widin and entered Bosnia. The margrave Louis of Baden, who afterward became one of the most celebrated of the methodical generals of the day, won a victory at Derbent on the 5th of September 1688, and next year, in spite of the outbreak of a general European war, he managed to win another battle at Nisch (Sept. 24th), to capture Widin (Oct. 14th) and to advance to the Balkans, but in 1690, more troops having to be withdrawn for the European war, the imperialist generals lost Nisch, Widin and Belgrade one after the other. There was, however, no repetition of the scenes of 1683, for in 1691 Louis won the battle of Szlankamen (Aug.

19th). After two more desultory if successful campaigns he was called to serve in western Europe, and for three years more the war dragged on without result, until in 1697 the young Prince Eugene was appointed to command the imperialists and won a great and decisive victory at Zenta on the Theiss (Sept. 11th). This induced a last general advance of the Germans eastward, which was definitively successful and brought about the peace of Carlowitz (January 1699).

(C. F. A.)

Naval Operations

The naval side of the war waged by the powers of western Europe from 1689 to 1697, to reduce the predominance of King Louis XIV., was not marked by any very conspicuous exhibition of energy or capacity, but it was singularly decisive in its results. At the beginning of the struggle the French fleet kept the sea in face of the united fleets of Great Britain and Holland. It displayed even in 1690 a marked superiority over them. Before the struggle ended it had been fairly driven into port, and though its failure was to a great extent due to the exhaustion of the French finances, yet the inability of the French admirals to make a proper use of their fleets, and the incapacity of the king's ministers to direct the efforts of his naval officers to the most effective aims, were largely responsible for the result.

When the war began in 1689, the British Admiralty was still suffering from the disorders of the reign of King Charles II., which had been only in part corrected during the short reign of James II. The first squadrons were sent out late and in insufficient strength. The Dutch, crushed by the obligation to maintain a great army, found an increasing difficulty in preparing their fleet for action early. Louis XIV., a despotic monarch, with as yet unexhausted resources, had it within his power to strike first. The opportunity offered him was a very tempting one. Ireland was still loyal to King James II., and would therefore have afforded an admirable basis of operations to a French fleet. No serious attempt was made to profit by the advantage thus presented. In March 1689 King James was landed and reinforcements were prepared for him at Brest. A British squadron under the command of Arthur Herbert (afterwards Lord Torrington), sent to intercept them, reached the French port too late, and on returning to the coast of Ireland sighted the convoy off the Old Head of Kinsale on the 10th of May. The French admiral Chateaurenault held on to Bantry Bay, and an indecisive encounter took place on the 11th of May. The troops and stores for King James were successfully landed. Then both admirals, the British and the French, returned home, and neither in that nor in the following year was any serious effort made by the French to gain command of the sea between Ireland and England. On the contrary, a great French fleet entered the Channel, and gained a success over the combined British and Dutch fleets on the 10th of July 1690 (see Beachy Head, Battle of), which was not followed up by vigorous action. In the meantime King William III. passed over to Ireland and won the battle of the Boyne. During the following year, while the cause of King James was being finally ruined in Ireland, the main French fleet was cruising in the Bay of Biscay, principally for the purpose of avoiding battle. During the whole of 1689, 1690 and 1691, British squadrons were active on the Irish coast. One raised the siege of Londonderry in July 1689, and another convoyed the first British forces sent over under the duke of Schomberg. Immediately after Beachy Head in 1690, a part of the Channel fleet carried out an expedition under the earl (afterwards duke) of Marlborough, which took Cork and reduced a large part of the south of the island. In 1691 the French did little more than help to carry away the wreckage of their allies and their own detachments. In 1692 a vigorous but tardy attempt was made to employ their fleet to cover an invasion of England (see La Hogue, Battle of). It ended in defeat, and the allies remained masters of the Channel. The defeat of La Hogue did not do so much harm to the naval power of King Louis as has sometimes been supposed. In the next year, 1693, he was able to strike a severe blow at the Allies. The important Mediterranean trade of Great Britain and Holland, called for convenience the Smyrna convoy, having been delayed during the previous year, anxious measures were taken to see it safe on its road in 1693. But the arrangements of the allied governments and admirals were not good. They made no effort to blockade Brest, nor did they take effective steps to discover whether or not the French fleet had left the port. The convoy was seen beyond the Scilly Isles by the main fleet. But as the French admiral Tourville had left Brest for the Straits of Gibraltar with a powerful force and had been joined by a squadron from Toulon, the whole convoy was scattered or taken by him, in the latter days of June, near Lagos. But though this success was a very fair equivalent for the defeat at La Hogue, it was the last serious effort made by the navy of Louis XIV. in this war. Want of money compelled him to lay his fleet up. The allies were now free to make full use of their own, to harass the French coast, to intercept French commerce, and to co-operate with the armies acting against France. Some of the operations undertaken by them

were more remarkable for the violence of the effort than for the magnitude of the results. The numerous bombardments of French Channel ports, and the attempts to destroy St Malo, the great nursery of the active French privateers, by infernal machines, did little harm. A British attack on Brest in June 1694 was beaten off with heavy loss. The scheme had been betrayed by Jacobite correspondents. Yet the inability of the French king to avert these enterprises showed the weakness of his navy and the limitations of his power. The protection of British and Dutch commerce was never complete, for the French privateers were active to the end. But French commerce was wholly ruined.

It was the misfortune of the allies that their co-operation with armies was largely with the forces of a power so languid and so bankrupt as Spain. Yet the series of operations directed by Russel in the Mediterranean throughout 1694 and 1695 demonstrated the superiority of the allied fleet, and checked the advance of the French in Catalonia. Contemporary with the campaigns in Europe was a long series of cruises against the French in the West Indies, undertaken by the British navy, with more or less help from the Dutch and a little feeble assistance from the Spaniards. They began with the cruise of Captain Lawrence Wright in 1690-1691, and ended with that of Admiral Nevil in 1696-1697. It cannot be said that they attained to any very honourable achievement, or even did much to weaken the French hold on their possessions in the West Indies and North America. Some, and notably the attack made on Quebec by Sir William Phips in 1690, with a force raised in the British colonies, ended in defeat. None of them was so triumphant as the plunder of Cartagena in South America by the Frenchman Pointis, in 1697, at the head of a semi-piratical force. Too often there was absolute misconduct. In the buccaneering and piratical atmosphere of the West Indies, the naval officers of the day, who were still infected with the corruption of the reign of Charles II., and who calculated on distance from home to secure them immunity, sank nearly to the level of pirates and buccaneers. The indifference of the age to the laws of health, and its ignorance of them, caused the ravages of disease to be frightful. In the case of Admiral Nevil's squadron, the admiral himself and all his captains except one, died during the cruise, and the ships were unmanned. Yet it was their own vices which caused these expeditions to fail, and not the strength of the French defence. When the war ended, the navy of King Louis XIV. had disappeared from the sea.

See Burchett, *Memoirs of Transactions at Sea during the War with France, 1688-1697* (London, 1703); Lediard, *Naval History* (London, 1735), particularly valuable for the quotations in his notes. For the West Indian voyages, Tronde, *Batailles navales de la France* (Paris, 1867); De Yonghe, *Geschiedenis van het Nederlandsche Zeewezen* (Haarlem, 1860).

(D. H.)

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1 The name "Grand Alliance" is applied to the coalition against Louis XIV. begun by the League of Augsburg. This coalition not only waged the war dealt with in the present article, but (with only slight modifications and with practically unbroken continuity) the war of the Spanish Succession (*q.v.*) that followed.

2 Louvois died in July 1691.

3 A few days before this the great naval reverse of La Hogue put an end to the projects of invading England hitherto entertained at Versailles.

4 Marsaglia is, if not the first, at any rate, one of the first, instances of a bayonet charge by a long deployed line of infantry.

5 Hussars figured here for the first time in western Europe. A regiment of them had been raised in 1692 from deserters from the Austrian service.

GRAND CANARY (Gran Canaria), an island in the Atlantic Ocean, forming part of the Spanish archipelago of the Canary Islands (*q.v.*). Pop. (1900) 127,471; area 523 sq. m. Grand Canary, the most fertile island of the group, is nearly circular in shape, with a diameter of 24 m. and a circumference of 75 m. The interior is a mass of mountain with ravines radiating to the shore. Its highest peak, Los Pexos, is 6400 ft. Large tracts are covered with native pine (*P. canariensis*). There are several mineral springs on the island. Las Palmas (pop. 44,517), the capital, is described in a separate article. Telde (8978), the second place in the island, stands on a plain, surrounded by palm trees. At Atalaya, a short distance from Las Palmas, the making of earthenware vessels employs some hundreds of people, who inhabit holes made in the tufa.

GRAND CANYON, a profound gorge in the north-west corner of Arizona, in the south-western part of the United States of America, carved in the plateau region by the Colorado river. Of it Captain Dutton says: “Those who have long and carefully studied the Grand Canyon of the Colorado do not hesitate for a moment to pronounce it by far the most sublime of all earthly spectacles”; and this is also the verdict of many who have only viewed it in one or two of its parts.

The Colorado river is made by the junction of two large streams, the Green and Grand, fed by the rains and snows of the Rocky Mountains. It has a length of about 2000 m. and a drainage area of 255,000 sq. m., emptying into the head of the Gulf of California. In its course the Colorado passes through a mountain section; then a plateau section; and finally a desert lowland section which extends to its mouth. It is in the plateau section that the Grand Canyon is situated. Here the surface of the country lies from 5000 to 9000 ft. above sea-level, being a tableland region of buttes and mesas diversified by lava intrusions, flows and cinder cones. The region consists in the main of stratified rocks bodily uplifted in a nearly horizontal position, though profoundly faulted here and there, and with some moderate folding. For a thousand miles the river has cut a series of canyons, bearing different names, which reach their culmination in the Marble Canyon, 66 m. long, and the contiguous Grand Canyon which extends for a distance of 217 m. farther down stream, making a total length of continuous canyon from 2000 to 6000 ft. in depth, for a distance of 283 m., the longest and deepest canyon in the world. This huge gash in the earth is the work of the Colorado river, with accompanying weathering, through long ages; and the river is still engaged in deepening it as it rushes along the canyon bottom.

The higher parts of the enclosing plateau have sufficient rainfall for forests, whose growth is also made possible in part by the cool climate and consequently retarded evaporation; but the less elevated portions have an arid climate, while the climate in the canyon bottom is that of the true desert. Thus the canyon is really in a desert region, as is shown by the fact that only two living streams enter the river for a distance of 500 m. from the Green river to the lower end of the Grand Canyon; and only one, the Kanab Creek, enters the Grand Canyon itself. This, moreover, is dry during most of the year. In spite of this lack of tributaries, a large volume of water flows through the canyon at all seasons of the year, some coming from the scattered tributaries, some from springs, but most from the rains and snows of the distant mountains about the headwaters. Owing to enclosure between steeply rising canyon walls, evaporation is retarded, thus increasing the possibility of the long journey of the water from the mountains to the sea across a vast stretch of arid land.

The river in the canyon varies from a few feet to an unknown depth, and at times of flood has a greatly increased volume. The river varies in width from 50 ft. in some of the narrow Granite Gorges, where it bathes both rock walls, to 500 or 600 ft. in more open places. In the 283 m. of the Marble and Grand Canyons, the river falls 2330 ft., and at one point has a fall of 210 ft. in 10 m. The current velocity varies from 3 to 20 or more miles per hour, being increased in places by low falls and rapids; but there are no high falls below the junction of the Green and Grand.

Besides the canyons of the main river, there are a multitude of lateral canyons occupied by streams at intervals of heavy rain. As Powell says, the region “is a composite of thousands, and tens of thousands of gorges.” There are “thousands of gorges like that below Niagara Falls, and there are a thousand Yosemites.” The largest of all, the Grand Canyon, has an average depth of 4000 ft. and a width of 4½ to 12 m. For a long distance, where crossing the Kaibab plateau, the depth is 6000 ft. For much of the distance there is an inner narrower gorge sunk in the bottom of a broad outer canyon. The narrow gorge is in some places no more than 3500 ft. wide at the top. To illustrate the depth of the Grand Canyon, Powell writes: “Pluck up Mount Washington (6293 ft. high) by the roots to the level of the sea, and drop it head first into the Grand Canyon, and the dam will not force its waters over the wall.”

While there are notable differences in the Grand Canyon from point to point, the main elements are much alike throughout its length and are due to the succession of rock strata revealed in the canyon walls. At the base, for some 800 ft., there is a complex of crystalline rocks of early geological age, consisting of gneiss, schist, slate and other rocks, greatly plicated and traversed by dikes and granite intrusions. This is an ancient mountain mass, which has been greatly denuded. On it rest a series of durable quartzite beds inclined to the

horizontal, forming about 800 ft. more of the lower canyon wall. On this come first 500 ft. of greenish sandstones and then 700 ft. of bedded sandstone and limestone strata, some massive and some thin, which on weathering form a series of alcoves. These beds, like those above, are in nearly horizontal position. Above this comes 1600 ft. of limestone—often a beautiful marble, as in the Marble Canyon, but in the Grand Canyon stained a brilliant red by iron oxide washed from overlying beds. Above this "red wall" are 800 ft. of grey and bright red sandstone beds looking "like vast ribbons of landscape." At the top of the canyon is 1000 ft. of limestone with gypsum and chert, noted for the pinnacles and towers which denudation has developed. It is these different rock beds, with their various colours, and the differences in the effect of weathering upon them, that give the great variety and grandeur to the canyon scenery. There are towers and turrets, pinnacles and alcoves, cliffs, ledges, crags and moderate talus slopes, each with its characteristic colour and form according to the set of strata in which it lies. The main river has cleft the plateau in a huge gash; innumerable side gorges have cut it to right and left; and weathering has etched out the cliffs and crags and helped to paint it in the gaudy colour bands that stretch before the eye. There is grandeur here and weirdness in abundance, but beauty is lacking. Powell puts the case graphically when he writes: "A wall of homogeneous granite like that in the Yosemite is but a naked wall, whether it be 1000 or 5000 ft. high. Hundreds and thousands of feet mean nothing to the eye when they stand in a meaningless front. A mountain covered by pure snow 10,000 ft. high has but little more effect on the imagination than a mountain of snow 1000 ft. high—it is but more of the same thing; but a façade of seven systems of rock has its sublimity multiplied sevenfold."

To the ordinary person most of the Grand Canyon is at present inaccessible, for, as Powell states, "a year scarcely suffices to see it all"; and "it is a region more difficult to traverse than the Alps or the Himalayas." But a part of the canyon is now easily accessible to tourists. A trail leads from the Atchison, Topeka & Santa Fé railway at Flagstaff, Arizona; and a branch line of the railway extends from Williams, Arizona, to a hotel on the very brink of the canyon. The plateau, which in places bears an open forest, mainly of pine, varies in elevation, but is for the most part a series of fairly level terrace tops with steep faces, with mesas and buttes here and there, and, especially near the huge extinct volcano of San Francisco mountain, with much evidence of former volcanic activity, including numerous cinder cones. The traveller comes abruptly to the edge of the canyon, at whose bottom, over a mile below, is seen the silvery thread of water where the muddy torrent rushes along on its never-ceasing task of sawing its way into the depths of the earth. Opposite rise the highly coloured and terraced slopes of the other canyon wall, whose crest is fully 12 m. distant.

Down by the river are the folded rocks of an ancient mountain system, formed before vertebrate life appeared on the earth, then worn to an almost level condition through untold ages of slow denudation. Slowly, then, the mountains sank beneath the level of the sea, and in the Carboniferous Period—about the time of the formation of the coal-beds—sediments began to bury the ancient mountains. This lasted through other untold ages until the Tertiary Period—through much of the Palaeozoic and all of the Mesozoic time—and a total of from 12,000 to 16,000 ft. of sediments were deposited. Since then erosion has been dominant, and the river has eaten its way down to, and into, the deeply buried mountains, opening the strata for us to read, like the pages of a book. In some parts of the plateau region as much as 30,000 ft. of rock have been stripped away, and over an area of 200,000 sq. m. an average of over 6000 ft. has been removed.

The Grand Canyon was probably discovered by G. L. de Cardenas in 1540, but for 329 years the inaccessibility of the region prevented its exploration. Various people visited parts of it or made reports regarding it; and the Ives Expedition of 1858 contains a report upon the canyon written by Prof. J. S. Newberry. But it was not until 1869 that the first real exploration of the Grand Canyon was made. In that year Major J. W. Powell, with five associates (three left the party in the Grand Canyon), made the complete journey by boat from the junction of the Green and Grand rivers to the lower end of the Grand Canyon. This hazardous journey ranks as one of the most daring and remarkable explorations ever undertaken in North America; and Powell's descriptions of the expedition are among the most fascinating accounts of travel relating to the continent. Powell made another expedition in 1871, but did not go the whole length of the canyon. The government survey conducted by Lieut. George M. Wheeler also explored parts of the canyon, and C. E. Dutton carried on extensive studies of the canyon and the contiguous plateau region. In 1890 Robert B. Stanton, with six associates, went through the canyon in boats, making a survey to determine the feasibility of building a railway along its base. Two other parties, one in 1896 (Nat. Galloway and William Richmond) the other in 1897 (George F. Flavell and companion), have made the journey through the canyon. So far as there is record these are the only four

parties that have ever made the complete journey through the Grand Canyon. It has sometimes been said that James White made the passage of the canyon before Powell did; but this story rests upon no real basis.

For accounts of the Grand Canyon of the Colorado see J. W. Powell, *Explorations of the Colorado River of the West and its Tributaries* (Washington, 1875); J. W. Powell, *Canyons of the Colorado* (Meadville, Pa., 1895); F. S. Dellenbaugh, *The Romance of the Colorado River* (New York, 1902); Capt. C. E. Dutton, *Tertiary History of the Grand Canyon District, with Atlas* (Washington, 1882), being Monograph No. 2, U.S. Geological Survey. See also the excellent topographic map of the Grand Canyon prepared by F. E. Matthes and published by the U.S. Geological Survey.

(R. S. T.)

GRAND-DUKE (Fr. *grand-duc*, Ital. *granduca*, Ger. *Grossherzog*), a title borne by princes ranking between king and duke. The dignity was first bestowed in 1567 by Pope Pius V. on Duke Cosimo I. of Florence, his son Francis obtaining the emperor's confirmation in 1576; and the predicate "Royal Highness" was added in 1699. In 1806 Napoleon created his brother-in-law Joachim Murat, grand-duke of Berg, and in the same year the title was assumed by the landgrave of Hesse-Darmstadt, the elector of Baden, and the new ruler of the secularized bishopric of Würzburg (formerly Ferdinand III., grand-duke of Tuscany) on joining the Confederation of the Rhine. At the present time, according to the decision of the Congress of Vienna, the title is borne by the sovereigns of Luxemburg, Saxe-Weimar (grand-duke of Saxony), Mecklenburg-Schwerin, Mecklenburg-Strelitz, and Oldenburg (since 1829), as well as by those of Hesse-Darmstadt and Baden. The emperor of Austria includes among his titles those of grand-duke of Cracow and Tuscany, and the king of Prussia those of grand-duke of the Lower Rhine and Posen. The title is also retained by the dispossessed Habsburg-Lorraine dynasty of Tuscany.

Grand-duke is also the conventional English equivalent of the Russian *velíkiy knyaz*, more properly "grand-prince" (Ger. Grossfürst), at one time the title of the rulers of Russia, who, as the eldest born of the house of Rurik, exercised overlordship over the *udyelniye knyazi* or local princes. On the partition of the inheritance of Rurik, the eldest of each branch assumed the title of grand-prince. Under the domination of the Golden Horde the right to bestow the title *velíkiy knyaz* was reserved by the Tatar Khan, who gave it to the prince of Moskow. In Lithuania this title also symbolized a similar overlordship, and it passed to the kings of Poland on the union of Lithuania with the Polish republic. The style of the emperor of Russia now includes the titles of grand-duke (*velíkiy knyaz*) of Smolensk, Lithuania, Volhynia, Podolia and Finland. Until 1886 this title grand-duke or grand-duchess, with the style "Imperial Highness," was borne by all descendants of the imperial house. It is now confined to the sons and daughters, brothers and sisters, and male grandchildren of the emperor. The other members of the imperial house bear the title of prince (*knyaz*) and princess (*knyaginya*, if married, *knyazhna*, if unmarried) with the style of "Highness." The emperor of Austria, as king of Hungary, also bears this title as "grand-duke" of Transylvania, which was erected into a "grand-princedom" (Grossfürstentum) in 1765 by Maria Theresa.

GRANDEE (Span. *Grande*), a title of honour borne by the highest class of the Spanish nobility. It would appear to have been originally assumed by the most important nobles to distinguish them from the mass of the *ricos hombres*, or great barons of the realm. It was thus, as Selden points out, not a general term denoting a class, but "an additional dignity not only to all dukes, but to some marquesses and condes also" (*Titles of Honor*, ed. 1672, p. 478). It formerly implied certain privileges; notably that of sitting covered in the royal presence. Until the time of Ferdinand and Isabella, when the power of the territorial nobles was broken, the grandees had also certain more important rights, *e.g.* freedom from taxation, immunity from arrest save at the king's express command, and even—in certain cases—the right to renounce their allegiance and make war on the king. Their number and privileges were further restricted by Charles I. (the emperor Charles V.), who reserved to

the crown the right to bestow the title. The grandees of Spain were further divided into three classes: (1) those who spoke to the king and received his reply with their heads covered; (2) those who addressed him uncovered, but put on their hats to hear his answer; (3) those who awaited the permission of the king before covering themselves. All grandees were addressed by the king as “my cousin” (*mi primo*), whereas ordinary nobles were only qualified as “my kinsman” (*mi pariente*). The title of “grandee,” abolished under King Joseph Bonaparte, was revived in 1834, when by the *Estatudo real* grandees were given precedence in the Chamber of Peers. The designation is now, however, purely titular, and implies neither privilege nor power.

GRAND FORKS, a city in the Boundary district of British Columbia; situated at the junction of the north and south forks of the Kettle river, 2 m. N. of the international boundary. Pop. (1908) about 2500. It is in a good agricultural district, but owes its importance largely to the erection here of the extensive smelting plant of the Granby Consolidated Company, which smelts the ores obtained from the various parts of the Boundary country, but chiefly those from the Knob Hill and Old Ironsides mines. The Canadian Pacific railway, as well as the Great Northern railway, runs to Grand Forks, which thus has excellent railway communication with the south and east.

GRAND FORKS, a city and the county-seat of Grand Forks county, North Dakota, U.S.A., at the junction of the Red river (of the North) and Red Lake river (whence its name), about 80 m. N. of Fargo. Pop. (1900) 7652, of whom 2781 were foreign-born; (1905) 10,127; (1910) 27,888. It is served by the Northern Pacific and the Great Northern railways, and has a considerable river traffic, the Red river (when dredged) having a channel 60 ft. wide and 4 ft. deep at low water below Grand Forks. At University, a small suburb, is the University of North Dakota (co-educational; opened 1884). Affiliated with it is Wesley College (Methodist Episcopal), now at Grand Forks (with a campus adjoining that of the University), but formerly the Red River Valley University at Wahpeton, North Dakota. In 1907-1908 the University had 57 instructors and 861 students; its library had 25,000 bound volumes and 5000 pamphlets. At Grand Forks, also, are St Bernard’s Ursuline Academy (Roman Catholic) and Grand Forks College (Lutheran). Among the city’s principal buildings are the public library, the Federal building and a Y.M.C.A. building. As the centre of the great wheat valley of the Red river, it has a busy trade in wheat, flour and agricultural machinery and implements, as well as large jobbing interests. There are railway car-shops here, and among the manufactures are crackers, brooms, bricks and tiles and cement. The municipality owns its water-works and an electric lighting plant for street lighting. In 1801 John Cameron (d. 1804) erected a temporary trading post for the North-West Fur Company on the site of the present city; it afterwards became a trading post of the Hudson’s Bay Company. The first permanent settlement was made in 1871, and Grand Forks was reached by the Northern Pacific and chartered as a city in 1881.

GRAND HAVEN, a city, port of entry, and the county-seat of Ottawa county, Michigan, U.S.A., on Lake Michigan, at the mouth of Grand river, 30 m. W. by N. of Grand Rapids and 78 m. E. of Milwaukee. Pop. (1900) 4743, of whom 1277 were foreign-born; (1904) 5239; (1910) 5856. It is served by the Grand Trunk and the Père Marquette railways, and by steamboat lines to Chicago, Milwaukee and other lake ports, and is connected with Grand Rapids and Muskegon by an electric line. The city manufactures pianos, refrigerators, printing presses and leather; is a centre for the shipment of fruit and celery; and has valuable fisheries near—fresh, salt and smoked fish, especially whitefish, are shipped in

considerable quantities. Grand Haven is the port of entry for the Customs District of Michigan, and has a small export and import trade. The municipality owns and operates its water-works and electric-lighting plant. A trading post was established here about 1821 by an agent of the American Fur Company, but the permanent settlement of the city did not begin until 1834. Grand Haven was laid out as a town in 1836, and was chartered as a city in 1867.

GRANDIER, URBAN (1590-1634), priest of the church of Sainte Croix at Loudun in the department of Vienne, France, was accused of witchcraft in 1632 by some hysterical novices of the Carmelite Convent, where the trial, protracted for two years, was held. Grandier was found guilty and burnt alive at Loudun on the 18th of August 1634.

GRAND ISLAND, a city and the county-seat of Hall county, Nebraska, U.S.A., on the Platte river, about 154 m. W. by S. of Omaha. Pop. (1900) 7554 (1339 foreign-born); (1910) 10,326. It is served by the Union Pacific, the Chicago, Burlington & Quincy, and the St Joseph & Grand Island railways, being the western terminus of the last-named line and a southern terminus of a branch of the Union Pacific. The city is situated on a slope skirting the broad, level bottom-lands of the Platte river, in the midst of a fertile farming region. Grand Island College (Baptist; co-educational) was established in 1892 and the Grand Island Business and Normal College in 1890; and the city is the seat of a state Sailors' and Soldiers' Home, established in 1888. Grand Island has a large wholesale trade in groceries, fruits, &c.; is an important horse-market, and has large stock-yards. There are shops of the Union Pacific in the city, and among its manufactures are beet-sugar—Grand Island is in one of the principal beet-sugar-growing districts of the state—brooms, wire fences, confectionery and canned corn. The most important industry of the county is the raising and feeding of sheep and meat cattle. A "Grand Island" was founded in 1857, and was named from a large island (nearly 50 m. long) in the Platte opposite its site; but the present city was laid out by the Union Pacific in 1866. It was chartered as a city in 1873.

GRANDMONTINES, a religious order founded by St Stephen of Thiers in Auvergne towards the end of the 11th century. St Stephen was so impressed by the lives of the hermits whom he saw in Calabria that he desired to introduce the same manner of life into his native country. He was ordained, and in 1073 obtained the pope's permission to establish an order. He betook himself to Auvergne, and in the desert of Muret, near Limoges, he made himself a hut of branches of trees and lived there for some time in complete solitude. A few disciples gathered round him, and a community was formed. The rule was not reduced to writing until after Stephen's death, 1124. The life was eremitical and very severe in regard to silence, diet and bodily austerities; it was modelled after the rule of the Camaldolese, but various regulations were adopted from the Augustinian canons. The superior was called the "Corrector." About 1150 the hermits, being compelled to leave Muret, settled in the neighbouring desert of Grandmont, whence the order derived its name. Louis VII. founded a house at Vincennes near Paris, and the order had a great vogue in France, as many as sixty houses being established by 1170, but it seems never to have found favour out of France; it had, however, a couple of cells in England up to the middle of the 15th century. The system of lay brothers was introduced on a large scale, and the management of the temporals was in great measure left in their hands; the arrangement did not work well, and the quarrels between the lay brothers and the choir monks were a constant source of weakness. Later centuries witnessed mitigations and reforms in the life, and at last the order came to an end just before the French Revolution. There were two or three convents of Grandmontine nuns.

The order played no great part in history.

See Helyot, *Hist. des ordres religieux* (1714), vii. cc. 54, 55; Max Heimbucher, *Orden und Kongregationen* (1896). i. § 31; and the art. in Wetzer and Welte, *Kirchenlexicon* (ed. 2), and in Herzog, *Realencyklopädie* (ed. 3).

(E. C. B.)

GRAND RAPIDS, a city and the county-seat of Kent county, Michigan, U.S.A., at the head of navigation on the Grand river, about 30 m. from Lake Michigan and 145 m. W.N.W. of Detroit. Pop. (1890) 60,278; (1900) 87,565, of whom 23,896 were foreign-born and 604 were negroes; (1910 census) 112,571. Of the foreign-born population in 1900, 11,137 were Hollanders; 3318 English-Canadians; 3253 Germans; 1137 Irish; 1060 from German Poland; and 1026 from England. Grand Rapids is served by the Michigan Central, the Lake Shore & Michigan Southern, the Grand Trunk, the Père Marquette and the Grand Rapids & Indiana railways, and by electric interurban railways. The valley here is about 2 m. wide, with a range of hills on either side, and about midway between these hills the river flows over a limestone bed, falling about 18 ft. in 1 m. Factories and mills line both banks, but the business blocks are nearly all along the foot of the E. range of hills; the finest residences command picturesque views from the hills farther back, the residences on the W. side being less pretentious and standing on bottom-lands. The principal business thoroughfares are Canal, Monroe and Division streets. Among the important buildings are the United States Government building (Grand Rapids is the seat of the southern division of the Federal judicial district of western Michigan), the County Court house, the city hall, the public library (presented by Martin A. Ryerson of Chicago), the Manufacturer’s building, the *Evening Press* building, the Michigan Trust building and several handsome churches. The principal charitable institutions are the municipal Tuberculosis Sanatorium; the city hospital; the Union Benevolent Association, which maintains a home and hospital for the indigent, together with a training school for nurses; Saint John’s orphan asylum (under the superintendence of the Dominican Sisters); Saint Mary’s hospital (in charge of the Sisters of Mercy); Butterworth hospital (with a training school for nurses); the Woman’s Home and Hospital, maintained largely by the Woman’s Christian Temperance Union; the Aldrich Memorial Deaconess’ Home; the D. A. Blodgett Memorial Children’s Home, and the Michigan Masonic Home. About 1 m. N. of the city, overlooking the river, is the Michigan Soldiers’ Home, with accommodation for 500. On the E. limits of the city is Reed’s Lake, a popular resort during the summer season. The city is the see of Roman Catholic and Protestant Episcopal bishops. In 1907-1908, through the efforts of a committee of the Board of Trade, interest was aroused in the improvement of the city, appropriations were made for a “city plan,” and flood walls were completed for the protection of the lower parts of the city from inundation. The large quantities of fruit, cereals and vegetables from the surrounding country, and ample facilities for transportation by rail and by the river, which is navigable from below the rapids to its mouth, make the commerce and trade of Grand Rapids very important. The manufacturing interests are greatly promoted by the fine water-power, and as a furniture centre the city has a world-wide reputation—the value of the furniture manufactured within its limits in 1904 amounted to $9,409,097, about 5.5% of the value of all furniture manufactured in the United States. Grand Rapids manufactures carpet sweepers—a large proportion of the whole world’s product,—flour and grist mill products, foundry and machine-shop products, planing-mill products, school seats, wood-working tools, fly paper, calcined plaster, barrels, kegs, carriages, wagons, agricultural implements and bricks and tile. The total factory product in 1904 was valued at $31,032,589, an increase of 39.6% in four years.

On the site of Grand Rapids there was for a long time a large Ottawa Indian village, and for the conversion of the Indians a Baptist mission was established in 1824. Two years later a trading post joined the mission, in 1833 a saw mill was built, and for the next few years the growth was rapid. The settlement was organized as a town in 1834, was incorporated as a village in 1838, and was chartered as a city in 1850, the city charter being revised in 1857, 1871, 1877 and 1905.

GRAND RAPIDS, a city and the county-seat of Wood county, Wisconsin, U.S.A., on both sides of the Wisconsin river, about 137 m. N.W. of Milwaukee. Pop. (1900) 4493, of whom 1073 were foreign-born; (1905) 6157; (1910) 6521. It is served by the Minneapolis, St Paul & Sault Ste Marie, the Green Bay & Western, the Chicago & North-Western, and the Chicago, Milwaukee & St Paul railways. It is a railway and distributing centre, and has manufactories of lumber, sash, doors and blinds, hubs and spokes, woodenware, paper, wood-pulp, furniture and flour. The public buildings include a post office, court house, city hall, city hospital and the T. B. Scott Free Public Library (1892). The city owns and operates its water-works; the electric-lighting and telephone companies are co-operative. Grand Rapids was first chartered as a city in 1869. That part of Grand Rapids on the west bank of the Wisconsin river was formerly the city of Centralia (pop. in 1890, 1435); it was annexed in 1900.

GRANDSON (Ger. *Grandsee*), a town in the Swiss canton of Vaud, near the south-western end of the Lake of Neuchâtel, and by rail 20 m. S.W. of Neuchâtel and 3 m. N. of Yverdon. Its population in 1900 was 1771, mainly French-speaking and Protestant. Its ancient castle was long the home of a noted race of barons, while in the very old church (once belonging to a Benedictine monastery) there are a number of Roman columns, &c., from Avenches and Yverdon. It has now a tobacco factory. Its lords were vassals of the house of Savoy, till in 1475 the castle was taken by the Swiss at the beginning of their war with Charles the Bold, duke of Burgundy, whose ally was the duchess of Savoy. It was retaken by Charles in February 1476, and the garrison put to death. The Swiss hastened to revenge this deed, and in a famous battle (2nd March 1476) defeated Charles with great loss, capturing much booty. The scene of the battle was between Concise and Corcelles, north-east of the town, and is marked by several columns, perhaps ancient menhirs. Grandson was thenceforward till 1798 ruled in common by Berne and Fribourg, and then was given to the canton du Léman, which in 1803 became that of Vaud.

See F. Chabloz, *La Bataille de Grandson* (Lausanne, 1897).

GRANET, FRANÇOIS MARIUS (1777-1849), French painter, was born at Aix in Provence, on the 17th of December 1777; his father was a small builder. The boy’s strong desires led his parents to place him—after some preliminary teaching from a passing Italian artist—in a free school of art directed by M. Constantin, a landscape painter of some reputation. In 1793 Granet followed the volunteers of Aix to the siege of Toulon, at the close of which he obtained employment as a decorator in the arsenal. Whilst a lad he had, at Aix, made the acquaintance of the young comte de Forbin, and upon his invitation Granet, in the year 1797, went to Paris. De Forbin was one of the pupils of David, and Granet entered the same studio. Later he got possession of a cell in the convent of Capuchins, which, having served for a manufactory of assignats during the Revolution, was afterwards inhabited almost exclusively by artists. In the changing lights and shadows of the corridors of the Capuchins, Granet found the materials for that one picture to the painting of which, with varying success, he devoted his life. In 1802 he left Paris for Rome, where he remained until 1819, when he returned to Paris, bringing with him besides various other works one of fourteen repetitions of his celebrated Chœur des Capucins, executed in 1811. The figures of the monks celebrating mass are taken in this subject as a substantive part of the architectural effect, and this is the case with all Granet’s works, even with those in which the figure subject would seem to assert its importance, and its historical or romantic interest. “Stella painting a Madonna on his Prison Wall,” 1810 (Leuchtenberg collection); “Sodoma à l’hôpital,” 1815 (Louvre); “Basilique basse de St François d’Assise,” 1823 (Louvre); “Rachat de prisonniers,” 1831 (Louvre); “Mort de Poussin,” 1834 (Villa Demidoff, Florence), are among his principal works; all are marked by the same peculiarities, everything is sacrificed to tone. In 1819 Louis Philippe decorated Granet, and afterwards named him Chevalier de l’Ordre St Michel, and Conservateur des tableaux de Versailles (1826). He became member of the institute in 1830; but in spite of these honours, and the ties which bound him to M. de

Forbin, then director of the Louvre, Granet constantly returned to Rome. After 1848 he retired to Aix, immediately lost his wife, and died himself on the 21st of November 1849. He bequeathed to his native town the greater part of his fortune and all his collections, now exhibited in the Musée, together with a very fine portrait of the donor painted by Ingres in 1811.

GRANGE (through the A.-Fr. *graunge*, from the Med. Lat. *granea*, a place for storing grain, *granum*), properly a granary or barn. In the middle ages a "grange" was a detached portion of a manor with farm-houses and barns belonging to a lord or to a religious house; in it the crops could be conveniently stored for the purpose of collecting rent or tithe. Thus, such barns are often known as "tithe-barns." In many cases a chapel was included among the buildings or stood apart as a separate edifice. The word is still used as a name for a superior kind of farm-house, or for a country-house which has farm-buildings and agricultural land attached to it.

Architecturally considered, the "grange" was usually a long building with high wooden roof, sometimes divided by posts or columns into a sort of nave and aisles, and with walls strongly buttressed. Sometimes these granges were of very great extent; one at St Leonards, Hampshire, was originally 225 ft. long by 75 ft. wide, and a still larger one (303 ft. long) existed at Chertsey. Ancient granges, or tithe-barns, still exist at Glastonbury, Bradford-on-Avon, St Mary's Abbey, York, and at Coxwold. A fine example at Peterborough was pulled down at the end of the 19th century. In France there are many examples in stone of the 12th, 13th and 14th centuries; some divided into a central and two side aisles by arcades in stone. Externally granges are noticeable on account of their great roofs and the slight elevation of the eaves, from 8 to 10 ft. only in height. In the 15th century they were sometimes protected by moats and towers. At Ardennes in Normandy, where the grange was 154 ft. long; Vauclerc near Laon, Picardy, 246 ft. long and in two storeys; at Perrières, St Vigor, near Bayeux, and Ouilly near Falaise, all in Normandy; and at St Martin-au-Bois (Oise) are a series of fine examples. Attached to the abbey of Longchamps, near Paris, is one of the best-preserved granges in France, with walls in stone and internally divided into three aisles in oak timber of extremely fine construction.

In the social economic movement in the United States of America, which began in 1867 and was known as the "Farmers' Movement," "grange" was adopted as the name for a local chapter of the Order of the Patrons of Husbandry, and the movement is thus often known as the "Grangers' Movement" (see Farmers' Movement). There are a National Grange at Washington, supervising the local divisions, and state granges in most states.

GRANGEMOUTH, a police burgh and seaport of Stirlingshire, Scotland. Pop. (1901) 8386. It is situated on the south shore of the estuary of the Forth, at the mouth of the Carron and also of Grange Burn, a right-hand tributary of the Carron, 3 m. N.E. of Falkirk by the North British and Caledonian railways. It is the terminus of the Forth and Clyde Canal, from the opening of which (1789) its history may be dated. The principal buildings are the town hall (in the Greek style), public hall, public institute and free library, and there is a public park presented by the marquess of Zetland. Since 1810, when it became a head port, it has gradually attained the position of the chief port of the Forth west of Leith. The first dock (opened in 1846), the second (1859) and the third (1882) cover an area of 28 acres, with timber ponds of 44 acres and a total quayage of 2500 yards. New docks, 93 acres in extent, with an entrance from the firth, were opened in 1905 at a cost of more than £1,000,000. The works rendered it necessary to divert the influx of the Grange from the Carron to the Forth. Timber, pig-iron and iron ore are the leading imports, and coal, produce and iron the chief exports. The industries include shipbuilding, rope and sail making and iron founding. There is regular steamer communication with London, Christiania, Hamburg, Rotterdam and Amsterdam. Experiments in steam navigation were carried out in 1802 with the "Charlotte Dundas" on the Forth and Clyde Canal at Grangemouth. Kersa House adjoining the town on

the S.W. is a seat of the marquess of Zetland.

GRANGER, JAMES (1723-1776), English clergyman and print-collector, was born in Dorset in 1723. He went to Oxford, and then entered holy orders, becoming vicar of Shiplake; but apart from his hobby of portrait-collecting, which resulted in the principal work associated with his name, and the publication of some sermons, his life was uneventful. Yet a new word was added to the language—"to grangerize"—on account of him. In 1769 he published in two quarto volumes a *Biographical History of England* "consisting of characters dispersed in different classes, and adapted to a methodical catalogue of engraved British heads"; this was "intended as an essay towards reducing our biography to a system, and a help to the knowledge of portraits." The work was supplemented in later editions by Granger, and still further editions were brought out by the Rev. Mark Noble, with additions from Granger's materials. Blank leaves were left for the filling in of engraved portraits for extra illustration of the text, and it became a favourite pursuit to discover such illustrations and insert them in a *Granger*, so that "grangerizing" became a term for such an extra-illustration of any work, especially with cuts taken from other books. The immediate result of the appearance of Granger's own work was the rise in value of books containing portraits, which were cut out and inserted in collector's copies.

GRANITE (adapted from the Ital. *granito*, grained; Lat. *granum*, grain), the group designation for a family of igneous rocks whose essential characteristics are that they are of acid composition (containing high percentages of silica), consist principally of quartz and felspar, with some mica, hornblende or augite, and are of holocrystalline or "granitoid" structure. In popular usage the term is given to almost any crystalline rock which resembles granite in appearance or properties. Thus syenites, diorites, gabbros, diabases, porphyries, gneiss, and even limestones and dolomites, are bought and sold daily as "granites." True granites are common rocks, especially among the older strata of the earth's crust. They have great variety in colour and general appearance, some being white or grey, while others are pink, greenish or yellow: this depends mainly on the state of preservation of their felspars, which are their most abundant minerals, and partly also on the relative proportion in which they contain biotite and other dark coloured silicates. Many granites have large rounded or angular crystals of felspar (Shap granite, many Cornish granites), well seen on polished faces. Others show an elementary foliation or banding (*e.g.* Aberdeen granite). Rounded or oval dark patches frequently appear in the granitic matrix of many Cornish rocks of this group.

In the field granite usually occurs in great masses, covering wide areas. These are generally elliptical or nearly circular and may be 20 m. in diameter or more. In the same district separate areas or "bosses" of granite may be found, all having much in common in their mineralogical and structural features, and such groups have probably all proceeded from the same focus or deep-seated source. Towards their margins these granite outcrops often show modifications by which they pass into diorite or syenite, &c.; they may also be finer grained (like porphyries) or rich in tourmaline, or intersected by many veins of pegmatite. From the main granite dikes or veins often run out into the surrounding rocks, thus proving that the granite is intrusive and has forced its way upwards by splitting apart the strata among which it lies. Further evidence of this is afforded by the alteration which the granite has produced through a zone which varies from a few yards to a mile or more in breadth around it. In the vicinity of intrusive granites slates become converted into hornfelses containing biotite, chiastolite or andalusite, sillimanite and a variety of other minerals; limestones recrystallize as marbles, and all rocks, according to their composition, are more or less profoundly modified in such a way as to prove that they have been raised to a high temperature by proximity to the molten intrusive mass. Where exposed in cliffs and other natural sections many granites have a rudely columnar appearance. Others weather into large cuboidal blocks which may produce structures resembling cyclopean masonry. The tors of the west of England are of this nature. These differences depend on the disposition of

the joint cracks which traverse the rock and are opened up by the action of frost and weathering.

The majority of granites are so coarse in grain that their principal component minerals may be identified in the hand specimens by the unaided eye. The felspar is pearly, white or pink, with smooth cleaved surfaces; the quartz is usually transparent, glassy with rough irregular fractures; the micas appear as shining black or white flakes. Very coarse granites are called pegmatite or giant granite, while very fine granites are known as microgranites (though the latter term has also been applied to certain porphyries). Many granites show pearly scales of white mica; others contain dark green or black hornblende in small prisms. Reddish grains of sphene or of garnet are occasionally visible. In the tourmaline granites prisms of black schorl occur either singly or in stellate groups. The parallel banded structures of many granites, which may be original or due to crushing, connect these rocks with the granite gneisses or orthogneisses.

Under the microscope the felspar is mainly orthoclase with perthite or microcline, while a small amount of plagioclase (ranging from oligoclase to albite) is practically never absent. These minerals are often clouded by a deposit of fine mica and kaolin, due to weathering. The quartz is transparent, irregular in form, destitute of cleavage, and is filled with very small cavities which contain a fluid, a mobile bubble and sometimes a minute crystal. The micas, brown and white, are often in parallel growth. The hornblende of granites is usually pale green in section, the augite and enstatite nearly colourless. Tourmaline may be brown, yellow or blue, and often the same crystal shows zones of different colours. Apatite, zircon and iron oxides, in small crystals, are always present. Among the less common accessories may be mentioned pinkish garnets; andalusite in small pleochroic crystals; colourless grains of topaz; six-sided compound crystals of cordierite, which weather to dark green pinite; blue-black hornblende (riebeckite), beryl, tinstone, orthite and pyrites.

The sequence of crystallization in the granites is of a normal type, and may be ascertained by observing the perfection with which the different minerals have crystallized and the order in which they enclose one another. Zircon, apatite and iron oxides are the first; their crystals are small, very perfect and nearly free from enclosures; they are followed by hornblende and biotite; if muscovite is present it succeeds the brown mica. Of the felspars the plagioclase separates first and forms well-shaped crystals of which the central parts may be more basic than the outer zones. Last come orthoclase, quartz, microcline and micropegmatite, which fill up the irregular spaces left between the earlier minerals. Exceptions to this sequence are unusual; sometimes the first of the felspars have preceded the hornblende or biotite which may envelop them in ophitic manner. An earlier generation of felspar, and occasionally also of quartz, may be represented by large and perfect crystals of these minerals giving the rock a porphyritic character.

Many granites have suffered modification by the action of vapours emitted during cooling. Hydrofluoric and boric emanations exert a profound influence on granitic rocks; their felspar is resolved into aggregates of kaolin, muscovite and quartz; tourmaline appears, largely replacing the brown mica; topaz also is not uncommon. In this way the rotten granite or china stone, used in pottery, originates; and over considerable areas kaolin replaces the felspar and forms valuable sources of china clay. Veins of quartz, tourmaline and chlorite may traverse the granite, containing tinstone often in workable quantities. These veins are the principal sources of tin in Cornwall, but the same changes may appear in the body of the granite without being restricted to veins, and tinstone occurs also as an original constituent of some granite pegmatites.

Granites may also be modified by crushing. Their crystals tend to lose their original forms and to break into mosaics of interlocking grains. The latter structure is very well seen in the quartz, which is a brittle mineral under stress. White mica develops in the felspars. The larger crystals are converted into lenticular or elliptical “augen,” which may be shattered throughout or may have a peripheral seam of small detached granules surrounding a still undisintegrated core. Streaks of “granulitic” or pulverized material wind irregularly through the rock, giving it a roughly foliated character.

The interesting structural variation of granite in which there are spheroidal masses surrounded by a granitic matrix is known as “orbicular granite.” The spheroids range from a fraction of an inch to a foot in diameter, and may have a felspar crystal at the centre. Around this there may be several zones, alternately lighter and darker in colour, consisting of the essential minerals of the rock in different proportions. Radiate arrangement is sometimes visible in the crystals of the whole or part of the spheroid. Spheroidal granites of this sort are found in Sweden, Finland, Ireland, &c. In other cases the spheroids are simply dark

rounded lumps of biotite, in fine scales. These are probably due to the adhesion of the biotite crystals to one another as they separated from the rock magma at an early stage in its crystallization. The Rapakiwi granites of Finland have many round or ovoidal felspar crystals scattered through a granitic matrix. These larger felspars have no crystalline outlines and consist of orthoclase or microcline surrounded by borders of white oligoclase. Often they enclose dark crystals of biotite and hornblende, arranged zonally. Many of these granites contain tourmaline, fluorite and monazite. In most granite masses, especially near their contacts with the surrounding rocks, it is common to find enclosures of altered sedimentary or igneous materials which are more or less dissolved and permeated by the granitic magma.

The chemical composition of a few granites from different parts of the world is given below:—

	SiO_2.	Al_2O_3.	Fe_2O_3.	FeO.	MgO.	CaO.	Na_2O.	K_2O.
I.	74.69	16.21	..	1.16	0.48	0.28	1.18	3.64
II.	71.33	11.18	3.96	1.45	0.88	2.10	3.51	3.49
III.	72.93	13.87	1.94	0.79	0.51	0.74	3.68	3.74
IV.	76.12	12.18	1.21	0.72	1.12	1.54	2.55	3.21
V.	73.90	13.65	0.28	0.42	0.14	0.23	2.53	7.99
VI.	68.87	16.62	0.43	2.72	1.60	0.71	1.80	6.48

I. Carn Brea, Cornwall (Phillips); II. Mazaruni, Brit. Guiana (Harrison); III. Rödö, near Alnö, Vesternorrland, Sweden (Holmquist); IV. Abruzzen, a group of hills in the Riesengebirge (Milch); V. Pikes Peak, Colorado (Matthews); VI. Wilson’s Creek, near Omeo, Victoria (Howitt).

Only the most important components are shown in the table, but all granites contain also small amounts of zirconia, titanium oxide, phosphoric acid, sulphur, oxides of barium, strontium, manganese and water. These are in all cases less than 1%, and usually much less than this, except the water, which may be 2 or 3% in weathered rocks. From the chemical composition it may be computed that granites contain, on an average, 35 to 55% of quartz, 20 to 30% of orthoclase, 20 to 30% of plagioclase felspar (including the albite of microperthite) and 5 to 10% of ferromagnesian silicates and minor accessories such as apatite, zircon, sphene and iron oxides. The aplites, pegmatites, graphic granites and muscovite granites are usually richest in silica, while with increase of biotite and hornblende, augite and enstatite the analyses show the presence of more magnesia, iron and lime.

In the weathering of granite the quartz suffers little change; the felspar passes into dull cloudy, soft aggregates of kaolin, muscovite and secondary quartz, while chlorite, quartz and calcite replace the biotite, hornblende and augite. The rock often assumes a rusty brown colour from the liberation of the oxides of iron, and the decomposed mass is friable and can easily be dug with a spade; where the granite has been cut by joint planes not too close together weathering proceeds from their surfaces and large rounded blocks may be left embedded in rotted materials. The amount of water in the rock increases and part of the alkalis is carried away in solution; they form valuable sources of mineral food to plants. The chemical changes are shown by the following analyses:

	H_2O.	SiO_2.	TiO_2.	Al_2O_3.	FeO.	Fe_2O_3.	CaO.	MgO.	Na_2O.	K_2O.	P_2O_5.
I.	1.22	69.33	n.d.	14.33	3.60	..	3.21	2.44	2.70	2.67	0.10
II.	3.27	66.82	n.d.	15.62	1.69	1.88	3.13	2.76	2.58	2.44	n.d.
III.	4.70	65.69	0.31	15.23	..	4.39	2.63	2.64	2.12	2.00	0.06

Analyses of I., fresh grey granite; II. brown moderately firm granite; III. residual sand, produced by the weathering of the same mass (anal. G. P. Merrill).

The differences are surprisingly small and are principally an increase in the water and a diminution in the amount of alkalis and lime together with the oxidation of the ferrous oxide.

(J. S. F.)

GRAN SASSO D’ITALIA (“Great Rock of Italy”), a mountain of the Abruzzi, Italy, the culminating point of the Apennines, 9560 ft. in height. In formation it resembles the

limestone Alps of Tirol and there are on its elevated plateaus a number of *doline* or funnel-shaped depressions into which the melted snow and the rain sink. The summit is covered with snow for the greater part of the year. Seen from the Adriatic, Monte Corno, as it is sometimes called, from its resemblance to a horn, affords a magnificent spectacle; the Alpine region beneath its summit is still the home of the wild boar, and here and there are dense woods of beech and pine. The group has numerous other lofty peaks, of which the chief are the Pizzo d'Intermesole (8680 ft.), the Corno Piccolo (8650 ft.), the Pizzo Cefalone (8307 ft.) and the Monte della Portella (7835 ft.). The most convenient starting-point for the ascent is Assergi, 10 m. N.E. of Aquila, at the S. foot of the Gran Sasso. The Italian Alpine Club has erected a hut S.W. of the principal summit, and has published a special guidebook (E. Abbate, *Guida al Gran Sasso d' Italia*, Rome, 1888). The view from the summit extends to the Tyrrhenian Sea on the west and the mountains of Dalmatia on the east in clear weather. The ascent was first made in 1794 by Orazio Delfico from the Teramo side. In Assergi is the interesting church of Sta. Maria Assunta, dating from 1150, with later alterations (see Gavini, in *L' Arte*, 1901, 316, 391).

GRANT, SIR ALEXANDER, 8th Bart. (1826-1884), British scholar and educationalist, was born in New York on the 13th of September 1826. After a childhood spent in the West Indies, he was educated at Harrow and Oxford. He entered Oxford as scholar of Balliol, and subsequently held a fellowship at Oriel from 1849 to 1860. He made a special study of the Aristotelian philosophy, and in 1857 published an edition of the *Ethics* (4th ed. 1885) which became a standard text-book at Oxford. In 1855 he was one of the examiners for the Indian Civil Service, and in 1856 a public examiner in classics at Oxford. In the latter year he succeeded to the baronetcy. In 1859 he went to Madras with Sir Charles Trevelyan, and was appointed inspector of schools; the next year he removed to Bombay, to fill the post of Professor of History and Political Economy in the Elphinstone College. Of this he became Principal in 1862; and, a year later, vice-chancellor of Bombay University, a post he held from 1863 to 1865 and again from 1865 to 1868. In 1865 he took upon himself also the duties of Director of Public Instruction for Bombay Presidency. In 1868 he was appointed a member of the Legislative Council. In the same year, upon the death of Sir David Brewster, he was appointed Principal of Edinburgh University, which had conferred an honorary LL.D. degree upon him in 1865. From that time till his death (which occurred in Edinburgh on the 30th of November 1884) his energies were entirely devoted to the well-being of the University. The institution of the medical school in the University was almost solely due to his initiative; and the Tercentenary Festival, celebrated in 1884, was the result of his wisely directed enthusiasm. In that year he published *The Story of the University of Edinburgh during its First Three Hundred Years*. He was created Hon. D.C.L. of Oxford in 1880, and an honorary fellow of Oriel College in 1882.

GRANT, ANNE (1755-1838), Scottish writer, generally known as Mrs Grant of Laggan, was born in Glasgow, on the 21st of February 1755. Her childhood was spent in America, her father, Duncan MacVicar, being an army officer on service there. In 1768 the family returned to Scotland, and in 1779 Anne married James Grant, an army chaplain, who was also minister of the parish of Laggan, near Fort Augustus, Inverness, where her father was barrack-master. On her husband's death in 1801 she was left with a large family and a small income. In 1802 she published by subscription a volume of *Original Poems, with some Translations from the Gaelic*, which was favourably received. In 1806 her *Letters from the Mountains*, with their spirited description of Highland scenery and legends, awakened much interest. Her other works are *Memoirs of an American Lady, with Sketches of Manners and Scenery in America as they existed previous to the Revolution* (1808), containing reminiscences of her childhood; *Essays on the Superstitions of the Highlanders of Scotland* (1811); and *Eighteen Hundred and Thirteen, a Poem* (1814). In 1810 she went to live in Edinburgh. For the last twelve years of her life she received a pension from government. She died on the 7th of November 1838.

See *Memoir and Correspondence of Mrs Grant of Laggan, edited by her son J. P. Grant* (3 vols., 1844).

GRANT, CHARLES (1746-1823), British politician, was born at Aldourie, Inverness-shire, on the 16th of April 1746, the day on which his father, Alexander Grant, was killed whilst fighting for the Jacobites at Culloden. When a young man Charles went to India, where he became secretary, and later a member of the board of trade. He returned to Scotland in 1790, and in 1802 was elected to parliament as member for the county of Inverness. In the House of Commons his chief interests were in Indian affairs, and he was especially vigorous in his hostility to the policy of the Marquess Wellesley. In 1805 he was chosen chairman of the directors of the East India Company and he retired from parliament in 1818. A friend of William Wilberforce, Grant was a prominent member of the evangelical party in the Church of England; he was a generous supporter of the church's missionary undertakings. He was largely responsible for the establishment of the East India college, which was afterwards erected at Haileybury. He died in London on the 31st of October 1823. His eldest son, Charles, was created a peer in 1835 as Baron Glenelg.

See Henry Morris, *Life of Charles Grant* (1904).

GRANT, SIR FRANCIS (1803-1878), English portrait-painter, fourth son of Francis Grant of Kilgraston, Perthshire, was born at Edinburgh in 1803. He was educated for the bar, but at the age of twenty-four he began at Edinburgh systematically to study the practice of art. On completing a course of instruction he removed to London, and as early as 1843 exhibited at the Royal Academy. At the beginning of his career he utilized his sporting experiences by painting groups of huntsmen, horses and hounds, such as the "Meet of H.M. Staghounds" and the "Melton Hunt"; but his position in society gradually made him a fashionable portrait-painter. In drapery he had the taste of a connoisseur, and rendered the minutest details of costume with felicitous accuracy. In female portraiture he achieved considerable success, although rather in depicting the high-born graces and external characteristics than the true personality. Among his portraits of this class may be mentioned Lady Glenlyon, the marchioness of Waterford, Lady Rodney and Mrs Beauclerk. In his portraits of generals and sportsmen he proved himself more equal to his subjects than in those of statesmen and men of letters. He painted many of the principal celebrities of the time, including Scott, Macaulay, Lockhart, Disraeli, Hardinge, Gough, Derby, Palmerston and Russell, his brother Sir J. Hope Grant and his friend Sir Edwin Landseer. From the first his career was rapidly prosperous. In 1842 he was elected an associate of the Royal Academy, and in 1851 an Academician; and in 1866 he was chosen to succeed Sir C. Eastlake in the post of president, for which his chief recommendations were his social distinction, tact, urbanity and friendly and liberal consideration of his brother artists. Shortly after his election as president he was knighted, and in 1870 the degree of D.C.L. was conferred upon him by the university of Oxford. He died on the 5th of October 1878.

GRANT, GEORGE MONRO (1835-1902), principal of Queen's University, Kingston, Ontario, was born in Nova Scotia in 1835. He was educated at Glasgow university, where he had a brilliant academic career; and having entered the ministry of the Presbyterian Church, he returned to Canada and obtained a pastoral charge in Halifax, Nova Scotia, which he held from 1863 to 1877. He quickly gained a high reputation as a preacher and as an eloquent speaker on political subjects. When Canada was confederated in 1867 Nova Scotia was the province most strongly opposed to federal union. Grant threw the whole weight of his great influence in favour of confederation, and his oratory played an important part in securing the

success of the movement. When the consolidation of the Dominion by means of railway construction was under discussion in 1872, Grant travelled from the Atlantic to the Pacific with the engineers who surveyed the route of the Canadian Pacific railway, and his book *Ocean to Ocean* (1873) was one of the first things that opened the eyes of Canadians to the value of the immense heritage they enjoyed. He never lost an opportunity, whether in the pulpit or on the platform, of pressing on his hearers that the greatest future for Canada lay in unity with the rest of the British Empire; and his broad statesman-like judgment made him an authority which politicians of all parties were glad to consult. In 1877 Grant was appointed principal of Queen's University, Kingston, Ontario, which through his exertions and influence expanded from a small denominational college into a large and influential educational centre; and he attracted to it an exceptionally able body of professors whose influence in speculation and research was widely felt during the quarter of a century that he remained at its head. In 1888 he visited Australia, New Zealand and South Africa, the effect of this experience being to strengthen still further the Imperialism which was the guiding principle of his political opinions. On the outbreak of the South African War in 1899 Grant was at first disposed to be hostile to the policy of Lord Salisbury and Mr Chamberlain; but his eyes were soon opened to the real nature of President Kruger's government, and he enthusiastically welcomed and supported the national feeling which sent men from the outlying portions of the Empire to assist in upholding British supremacy in South Africa. Grant did not live to see the conclusion of peace, his death occurring at Kingston on the 10th of May 1902. At the time of his death *The Times* observed that "it is acknowledged on all hands that in him the Dominion has lost one of the ablest men that it has yet produced." He was the author of a number of works, of which the most notable besides *Ocean to Ocean* are, *Advantages of Imperial Federation* (1889), *Our National Objects and Aims* (1890), *Religions of the World in Relation to Christianity* (1894) and volumes of sermons and lectures. Grant married in 1872 Jessie, daughter of William Lawson of Halifax.

GRANT, JAMES (1822-1887), British novelist, was born in Edinburgh on the 1st of August 1822. His father, John Grant, was a captain in the 92nd Gordon Highlanders and had served through the Peninsular War. For several years James Grant was in Newfoundland with his father, but in 1839 he returned to England, and entered the 62nd Foot as an ensign. In 1843 he resigned his commission and devoted himself to writing, first magazine articles, but soon a profusion of novels, full of vivacity and incident, and dealing mainly with military scenes and characters. His best stories, perhaps, were *The Romance of War* (his first, 1845), *Bothwell* (1851), *Frank Hilton; or, The Queen's Own* (1855), *The Phantom Regiment* and *Harry Ogilvie* (1856), *Lucy Arden* (1858), *The White Cockade* (1867), *Only an Ensign* (1871), *Shall I Win Her?* (1874), *Playing with Fire* (1887). Grant also wrote *British Battles on Land and Sea* (1873-1875) and valuable books on Scottish history. Permanent value attaches to his great work, in three volumes, on *Old and New Edinburgh* (1880). He was the founder and energetic promoter of the National Association for the Vindication of Scottish Rights. In 1875 he became a Roman Catholic. He died on the 5th of May 1887.

GRANT, JAMES AUGUSTUS (1827-1892), Scottish explorer of eastern equatorial Africa, was born at Nairn, where his father was the parish minister, on the 11th of April 1827. He was educated at the grammar school and Marischal College, Aberdeen, and in 1846 joined the Indian army. He saw active service in the Sikh War (1848-49), served throughout the mutiny of 1857, and was wounded in the operations for the relief of Lucknow. He returned to England in 1858, and in 1860 joined J. H. Speke (*q.v.*) in the memorable expedition which solved the problem of the Nile sources. The expedition left Zanzibar in October 1860 and reached Gondokoro, where the travellers were again in touch with civilization, in February 1863. Speke was the leader, but Grant carried out several investigations independently and made valuable botanical collections. He acted throughout in absolute loyalty to his comrade. In 1864 he published, as supplementary to Speke's account of their journey, *A Walk across Africa*, in which he dealt particularly with "the ordinary life and pursuits, the habits and

feelings of the natives" and the economic value of the countries traversed. In 1864 he was awarded the patron's medal of the Royal Geographical Society, and in 1866 given the Companionship of the Bath in recognition of his services in the expedition. He served in the intelligence department of the Abyssinian expedition of 1868; for this he was made C.S.I. and received the Abyssinian medal. At the close of the war he retired from the army with the rank of lieutenant-colonel. He had married in 1865, and he now settled down at Nairn, where he died on the 11th of February 1892. He made contributions to the journals of various learned societies, the most notable being the "Botany of the Speke and Grant Expedition" in vol. xxix. of the *Transactions of the Linnaean Society*.

GRANT, SIR JAMES HOPE (1808-1875), English general, fifth and youngest son of Francis Grant of Kilgraston, Perthshire, and brother of Sir Francis Grant, P.R.A., was born on the 22nd of July 1808. He entered the army in 1826 as cornet in the 9th Lancers, and became lieutenant in 1828 and captain in 1835. In 1842 he was brigade-major to Lord Saltoun in the Chinese War, and specially distinguished himself at the capture of Chin-Kiang, after which he received the rank of major and the C.B. In the first Sikh War of 1845-46 he took part in the battle of Sobraon; and in the Punjab campaign of 1848-49 he commanded the 9th Lancers, and won high reputation in the battles of Chillianwalla and Guzerat (Gujarat). He was promoted brevet lieutenant-colonel and shortly afterwards to the same substantive rank. In 1854 he became brevet-colonel, and in 1856 brigadier of cavalry. He took a leading part in the suppression of the Indian mutiny of 1857, holding for some time the command of the cavalry division, and afterwards of a movable column of horse and foot. After rendering valuable service in the operations before Delhi and in the final assault on the city, he directed the victorious march of the cavalry and horse artillery despatched in the direction of Cawnpore to open up communication with the commander-in-chief Sir Colin Campbell, whom he met near the Alambagh, and who raised him to the rank of brigadier-general, and placed the whole force under his command during what remained of the perilous march to Lucknow for the relief of the residency. After the retirement towards Cawnpore he greatly aided in effecting there the total rout of the rebel troops, by making a detour which threatened their rear; and following in pursuit with a flying column, he defeated them with the loss of nearly all their guns at Serai Ghat. He also took part in the operations connected with the recapture of Lucknow, shortly after which he was promoted to the rank of major-general, and appointed to the command of the force employed for the final pacification of India, a position in which his unwearied energy, and his vigilance and caution united to high personal daring, rendered very valuable service. Before the work of pacification was quite completed he was created K.C.B. In 1859 he was appointed, with the local rank of lieutenant-general, to the command of the British land forces in the united French and British expedition against China. The object of the campaign was accomplished within three months of the landing of the forces at Pei-tang (1st of August 1860). The Taku Forts had been carried by assault, the Chinese defeated three times in the open and Peking occupied. For his conduct in this, which has been called the "most successful and the best carried out of England's little wars," he received the thanks of parliament and was gazetted G.C.B. In 1861 he was made lieutenant-general and appointed commander-in-chief of the army of Madras; on his return to England in 1865 he was made quartermaster-general at headquarters; and in 1870 he was transferred to the command of the camp at Aldershot, where he took a leading part in the reform of the educational and training systems of the forces, which followed the Franco-German War. The introduction of annual army manœuvres was largely due to Sir Hope Grant. In 1872 he was gazetted general. He died in London on the 7th of March 1875.

Incidents in the Sepoy War of 1857-58, compiled from the Private Journal of General Sir Hope Grant, K.C.B., together with some explanatory chapters by Capt. H. Knollys, Royal Artillery, was published in 1873, and *Incidents in the China War of 1860* appeared posthumously under the same editorship in 1875.

GRANT, SIR PATRICK (1804-1895), British field marshal, was the second son of Major John Grant, 97th Foot, of Auchterblair, Inverness-shire, where he was born on the 11th of September 1804. He entered the Bengal native infantry as ensign in 1820, and became captain in 1832. He served in Oudh from 1834 to 1838, and raised the Hariana Light Infantry. Employed in the adjutant-general's department of the Bengal army from 1838 until 1854, he became adjutant-general in 1846. He served under Sir Hugh Gough at the battle of Maharajpur in 1843, winning a brevet majority, was adjutant-general of the army at the battles of Moodkee in 1845 (twice severely wounded), and of Ferozshah and Sobraon in 1846, receiving the C.B. and the brevet rank of lieutenant-colonel. He took part in the battles of Chillianwalla and Gujarat in 1849, gaining further promotion, and was appointed aide-de-camp to the queen. He served also in Kohat in 1851 under Sir Charles Napier. Promoted major-general in 1854, he was commander-in-chief of the Madras army from 1856 to 1861. He was made K.C.B. in 1857, and on General Anson's death was summoned to Calcutta to take supreme command of the army in India. From Calcutta he directed the operations against the mutineers, sending forces under Havelock and Outram for the relief of Cawnpore and Lucknow, until the arrival of Sir Colin Campbell from England as commander-in-chief, when he returned to Madras. On leaving India in 1861 he was decorated with the G.C.B. He was promoted lieutenant-general in 1862, was governor of Malta from 1867 to 1872, was made G.C.M.G. in 1868, promoted general in 1870, field marshal in 1883 and colonel of the Royal Horse Guards and gold-stick-in-waiting to the queen in 1885. He married as his second wife, in 1844, Frances Maria, daughter of Sir Hugh (afterwards Lord) Gough. He was governor of the Royal Hospital, Chelsea, from 1874 until his death there on the 28th of March 1895.

GRANT, ROBERT (1814-1892), British astronomer, was born at Grantown, Scotland, on the 17th of June 1814. At the age of thirteen the promise of a brilliant career was clouded by a prolonged illness of such a serious character as to incapacitate him from all school-work for six years. At twenty, however, his health greatly improved, and he set himself resolutely, without assistance, to repair his earlier disadvantages by the diligent study of Greek, Latin, Italian and mathematics. Astronomy also occupied his attention, and it was stimulated by the return of Halley's comet in 1835, as well as by his success in observing the annular eclipse of the sun of the 15th of May 1836. After a short course at King's College, Aberdeen, he obtained in 1841 employment in his brother's counting-house in London. During this period the idea occurred to him of writing a history of physical astronomy. Before definitely beginning the work he had to search, amongst other records, those of the French Academy, and for that purpose took up his residence in Paris in 1845, supporting himself by giving lessons in English. He returned to London in 1847. *The History of Physical Astronomy from the Earliest Ages to the Middle of the Nineteenth Century* was first published in parts in *The Library of Useful Knowledge*, but after the issue of the ninth part this mode of publication was discontinued, and the work appeared as a whole in 1852. The main object of the work is, in the author's words, "to exhibit a view of the labours of successive inquirers in establishing a knowledge of the mechanical principles which regulate the movements of the celestial bodies, and in explaining the various phenomena relative to their physical constitution which observation with the telescope has disclosed." The lucidity and completeness with which a great variety of abstruse subjects were treated, the extent of research and the maturity of judgment it displayed, were the more remarkable, when it is remembered that this was the first published work of one who enjoyed no special opportunities, either for acquiring materials, or for discussing with others engaged in similar pursuits the subjects it treats of. The book at once took a leading place in astronomical literature, and earned for its author in 1856 the award of the Royal Astronomical Society's gold medal. In 1859 he succeeded John Pringle Nichol as professor of astronomy in the University of Glasgow. From time to time he contributed astronomical papers to the *Monthly Notices, Astronomische Nachrichten, Comptes rendus* and other scientific serials; but his principal work at Glasgow consisted in determining the places of a large number of stars with the Ertel transit-circle of the Observatory. The results of these labours, extending over twenty-one years, are contained in the *Glasgow Catalogue of 6415 Stars*, published in 1883. This was followed in 1892 by the *Second Glasgow Catalogue of 2156 Stars*, published a few weeks after his death, which took place on the 24th of October 1892.

See *Month. Notices Roy. Astr. Society*, liii., 210 (E. Dunkin); *Nature*, Nov. 10, 1892; *The*

Times, Nov. 2, 1892; *Roy. Society's Catalogue of Scient. Papers*.

(A. A. R.*)

GRANT, ULYSSES SIMPSON (1822-1885), American soldier, and eighteenth president of the United States, was born at Point Pleasant, Ohio, on the 27th of April 1822. He was a descendant of Matthew Grant, a Scotchman, who settled in Dorchester, Massachusetts, in 1630. His earlier years were spent in helping his father, Jesse R. Grant, upon his farm in Ohio. In 1839 he was appointed to a place in the military academy at West Point, and it was then that his name assumed the form by which it is generally known. He was christened Hiram, after an ancestor, with Ulysses for a middle name. As he was usually called by his middle name, the congressman who recommended him for West Point supposed it to be his first name, and added thereto the name of his mother's family, Simpson. Grant was the best horseman of his class, and took a respectable place in mathematics, but at his graduation in 1843 he only ranked twenty-first in a class of thirty-nine. In September 1845 he went with his regiment to join the forces of General Taylor in Mexico; there he took part in the battles of Palo Alto, Resaca de la Palma and Monterey, and, after his transfer to General Scott's army, which he joined in March 1847, served at Vera Cruz, Cerro Gordo, Churubusco, Molino del Rey and at the storming of Chapultepec. He was breveted first lieutenant for gallantry at Molino del Rey and captain for gallantry at Chapultepec. In August 1848, after the close of the war, he married Julia T. Dent (1826-1902), and was for a while stationed in California and Oregon, but in 1854 he resigned his commission. His reputation in the service had suffered from allegations of intemperate drinking, which, whether well founded or not, 356
certainly impaired his usefulness as a soldier. For the next six years he lived in St Louis, Missouri, earning a scanty subsistence by farming and dealings in real estate. In 1860 he removed to Galena, Illinois, and became a clerk in a leather store kept by his father. At that time his earning capacity seems not to have exceeded $800 a year, and he was regarded by his friends as a broken and disappointed man. He was living at Galena at the outbreak of hostilities between the North and South.

Grant's Civil War career.

[For the history of the Civil War, and of Grant's battles and campaigns, the reader is referred to the article American Civil War. To the "call to arms" of 1861 Grant promptly responded. After some delay he was commissioned colonel of the 21st Illinois regiment and soon afterwards brigadier-general. He was shortly assigned to a territorial command on the Mississippi, and first won distinction by his energy in seizing, on his own responsibility, the important point of Paducah, Kentucky, situated at the confluence of the two great waterways of the Tennessee and the Ohio (6th Sept. 1861). On the 7th of November he fought his first battle as a commander, that of Belmont (Missouri), which, if it failed to achieve any material result, certainly showed him to be a capable and skilful leader. Early in 1862 he was entrusted by General H. W. Halleck with the command of a large force to clear the lower reaches of the Cumberland and the Tennessee, and, whatever criticism may be passed on the general strategy of the campaign, Grant himself, by his able and energetic work, thoroughly deserved the credit of his brilliant success of Fort Donelson, where 15,000 Confederates were forced to capitulate. Grant and his division commanders were promoted to the rank of major-general U.S.V. soon afterwards, but Grant's own fortunes suffered a temporary eclipse owing to a disagreement with Halleck. When, after being virtually under arrest, he rejoined his army, it was concentrated about Savannah on the Tennessee, preparing for a campaign towards Corinth, Miss. On the 6th of April 1862 a furious assault on Grant's camps brought on the battle of Shiloh (*q.v.*). After two days' desperate fighting the Confederates withdrew before the combined attack of the Army of the Tennessee under Grant and the Army of the Ohio under Buell. But the Army of the Tennessee had been on the verge of annihilation on the evening of the first day, and Grant's leadership throughout was by no means equal to the emergency, though he displayed his usual personal bravery and resolution. In the grand advance of Halleck's armies which followed Shiloh, Grant was relieved of all important duties by his assignment as second in command of the whole force, and was thought by the army at large to be in disgrace. But Halleck soon went to Washington as general-in-chief, and Grant took command of his old army and of Rosecrans' Army of the Mississippi. Two victories (Iuka and Corinth) were won in the autumn of 1862, but the credit of both fell to Rosecrans, who commanded in the field, and the nadir of Grant's military fortunes was reached when the first advance on Vicksburg (*q.v.*), planned on an unsound basis, and

complicated by a series of political intrigues (which had also caused the adoption of the original scheme), collapsed after the minor reverses of Holly Springs and Chickasaw Bayou (December 1862).

It is fair to assume that Grant would have followed other unsuccessful generals into retirement, had he not shown that, whatever his mistakes or failures, and whether he was or was not sober and temperate in his habits, he possessed the iron determination and energy which in the eyes of Lincoln and Stanton,[1] and of the whole Northern people, was the first requisite of their generals. He remained then with his army near Vicksburg, trying one plan after another without result, until at last after months of almost hopeless work his perseverance was crowned with success—a success directly consequent upon a strange and bizarre campaign of ten weeks, in which his daring and vigour were more conspicuous than ever before. On the 4th of July 1863 the great fortress surrendered with 29,491 men, this being one of the most important victories won by the Union arms in the whole war. Grant was at once made a major-general in the regular army. A few months later the great reverse of Chickamauga created an alarm in the North commensurate with the elation that had been felt at the double victory of Vicksburg and Gettysburg, and Grant was at once ordered to Chattanooga, to decide the fate of the Army of the Cumberland in a second battle. Four armies were placed under his command, and three of these concentrated at Chattanooga. On the 25th of November 1863 a great three-days' battle ended with the crushing defeat of the Confederates, who from this day had no foothold in the centre and west.

After this, in preparation for a grand combined effort of all the Union forces, Grant was placed in supreme command, and the rank of lieutenant-general revived for him (March 1864). Grant's headquarters henceforth accompanied the Army of the Potomac, and the lieutenant-general directed the campaign in Virginia. This, with Grant's driving energy infused into the best army that the Union possessed, resolved itself into a series, almost uninterrupted, of terrible battles. Tactically the Confederates were almost always victorious, strategically, Grant, disposing of greatly superior forces, pressed back Lee and the Army of Northern Virginia to the lines of Richmond and Petersburg, while above all, in pursuance of his explicit policy of "attrition," the Federal leader used his men with a merciless energy that has few, if any, parallels in modern history. At Cold Harbor six thousand men fell in one useless assault lasting an hour, and after two months the Union armies lay before Richmond and Petersburg indeed, but had lost no fewer than 72,000 men. But Grant was unshaken in his determination. "I purpose to fight it out on this line, if it takes all summer," was his message from the battlefield of Spottsylvania to the chief of staff at Washington. Through many weary months he never relaxed his hold on Lee's army, and, in spite of repeated partial reverses, that would have been defeats for his predecessors, he gradually wore down his gallant adversary. The terrible cost of these operations did not check him: only on one occasion of grave peril were any troops sent from his lines to serve elsewhere, and he drew to himself the bulk of the men whom the Union government was recruiting by thousands for the final effort. Meanwhile all the other campaigns had been closely supervised by Grant, preoccupied though he was with the operations against his own adversary. At a critical moment he actually left the Virginian armies to their own commanders, and started to take personal command in a threatened quarter, and throughout he was in close touch with Sherman and Thomas, who conducted the campaigns on the south-east and the centre. That he succeeded in the efficient exercise of the chief command of armies of a total strength of over one million men, operating many hundreds of miles apart from each other, while at the same time he watched and manœuvred against a great captain and a veteran army in one field of the war, must be the greatest proof of Grant's powers as a general. In the end complete success rewarded the sacrifices and efforts of the Federals on every theatre of war; in Virginia, where Grant was in personal control, the merciless policy of attrition wore down Lee's army until a mere remnant was left for the final surrender.

Grant had thus brought the great struggle to an end, and was universally regarded as the saviour of the Union. A careful study of the history of the war thoroughly bears out the popular view. There were soldiers more accomplished, as was McClellan, more brilliant, as was Rosecrans, and more exact, as was Buell, but it would be difficult to prove that these generals, or indeed any others in the service, could have accomplished the task which Grant brought to complete success. Nor must it be supposed that Grant learned little from three years' campaigning in high command. There is less in common than is often supposed between the buoyant energy that led Grant to Shiloh and the grim plodding determination that led him to Vicksburg and to Appomattox. Shiloh revealed to Grant the intensity of the struggle, and after that battle, appreciating to the full the material and moral factors with which he had to deal, he gradually trained his military character on those lines which alone could conduce to ultimate success. Singleness of purpose, and relentless vigour in the

execution of the purpose, were the qualities necessary to the conduct of the vast enterprise of subduing the Confederacy. Grant possessed or acquired both to such a degree that he proved fully equal to the emergency. If in technical finesse he was surpassed by many of his predecessors and his subordinates, he had the most important qualities of a great captain, courage that rose higher with each obstacle, and the clear judgment to distinguish the essential from the minor issues in war.—(C. F. A.)]

After the assassination of President Lincoln a disposition was shown by his successor, Andrew Johnson, to deal severely with the Confederate leaders, and it was understood that indictments for treason were to be brought against General Lee and others. Grant, however, insisted that the United States government was bound by the terms accorded to Lee and his army at Appomattox. He went so far as to threaten to resign his commission if the president disregarded his protest. This energetic action on Grant's part saved the United States from a foul stain upon its escutcheon. In July 1866 the grade of general was created, for the first time since the organization of the government, and Grant was promoted to that position. In the following year he became involved in the deadly quarrel between President Johnson and Congress. To tie the president's hands Congress had passed the Tenure of Office Act, forbidding the president to remove any cabinet officer without the consent of the Senate; but in August 1867 President Johnson suspended Secretary Stanton and appointed Grant secretary of war *ad interim* until the pleasure of the Senate should be ascertained. Grant accepted the appointment under protest, and held it until the following January, when the Senate refused to confirm the president's action, and Secretary Stanton resumed his office. President Johnson was much disgusted at the readiness with which Grant turned over the office to Stanton, and a bitter controversy ensued between Johnson and Grant. Hitherto Grant had taken little part in politics. The only vote which he had ever cast for a presidential candidate was in 1856 for James Buchanan; and leading Democrats, so late as the beginning of 1868, hoped to make him their candidate in the election of that year; but the effect of the controversy with President Johnson was to bring Grant forward as the candidate of the Republican party. At the convention in Chicago on the 20th of May 1868 he was unanimously nominated on the first ballot. The Democratic party nominated the one available Democrat who had the smallest chance of beating him—Horatio Seymour, lately governor of New York, an excellent statesman, but at that time hopeless as a candidate because of his attitude during the war. The result of the contest was at no time in doubt; Grant received 214 electoral votes and Seymour 80.

Presidency, 1868.

The most important domestic event of Grant's first term as president was the adoption of the fifteenth amendment to the Constitution on the 30th of March 1870, providing that suffrage throughout the United States should not be restricted on account of race, colour or previous condition of servitude. The most important event in foreign policy was the treaty with Great Britain of the 8th of May 1871, commonly known as the Treaty of Washington, whereby several controversies between the United States and Great Britain, including the bitter questions as to damage inflicted upon the United States by the "Alabama" and other Confederate cruisers built and equipped in England, were referred to arbitration. In 1869 the government of Santo Domingo (or the Dominican Republic) expressed a wish for annexation by the United States, and such a step was favoured by Grant, but a treaty negotiated with this end in view failed to obtain the requisite two-thirds vote in the Senate. In May 1872 something was done towards alleviating the odious Reconstruction laws for dragooning the South, which had been passed by Congress in spite of the vetoes of President Johnson. The Amnesty Bill restored civil rights to all persons in the South, save from 300 to 500 who had held high positions under the Confederacy. As early as 1870 President Grant recommended measures of civil service reform, and succeeded in obtaining an act authorizing him to appoint a Civil Service commission. A commission was created, but owing to the hostility of the politicians in Congress it accomplished little. During the fifty years since Crawford's Tenure of Office Act was passed in 1820, the country had been growing more and more familiar with the spectacle of corruption in high places. The evil rose to alarming proportions during Grant's presidency, partly because of the immense extension of the civil service, partly because of the growing tendency to alliance between spoilsmen and the persons benefited by protective tariffs, and partly because the public attention was still so much absorbed in Southern affairs that little energy was left for curbing rascality in the North. The scandals, indeed, were rife in Washington, and affected persons in close relations with the president. Grant was ill-fitted for coping with the difficulties of such a situation. Along with high intellectual powers in certain directions, he had a simplicity of nature charming in itself, but often calculated to render him the easy prey of sharpers. He found it almost impossible to believe that anything could be wrong in persons to whom he had given

his friendship, and on several occasions such friends proved themselves unworthy of him. The feeling was widely prevalent in the spring of 1872 that the interests of pure government in the United States demanded that President Grant should not be elected to a second term. This feeling led a number of high-minded gentlemen to form themselves into an organization under the name of Liberal Republicans. They held a convention at Cincinnati in May with the intention of nominating for the presidency Charles Francis Adams, who had ably represented the United States at the court of St James's during the Civil War. The convention, was, however, captured by politicians who converted the whole affair into a farce by nominating Horace Greeley, editor of the *New York Tribune*, who represented almost anything rather than the object for which the convention had been called together. The Democrats had despaired of electing a candidate of their own, and hoped to achieve success by adopting the Cincinnati nominee, should he prove to be an eligible person. The event showed that while their defeat in 1868 had taught them despondency, it had not taught them wisdom; it was still in their power to make a gallant fight by nominating a person for whom Republican reformers could vote. But with almost incredible fatuity, they adopted Greeley as their candidate. As a natural result Grant was re-elected by an overwhelming majority.

Second presidency.

The most important event of his second term was his veto of the Inflation Bill in 1874 followed by the passage of the Resumption Act in the following year. The country was still labouring under the curse of an inconvertible paper currency originating with the Legal Tender Act of 1862. There was a considerable party in favour of debasing the currency indefinitely by inflation, and a bill with that object was passed by Congress in April 1874. It was promptly vetoed by President Grant, and two months later he wrote a very sensible letter to Senator J. P. Jones of Nevada advocating a speedy return to specie payments. The passage of the Resumption Act in January 1875 was largely due to his consistent advocacy, and for these measures he deserves as high credit as for his victories in the field. In spite of these great services, popular dissatisfaction with the Republican party rapidly increased during the years 1874-1876. The causes were twofold: firstly, there was great dissatisfaction with the troubles in the Southern states, owing to the harsh Reconstruction laws and the robberies committed by the carpet-bag governments which those laws kept in power; secondly, the scandals at Washington, comprising wholesale frauds on the public revenue, awakened lively disgust. In some cases the culprits were so near to President Grant that many persons found it difficult to avoid the suspicion that he was himself implicated, and never perhaps was his hold upon popular favour so slight as in the summer and autumn of 1876.

Later life.

After the close of his presidency in the spring of 1877 Grant started on a journey round the world, accompanied by his wife and one son. He was received with distinguished honours in England and on the continent of Europe, whence he made his way to India, China and Japan. After his return to America in September 1880 he went back to his old home in Galena, Illinois. A faction among the managers of the Republican party attempted to secure his nomination for a third term as president, and in the convention at Chicago in June 1880 he received a vote exceeding 300 during 36 consecutive ballots. Nevertheless, his opponents made such effective use of the popular prejudice against third terms that the scheme was defeated, and Garfield was named in his stead. In August 1881 General Grant bought a house in the city of New York. His income was insufficient for the proper support of his family, and accordingly he had become partner in a banking house in which one of his sons was interested along with other persons. The name of the firm was Grant and Ward. The ex-president invested in it all his available property, but paid no attention to the management of the business. His facility in giving his confidence to unworthy people was now to be visited with dire calamity. In 1884 the firm became bankrupt, and it was discovered that two of the partners had been perpetrating systematic and gigantic frauds. This severe blow left General Grant penniless, just at the time when he was beginning to suffer acutely from the disease which finally caused his death. Down to this time he had never made any pretensions to literary skill or talent, but on being approached by the *Century Magazine* with a request for some articles he undertook the work in order to keep the wolf from the door. It proved a congenial task, and led to the writing of his *Personal Memoirs*, a frank, modest and charming book, which ranks among the best standard military biographies. The sales earned for the general and his family something like half a million dollars. The circumstances in which it was written made it an act of heroism comparable with any that Grant ever showed as a soldier. During most of the time he was suffering tortures from cancer in the throat, and it was only four days before his death that he finished the manuscript. In the spring of 1885 Congress passed a bill creating him a general on the retired list; and in the summer he was removed to a cottage at Mount M'Gregor, near Saratoga, where he passed the last five weeks of his life, and where he died on the 23rd of

July 1885. His body was placed in a temporary tomb in Riverside Drive, in New York City, overlooking the Hudson river.[2]

Grant showed many admirable and lovable traits. There was a charming side to his trustful simplicity, which was at times almost like that of a sailor set ashore. He abounded in kindliness and generosity, and if there was anything especially difficult for him to endure, it was the sight of human suffering, as was shown on the night at Shiloh, where he lay out of doors in the icy rain rather than stay in a comfortable room where the surgeons were at work. His good sense was strong, as well as his sense of justice, and these qualities stood him in good service as president, especially in his triumphant fight against the greenback monster. Altogether, in spite of some shortcomings, Grant was a massive, noble and lovable personality, well fit to be remembered as one of the heroes of a great nation.

(J. Fi.)

General Grant's son, Frederick Dent Grant (b. 1850), graduated at the U.S. Military Academy in 1871, was aide-de-camp to General Philip Sheridan in 1873-1881, and resigned from the army in 1881, after having attained the rank of lieutenant-colonel. He was U.S. minister to Austria in 1889-1893, and police commissioner of New York city in 1894-1898. He served as a brigadier-general of volunteers in the Spanish-American War of 1898, and then in the Philippines, becoming brigadier-general in the regular army in February 1901 and major-general in February 1906.

Bibliography.—Adam Badeau's *Military History of U. S. Grant* (3 vols., New York, 1867-1881), and *Grant in Peace* (Hartford, 1887), are appreciative but lacking in discrimination. William Conant Church's *Ulysses S. Grant and the Period of National Preservation and Reconstruction* (New York, 1897) is a good succinct account. Hamlin Garland's *Ulysses S. Grant, His Life and Character* (New York, 1898) gives especial attention to the personal traits of Grant and abounds in anecdote. See also Grant's *Personal Memoirs* (2 vols., New York, 1885-1886); J. G. Wilson's *Life and Public Services of U. S. Grant* (New York, 1886); J. R. Young's *Around the World with General Grant* (New York, 1880); Horace Porter's *Campaigning with Grant* (New York, 1897); James Ford Rhodes's *History of the United States* (vols. iii.-vii., New York, 1896-1906); James K. Hosmer's *Appeal to Arms and Outcome of the Civil War* (New York, 1907); John Eaton's *Grant, Lincoln, and the Freedmen* (New York, 1907), and various works mentioned in the articles American Civil War, Wilderness Campaign, &c.

1 President Lincoln was Grant's most unwavering supporter. Many amusing stories are told of his replies to various deputations which waited upon him to ask for Grant's removal. On one occasion he asked the critics to ascertain the brand of whisky favoured by Grant, so that he could send kegs of it to the other generals. The question of Grant's abstemiousness was and is of little importance. The cause at stake over-rode every prejudice and the people of the United States, since the war, have been in general content to leave the question alone, as was evidenced by the outcry raised in 1908, when President Taft reopened it in a speech at Grant's tomb.

2 The permanent tomb is of white granite and white marble and is 150 ft. high with a circular cupola topping a square building 90 ft. on the side and 72 ft. high; the sarcophagus, in the centre of the building, is of red Wisconsin porphyry. The cornerstone was laid by President Harrison in 1892, and the tomb was dedicated on the 27th of April 1897 with a splendid parade and addresses by President McKinley and General Horace Porter, president of the Grant Monument Association, which from 90,000 contributions raised the funds for the tomb.

GRANT (from A.-Fr. *graunter*, O. Fr. *greanter* for *creanter*, popular Lat. *creantare*, for *credentare*, to entrust, Lat. *credere*, to believe, trust), originally permission, acknowledgment, hence the gift of privileges, rights, &c., specifically in law, the transfer of property by an instrument in writing, termed a deed of grant. According to the old rule of common law, the immediate freehold in corporeal hereditaments lay in livery (see Feoffment), whereas incorporeal hereditaments, such as a reversion, remainder, advowson, &c., lay in grant, that is, passed by the delivery of the deed of conveyance or grant without further ceremony. The distinction between property lying in livery and in grant is now abolished, the Real Property Act 1845 providing that all corporeal tenements and hereditaments shall be transferable as well by grant as by livery (see Conveyancing). A grant of personal property is properly termed an assignment or bill of sale.

GRANTH, the holy scriptures of the Sikhs, containing the spiritual and moral teaching of Sikhism (*q.v.*). The book is called the *Adi Granth Sahib* by the Sikhs as a title of respect, because it is believed by them to be an embodiment of the gurus. The title is generally applied to the volume compiled by the fifth guru Arjan, which contains the compositions of Guru Nanak, the founder of the Sikh religion; of his successors, Guru Angad, Amar Das, Ram Das and Arjan; hymns of the Hindu bhagats or saints, Jaidev, Namdev, Trilochan, Sain, Ramanand, Kabir, Rai Das, Pipa, Bhikhan, Beni, Parmanand Das, Sur Das, Sadhna and Dhanna Jat; verses of the Mahommedan saint called Farid; and panegyrics of the gurus by bards who either attended them or admired their characters. The compositions of the ninth guru, Teg Bahadur, were subsequently added to the *Adi Granth* by Guru Govind Singh. One recension of the sacred volume preserved at Mangat in the Gujrat district contains a hymn composed by Mira Bai, queen of Chitor. The *Adi Granth* contains passages of great picturesqueness and beauty. The original copy is said to be in Kartarpur in the Jullundur district, but the chief copy in use is now in the Har Mandar or Golden Temple at Amritsar, where it is daily read aloud by the attendant Granthis or scripture readers.

There is also a second *Granth* which was compiled by the Sikhs in 1734, and popularly known as the *Granth of the tenth Guru*, but it has not the same authority as the *Adi Granth*. It contains Guru Govind Singh's *Jāpji*, the *Akāl Ustit* or Praise of the Creator, thirty-three *sawaias* (quatrains containing some of the main tenets of the guru and strong reprobation of idolatry and hypocrisy), and the *Vachitar Natak* or wonderful drama, in which the guru gives an account of his parentage, divine mission and the battles in which he was engaged. Then come three abridged translations by different hands of the *Devi Mahatamya*, an episode in the *Markandeya Puran*, in praise of Durga, the goddess of war. Then follow the *Gyan Parbodh* or awakening of knowledge, accounts of twenty-four incarnations of the deity, selected because of their warlike character; the *Hazare de Shabd*; the *Shastar Nam Mala*, which is a list of offensive and defensive weapons used in the guru's time, with special reference to the attributes of the Creator; the *Tria Charitar* or tales illustrating the qualities, but principally the deceit of women; the *Kabit*, compositions of a miscellaneous character; the *Zafarnama* containing the tenth guru's epistle to the emperor Aurangzeb, and several metrical tales in the Persian language. This *Granth* is only partially the composition of the tenth guru. The greater portion of it was written by bards in his employ.

Form of the Granth.

The two volumes are written in several different languages and dialects. The *Adi Granth* is largely in old Punjabi and Hindi, but Prakrit, Persian, Mahratti and Gujrati are also represented. The *Granth of the Tenth Guru* is written in the old and very difficult Hindi affected by literary men in the Patna district in the 16th century. In neither of these sacred volumes is there any separation of words. As there is no separation of words in Sanskrit, the *gyanis* or interpreters of the guru's hymns prefer to follow the ancient practice of junction of words. This makes the reading of the Sikh scriptures very difficult, and is one of the causes of the decline of the Sikh religion.

The hymns in the *Adi Granth* are arranged not according to the gurus or bhagats who compose them, but according to rags or musical measures. There are thirty-one such measures in the *Adi Granth*, and the hymns are arranged according to the measures to which they are composed. The gurus who composed hymns, namely the first, second, third, fourth, fifth and ninth gurus, all used the name Nanak as their nom-de-plume. Their compositions are distinguished by mahallas or wards. Thus the compositions of Guru Nanak are styled mahalla one, the compositions of Guru Angad are styled mahalla two, and so on. After the hymns of the gurus are found the hymns of the bhagats under their several musical measures. The Sikhs generally dislike any arrangement of the *Adi Granth* by which the compositions of each guru or bhagat should be separately shown.

The Sikh doctrines.

All the doctrines of the Sikhs are found set forth in the two *Granths* and in compositions called *Rahit Namas* and *Tanakhwah Namas*, which are believed to have been the utterances of the tenth guru. The cardinal principle of the sacred books is the unity of God, and starting from this premiss the rejection of idolatry and superstition. Thus Guru Govind Singh writes:

"Some worshipping stones, put them on their heads;
Some suspend lingams from their necks;

Some see the God in the South; some bow their heads to the West.
Some fools worship idols, others busy themselves with worshipping the dead.
The whole world entangled in false ceremonies hath not found God's secret."

Next to the unity of God comes the equality of all men in His sight, and so the abolition of caste distinctions. Guru Nanak says:

"Caste hath no power in the next world; there is a new order of beings,
Those whose accounts are honoured are the good."

The concremation of widows, though practised in later times by Hinduized Sikhs, is forbidden in the *Granth*. Guru Arjan writes:

"She who considereth her beloved as her God,
Is the blessed *sati* who shall be acceptable in God's Court."

It is a common belief that the Sikhs are allowed to drink wine and other intoxicants. This is not the case. Guru Nanak wrote:

"By drinking wine man committeth many sins."

Guru Arjan wrote:

"The fool who drinketh evil wine is involved in sin."

And in the Rahit Nama of Bhai Desu Singh there is the following:

"Let a Sikh take no intoxicant; it maketh the body lazy; it diverteth men from their temporal and spiritual duties, and inciteth them to evil deeds."

It is also generally believed that the Sikhs are bound to abstain from the flesh of kine. This, too, is a mistake, arising from the Sikh adoption of Hindu usages. The two *Granths* of the Sikhs and all their canonical works are absolutely silent on the subject. The Sikhs are not bound to abstain from any flesh, except that which is obviously unfit for human food, or what is killed in the Mahommedan fashion by jagging an animal's throat with a knife. This flesh-eating practice is one of the main sources of their physical strength. Smoking is strictly prohibited by the Sikh religion. Guru Teg Bahadur preached to his host as follows:

"Save the people from the vile drug, and employ thyself in the service of Sikhs and holy men. When the people abandon the degrading smoke and cultivate their lands, their wealth and prosperity shall increase, and they shall want for nothing ... but when they smoke the vile vegetable, they shall grow poor and lose their wealth."

Guru Govind Singh also said:

"Wine is bad, bhang destroyeth one generation, but tobacco destroyeth all generations."

In addition to these prohibitions Sikhism inculcates most of the positive virtues of Christianity, and specially loyalty to rulers, a quality which has made the Sikhs valuable servants of the British crown.

The *Granth* was translated by Dr Trumpp, a German missionary, on behalf of the Punjab government in 1877, but his rendering is in many respects incorrect, owing to insufficient knowledge of the Punjabi dialects. *The Sikh Religion*, &c., in 6 vols. (London, 1909) is an authoritative version prepared by M. Macauliffe, in concert with the modern leaders of the Sikh sect.

(M. M.)

GRANTHAM, THOMAS ROBINSON, 1st Baron (*c.* 1695-1770), English diplomatist and politician, was a younger son of Sir William Robinson, Bart. (1655-1736) of Newby, Yorkshire, who was member of parliament for York from 1697 to 1722. Having been a scholar and minor fellow of Trinity College, Cambridge, Thomas Robinson gained his earliest diplomatic experience in Paris and then went to Vienna, where he was English ambassador from 1730 to 1748. During 1741 he sought to make peace between the empress Maria Theresa and Frederick the Great, but in vain, and in 1748 he represented his country at the

congress of Aix-la-Chapelle. Returning to England he sat in parliament for Christchurch from 1749 to 1761. In 1754 Robinson was appointed a secretary of state and leader of the House of Commons by the prime minister, the duke of Newcastle, and it was on this occasion that Pitt made the famous remark to Fox, “the duke might as well have sent us his jackboot to lead us.” In November 1755 he resigned, and in April 1761 he was created Baron Grantham. He was master of the wardrobe from 1749 to 1754 and again from 1755 to 1760, and was joint postmaster-general in 1765 and 1766. He died in London on the 30th of September 1770.

Grantham’s elder son, Thomas Robinson (1738-1786), who became the 2nd baron, was born at Vienna on the 30th of November 1738. Educated at Westminster School and at Christ’s College, Cambridge, he entered parliament as member for Christchurch in 1761, and succeeded to the peerage in 1770. In 1771 he was sent as ambassador to Madrid and retained this post until war broke out between England and Spain in 1779. From 1780 to 1782 Grantham was first commissioner of the board of trade and foreign plantations, and from July 1782 to April 1783 secretary for the foreign department under Lord Shelburne. He died on the 20th of July 1786, leaving two sons, Thomas Philip, who became the 3rd baron, and Frederick John afterwards 1st earl of Ripon.

Thomas Philip Robinson, 3rd Baron Grantham (1781-1859). in 1803 took the name of Weddell instead of that of Robinson. In May 1833 he became Earl de Grey of Wrest on the death of his maternal aunt, Amabell Hume-Campbell, Countess de Grey (1751-1833), and he now took the name of de Grey. He was first lord of the admiralty under Sir Robert Peel in 1834-1835 and from 1841 to 1844 lord-lieutenant of Ireland. On his death without male issue his nephew, George Frederick Samuel Robinson, afterwards marquess of Ripon (*q.v.*), succeeded as Earl de Grey.

GRANTHAM, a municipal and parliamentary borough of Lincolnshire, England; situated in a pleasant undulating country on the river Witham. Pop. (1901) 17,593. It is an important junction of the Great Northern railway, 105 m. N. by W. from London, with branch lines to Nottingham, Lincoln and Boston; while there is communication with Nottingham and the Trent by the Grantham canal. The parish church of St Wulfram is a splendid building, exhibiting all the Gothic styles, but mainly Early English and Decorated. The massive and ornate western tower and spire, about 280 ft. in height, are of early Decorated workmanship. There is a double Decorated crypt beneath the lady chapel. The north and south porches are fine examples of a later period of the same style. The delicately carved font is noteworthy. Two libraries, respectively of the 16th and 17th centuries, are preserved in the church. At the King Edward VI. grammar school Sir Isaac Newton received part of his education. A bronze statue commemorates him. The late Perpendicular building is picturesque, and the school was greatly enlarged in 1904. The Angel Hotel is a hostelry of the 15th century, with a gateway of earlier date. A conduit dating from 1597 stands in the wide market-place. Modern public buildings are a gild hall, exchange hall, and several churches and chapels. The Queen Victoria Memorial home for nurses was erected in 1902-1903. The chief industries are malting and the manufacture of agricultural implements. Grantham returns one member to parliament. The borough falls within the S. Kesteven or Stamford division of the county. Grantham was created a suffragan bishopric in the diocese of Lincoln in 1905. The municipal borough is under a mayor, 4 aldermen and 12 councillors. Area, 1726 acres.

Although there is no authentic evidence of Roman occupation, Grantham (Graham, Granham in Domesday Book) from its situation on the Ermine Street, is supposed to have been a Roman station. It was possibly a borough in the Saxon period, and by the time of the Domesday Survey it was a royal borough with 111 burgesses. Charters of liberties existing now only in the confirmation charter of 1377 were granted by various kings. From the first the town was governed by a bailiff appointed by the lord of the manor, but by the end of the 14th century the office of alderman had come into existence. Finally government under a mayor and alderman was granted by Edward IV. in 1463, and Grantham became a corporate town. Among later charters, that of James II., given in 1685, changed the title to that of government by a mayor and 6 aldermen, but this was afterwards reversed and the old order resumed. Grantham was first represented in parliament in 1467, and returned two members; but by the Redistribution Act of 1885 the number was reduced to one. Richard III. in 1483 granted a Wednesday market and two fairs yearly, namely on the feast of St Nicholas the

Bishop, and the two following days, and on Passion Sunday and the day following. At the present day the market is held on Saturday, and fairs are held on the Monday, Tuesday and Wednesday following the fifth Sunday in Lent; a cherry fair on the 11th of July and two stock fairs on the 26th of October and the 17th of December.

GRANTLEY, FLETCHER NORTON, 1st Baron (1716-1789), English politician, was the eldest son of Thomas Norton of Grantley, Yorkshire, where he was born on the 23rd of June 1716. He became a barrister in 1739, and, after a period of inactivity, obtained a large and profitable practice, becoming a K.C. in 1754, and afterwards attorney-general for the county palatine of Lancaster. In 1756 he was elected member of parliament for Appleby; he represented Wigan from 1761 to 1768, and was appointed solicitor-general for England and knighted in 1762. He took part in the proceedings against John Wilkes, and, having become attorney-general in 1763, prosecuted the 5th Lord Byron for the murder of William Chaworth, losing his office when the marquess of Rockingham came into power in July 1765. In 1769, being now member of parliament for Guildford, Norton became a privy councillor and chief justice in eyre of the forests south of the Trent, and in 1770 was chosen Speaker of the House of Commons. In 1777, when presenting the bill for the increase of the civil list to the king, he told George III. that parliament has "not only granted to your majesty a large present supply, but also a very great additional revenue; great beyond example; great beyond your majesty's highest expense." This speech aroused general attention and caused some irritation; but the Speaker was supported by Fox and by the city of London, and received the thanks of the House of Commons. George, however, did not forget these plain words, and after the general election of 1780, the prime minister, Lord North, and his followers declined to support the re-election of the retiring Speaker, alleging that his health was not equal to the duties of the office, and he was defeated when the voting took place. In 1782 he was made a peer as Baron Grantley of Markenfield. He died in London on the 1st of January 1789. He was succeeded as Baron Grantley by his eldest son William (1742-1822). Wraxall describes Norton as "a bold, able and eloquent, but not a popular pleader," and as Speaker he was aggressive and indiscreet. Derided by satirists as "Sir Bullface Doublefee," and described by Horace Walpole as one who "rose from obscure infamy to that infamous fame which will long stick to him," his character was also assailed by Junius, and the general impression is that he was a hot-tempered, avaricious and unprincipled man.

See H. Walpole, *Memoirs of the Reign of George III.*, edited by G. F. R. Barker (1894); Sir N. W. Wraxall, *Historical and Posthumous Memoirs*, edited by H. B. Wheatley (1884); and J. A. Manning, *Lives of the Speakers* (1850).

GRANTOWN, the capital of Speyside, Elginshire, Scotland. Pop. (1901) 1568. It lies on the left bank of the Spey, 23¼ m. S. of Forres by the Highland railway, with a station on the Great North of Scotland's Speyside line connecting Craigellachie with Boat of Garten. It was founded in 1776 by Sir James Grant of Grant, and became the chief seat of that ancient family, who had lived on their adjoining estate of Freuchie (Gaelic, *fraochach*, "heathery") since the beginning of the 15th century, and hence were usually described as the lairds of Freuchie. The public buildings include the town hall, court house and orphan hospital; and the industries are mainly connected with the cattle trade and the distilling of whisky. The town, built of grey granite, presents a handsome appearance, and being delightfully situated in the midst of the most beautiful pine and birch woods in Scotland, with pure air and a bracing climate, is an attractive resort. Castle Grant, immediately to the north, is the principal mansion of the earl of Seafield, the head of the Clan Grant. In a cave, still called "Lord Huntly's Cave," in a rocky glen in the vicinity, George, marquess of Huntly, lay hid during Montrose's campaign in 1644-45.

GRANULITE (Lat. *granulum*, a little grain), a name used by petrographers to designate two distinct classes of rocks. According to the terminology of the French school it signifies a granite in which both kinds of mica (muscovite and biotite) occur, and corresponds to the German *Granit*, or to the English “muscovite biotite granite.” This application has not been accepted generally. To the German petrologists “granulite” means a more or less banded fine-grained metamorphic rock, consisting mainly of quartz and felspar in very small irregular crystals, and containing usually also a fair number of minute rounded pale-red garnets. Among English and American geologists the term is generally employed in this sense. The granulites are very closely allied to the gneisses, as they consist of nearly the same minerals, but they are finer grained, have usually less perfect foliation, are more frequently garnetiferous, and have some special features of microscopic structure. In the rocks of this group the minerals, as seen in a microscopic slide, occur as small rounded grains forming a mosaic closely fitted together. The individual crystals have never perfect form, and indeed rarely any traces of it. In some granulites they interlock, with irregular borders; in others they have been drawn out and flattened into tapering lenticles by crushing. In most cases they are somewhat rounded with smaller grains between the larger. This is especially true of the quartz and felspar which are the predominant minerals; mica always appears as flat scales (irregular or rounded but not hexagonal). Both muscovite and biotite may be present and vary considerably in abundance; very commonly they have their flat sides parallel and give the rock a rudimentary schistosity, and they may be aggregated into bands—in which case the granulites are indistinguishable from certain varieties of gneiss. The garnets are very generally larger than the above-mentioned ingredients, and easily visible with the eye as pink spots on the broken surfaces of the rock. They usually are filled with enclosed grains of the other minerals.

The felspar of the granulites is mostly orthoclase or cryptoperthite; microcline, oligoclase and albite are also common. Basic felspars occur only rarely. Among accessory minerals, in addition to apatite, zircon, and iron oxides, the following may be mentioned: hornblende (not common), riebeckite (rare), epidote and zoisite, calcite, sphene, andalusite, sillimanite, kyanite, hercynite (a green spinel), rutile, orthite and tourmaline. Though occasionally we may find larger grains of felspar, quartz or epidote, it is more characteristic of these rocks that all the minerals are in small, nearly uniform, imperfectly shaped individuals.

On account of the minuteness with which it has been described and the important controversies on points of theoretical geology which have arisen regarding it, the granulite district of Saxony (around Rosswein, Penig, &c.) may be considered the typical region for rocks of this group. It should be remembered that though granulites are probably the commonest rocks of this country, they are mingled with granites, gneisses, gabbros, amphibolites, mica schists and many other petrographical types. All of these rocks show more or less metamorphism either of a thermal character or due to pressure and crushing. The granites pass into gneiss and granulite; the gabbros into flaser gabbro and amphibolite; the slates often contain andalusite or chiastolite, and show transitions to mica schists. At one time these rocks were regarded as Archean gneisses of a special type. Johannes Georg Lehmann propounded the hypothesis that their present state was due principally to crushing acting on them in a solid condition, grinding them down and breaking up their minerals, while the pressure to which they were subjected welded them together into coherent rock. It is now believed, however, that they are comparatively recent and include sedimentary rocks, partly of Palaeozoic age, and intrusive masses which may be nearly massive or may have gneissose, flaser or granulitic structures. These have been developed largely by the injection of semi-consolidated highly viscous intrusions, and the varieties of texture are original or were produced very shortly after the crystallization of the rocks. Meanwhile, however, Lehmann’s advocacy of post-consolidation crushing as a factor in the development of granulites has been so successful that the terms granulitization and granulitic structures are widely employed to indicate the results of dynamometamorphism acting on rocks at a period long after their solidification.

The Saxon granulites are apparently for the most part igneous and correspond in composition to granites and porphyries. There are, however, many granulites which undoubtedly were originally sediments (arkoses, grits and sandstones). A large part of the highlands of Scotland consists of paragranulites of this kind, which have received the group name of “Moine gneisses.”

Along with the typical acid granulites above described, in Saxony, India, Scotland and other countries there occur dark-coloured basic granulites (“trap granulites”). These are fine-grained rocks, not usually banded, nearly black in colour with small red spots of garnet. Their essential minerals are pyroxene, plagioclase and garnet: chemically they resemble the

gabbros. Green augite and hypersthene form a considerable part of these rocks, they may contain also biotite, hornblende and quartz. Around the garnets there is often a radial grouping of small grains of pyroxene and hornblende in a clear matrix of felspar: these “centric” structures are frequent in granulites. The rocks of this group accompany gabbro and serpentine, but the exact conditions under which they are formed and the significance of their structures is not very clearly understood.

(J. S. F.)

GRANVELLA, ANTOINE PERRENOT, Cardinal de (1517-1586), one of the ablest and most influential of the princes of the church during the great political and ecclesiastical movements which immediately followed the appearance of Protestantism in Europe, was born on the 20th of August 1517 at Besançon, where his father, Nicolas Perrenot de Granvella (1484-1550), who afterwards became chancellor of the empire under Charles V., was practising as a lawyer. Later Nicolas held an influential position in the Netherlands, and from 1530 until his death he was one of the emperor’s most trusted advisers in Germany. On the completion of his studies in law at Padua and in divinity at Louvain, Antoine held a canonry at Besançon, but he was promoted to the bishopric of Arras when barely twenty-three (1540). In his episcopal capacity he attended several diets of the empire, as well as the opening meetings of the council of Trent; and the influence of his father, now chancellor, led to his being entrusted with many difficult and delicate pieces of public business, in the execution of which he developed a rare talent for diplomacy, and at the same time acquired an intimate acquaintance with most of the currents of European politics. One of his specially noteworthy performances was the settlement of the terms of peace after the defeat of the league of Schmalkalden at Mühlberg in 1547, a settlement in which, to say the least, some particularly sharp practice was exhibited. In 1550 he succeeded his father in the office of secretary of state; in this capacity he attended Charles in the war with Maurice, elector of Saxony, accompanied him in the flight from Innsbruck, and afterwards drew up the treaty of Passau (August 1552). In the following year he conducted the negotiations for the marriage of Mary of England and Philip II. of Spain, to whom, in 1555, on the abdication of the emperor, he transferred his services, and by whom he was employed in the Netherlands. In April 1559 Granvella was one of the Spanish commissioners who arranged the peace of Cateau Cambrésis, and on Philip’s withdrawal from the Netherlands in August of the same year he was appointed prime minister to the regent, Margaret of Parma. The policy of repression which in this capacity he pursued during the next five years secured for him many tangible rewards, in 1560 he was elevated to the archiepiscopal see of Malines, and in 1561 he received the cardinal’s hat; but the growing hostility of a people whose religious convictions he had set himself to trample under foot ultimately made it impossible for him to continue in the Low Countries, and by the advice of his royal master he, in March 1564, retired to Franche Comté. Nominally this withdrawal was only of a temporary character, but it proved to be final. The following six years were spent in comparative quiet, broken, however, by a visit to Rome in 1565; but in 1570 Granvella, at the call of Philip, resumed public life by accepting another mission to Rome. Here he helped to arrange the alliance between the Papacy, Venice and Spain against the Turks, an alliance which was responsible for the victory of Lepanto. In the same year he became viceroy of Naples, a post of some difficulty and danger, which for five years he occupied with ability and success. He was summoned to Madrid in 1575 by Philip II. to be president of the council for Italian affairs. Among the more delicate negotiations of his later years were those of 1580, which had for their object the ultimate union of the crowns of Spain and Portugal, and those of 1584, which resulted in a check to France by the marriage of the Spanish infanta Catherine to Charles Emmanuel, duke of Savoy. In the same year he was made archbishop of Besançon, but meanwhile he had been stricken with a lingering disease; he was never enthroned, but died at Madrid on the 21st of September 1586. His body was removed to Besançon, where his father had been buried. Granvella was a man of great learning, which was equalled by his industry, and these qualities made him almost indispensable both to Charles V. and to Philip II.

Numerous letters and memoirs of Granvella are preserved in the archives of Besançon. These were to some extent made use of by Prosper Levêque in his *Mémoires pour servir* (1753), as well as by the Abbé Boisot in the *Trésor de Granvella*. A commission for publishing the whole of the letters and memoirs was appointed by Guizot in 1834, and the result has

been the issue of nine volumes of the *Papiers d'État du cardinal de Granvelle*, edited by C. Weiss (Paris, 1841-1852). They form a part of the *Collection de documents inédits sur l'histoire de France*, and were supplemented by the *Correspondance du cardinal Granvelle, 1565-1586*, edited by M. E. Poullet and G. J. C. Piot (12 vols., Brussels, 1878-1896). See also the anonymous *Histoire du cardinal de Granville*, attributed to Courchetet D'Esnans (Paris, 1761); J. L. Motley, *Rise of the Dutch Republic*; M. Philippson, *Ein Ministerium unter Philipp II.* (Berlin, 1895); and the *Cambridge Modern History* (vol. iii. 1904).

GRANVILLE, GRANVILLE GEORGE LEVESON-GOWER, 2ND EARL (1815-1891), English statesman, eldest son of the 1st Earl Granville (1773-1846), by his marriage with Lady Harriet, daughter of the duke of Devonshire, was born in London on the 11th of May 1815. His father, Granville Leveson-Gower, was a younger son of Granville, 2nd Lord Gower and 1st marquess of Stafford (1720-1803), by his third wife; an elder son by the second wife (a daughter of the 1st duke of Bridgwater) became the 2nd marquess of Stafford, and his marriage with the daughter and heiress of the 17th earl of Sutherland (countess of Sutherland in her own right) led to the merging of the Gower and Stafford titles in that of the dukes of Sutherland (created 1833), who represent the elder branch of the family. As Lord Granville Leveson-Gower, the 1st Earl Granville (created viscount in 1815 and earl in 1833) entered the diplomatic service and was ambassador at St Petersburg (1804-1807) and at Paris (1824-1841). He was a Liberal in politics and an intimate friend of Canning. The title of Earl Granville had been previously held in the Carteret family.

After being at Eton and Christ Church, Oxford, young Lord Leveson went to Paris for a short time under his father, and in 1836 was returned to parliament in the Whig interest for Morpeth. For a short time he was under-secretary for foreign affairs in Lord Melbourne's ministry. In 1840 he married Lady Acton (Marie Louise Pelline de Dalberg, widow of Sir Richard Acton; see ACTON and DALBERG). From 1841 till his father's death in 1846, when he succeeded to the title, he sat for Lichfield. In the House of Lords he signalized himself as a Free Trader, and Lord John Russell made him master of the buckhounds (1846). He proved a useful member of the party, and his influence and amiable character were valuable in all matters needing diplomacy and good breeding. He became vice-president of the Board of Trade in 1848, and took a prominent part in promoting the great exhibition of 1851. In the latter year, having already been admitted to the cabinet, he succeeded Palmerston at the foreign office until Lord John Russell's defeat in 1852; and when Lord Aberdeen formed his government at the end of the year, he became first president of the council, and then chancellor of the duchy of Lancaster (1854). Under Lord Palmerston (1855) he was president of the council. His interest in education (a subject associated with this office) led to his election (1856) as chancellor of the London University, a post he held for thirty-five years; and he was a prominent champion of the movement for the admission of women, and also of the teaching of modern languages. From 1855 Lord Granville led the Liberals in the Upper House, both in office, and, after Palmerston's resignation in 1858, in opposition. He went in 1856 as head of the British mission to the tsar's coronation in Moscow. In June 1859 the queen, embarrassed by the rival ambitions of Palmerston and Russell, sent for him to form a ministry, but he was unable to do so, and Palmerston again became prime minister, with Lord John as foreign secretary and Granville as president of the council. In 1860 his wife died, and to this heavy loss was shortly added that of his great friends Lord and Lady Canning and of his mother (1862); but he devoted himself to his political work, and retained his office when, on Palmerston's death in 1865, Lord Russell (now a peer) became prime minister and took over the leadership in the House of Lords. He was made Lord Warden of the Cinque Ports, and in the same year married again, his second wife being Miss Castalia Campbell. From 1866 to 1868 he was in opposition, but in December 1868 he became colonial secretary in Gladstone's first ministry. His tact was invaluable to the government in carrying the Irish Church and Land Bills through the House of Lords. On the 27th of June 1870, on Lord Clarendon's death, he was transferred to the foreign office. Lord Granville's name is mainly associated with his career as foreign secretary (1870-1874 and 1880-1885); but the Liberal foreign policy of that period was not distinguished by enterprise or "backbone." Lord Granville personally was patient and polite, but his courteous and pacific methods were somewhat inadequate in dealing with the new situation then arising in Europe and outside it; and foreign governments had little scruple in creating embarrassments for Great Britain, and relying on the disinclination of the Liberal leaders to take strong

measures. The Franco-German War of 1870 broke out within a few days of Lord Granville's quoting in the House of Lords (11th of July) the curiously unprophetic opinion of the permanent under-secretary (Mr Hammond) that "he had never known so great a lull in foreign affairs." Russia took advantage of the situation to denounce the Black Sea clauses of the treaty of Paris, and Lord Granville's protest was ineffectual. In 1871 an intermediate zone between Asiatic Russia and Afghanistan was agreed on between him and Shuválov; but in 1873 Russia took possession of Khiva, within the neutral zone, and Lord Granville had to accept the aggression. When the Conservatives came into power in 1874, his part for the next six years was to criticize Disraeli's "spirited" foreign policy, and to defend his own more pliant methods. He returned to the foreign office in 1880, only to find an anti-British spirit developing in German policy which the temporizing methods of the Liberal leaders were generally powerless to deal with. Lord Granville failed to realize in time the importance of the Angra Pequeña question in 1883-1884, and he was forced, somewhat ignominiously, to yield to Bismarck over it. Whether in Egypt, Afghanistan or equatorial and south-west Africa, British foreign policy was dominated by suavity rather than by the strength which commands respect. Finally, when Gladstone took up Home Rule for Ireland, Lord Granville, whose mind was similarly receptive to new ideas, adhered to his chief (1886), and gracefully gave way to Lord Rosebery when the latter was preferred to the foreign office; the Liberals had now realized that they had lost ground in the country by Lord Granville's occupancy of the post. He went to the Colonial Office for six months, and in July 1886 retired from public life. He died in London on the 31st of March 1891, being succeeded in the title by his son, born in 1872. Lord Granville was a man of much charm and many friendships, and an admirable after-dinner speaker. He spoke French like a Parisian, and was essentially a diplomatist; but he has no place in history as a constructive statesman.

The life of Lord Granville (1905), by Lord Fitzmaurice, is full of interesting material for the history of the period, but being written by a Liberal, himself an under-secretary for foreign affairs, it explains rather than criticizes Lord Granville's work in that department.

(H. Ch.)

GRANVILLE, JOHN CARTERET, Earl (1690-1763), English statesman, commonly known by his earlier title as Lord Carteret, born on the 22nd of April 1690, was the son of George, 1st Lord Carteret, by his marriage with Grace Granville, daughter of Sir John Granville, 1st earl of Bath, and great grandson of the Elizabethan admiral, Sir Richard Grenville, famous for his death in the "Revenge." The family of Carteret was settled in the Channel Islands, and was of Norman descent. John Carteret was educated at Westminster, and at Christ Church, Oxford. Swift says that "with a singularity scarce to be justified he carried away more Greek, Latin and philosophy than properly became a person of his rank." Throughout life Carteret not only showed a keen love of the classics, but a taste for, and a knowledge of, modern languages and literatures. He was almost the only Englishman of his time who knew German. Harte, the author of the *Life of Gustavus Adolphus*, acknowledged the aid which Carteret had given him. On the 17th of October 1710 he married at Longleat Lady Frances Worsley, grand-daughter of the first Viscount Weymouth. He took his seat in the Lords on the 25th of May 1711. Though his family, on both sides, had been devoted to the house of Stuart, Carteret was a steady adherent of the Hanoverian dynasty. He was a friend of the Whig leaders Stanhope and Sunderland, took a share in defeating the Jacobite conspiracy of Bolingbroke on the death of Queen Anne, and supported the passing of the Septennial Act. Carteret's interests were however in foreign, and not in domestic policy. His serious work in public life began with his appointment, early in 1719, as ambassador to Sweden. During this and the following year he was employed in saving Sweden from the attacks of Peter the Great, and in arranging the pacification of the north. His efforts were finally successful. During this period of diplomatic work he acquired an exceptional knowledge of the affairs of Europe, and in particular of Germany, and displayed great tact and temper in dealing with the Swedish senate, with Queen Ulrica, with the king of Denmark and Frederick William I. of Prussia. But he was not qualified to hold his own in the intrigues of court and parliament in London. Named secretary of state for the southern department on his return home, he soon became helplessly in conflict with the intrigues of Townshend and Sir Robert Walpole. To Walpole, who looked upon every able colleague, or subordinate, as an enemy to be removed, Carteret was exceptionally odious. His capacity to speak German with the king would alone have made Sir Robert detest him. When, therefore, the violent agitation in Ireland against

Wood's halfpence (see SWIFT, JONATHAN) made it necessary to replace the duke of Grafton as lord lieutenant, Carteret was sent to Dublin. He landed in Dublin on the 23rd of October 1724, and remained there till 1730. In the first months of his tenure of office he had to deal with the furious opposition to Wood's halfpence, and to counteract the effect of Swift's *Draper's Letters*. The lord lieutenant had a strong personal liking for Swift, who was also a friend of Lady Carteret's family. It is highly doubtful whether Carteret could have reconciled his duty to the crown with his private friendships, if government had persisted in endeavouring to force the detested coinage on the Irish people. Wood's patent was however withdrawn, and Ireland settled down. Carteret was a profuse and popular lord lieutenant who pleased both the "English interest" and the native Irish. He was at all times addicted to lavish hospitality, and according to the testimony of contemporaries was too fond of burgundy. When he returned to London in 1730, Walpole was firmly established as master of the House of Commons, and as the trusted minister of King George II. He had the full confidence of Queen Caroline, whom he prejudiced against Carteret. Till the fall of Walpole in 1742, Carteret could take no share in public affairs except as a leader of opposition of the Lords. His brilliant parts were somewhat obscured by his rather erratic conduct, and a certain contempt, partly aristocratic and partly intellectual, for commonplace men and ways. He endeavoured to please Queen Caroline, who loved literature, and he has the credit, on good grounds, of having paid the expenses of the first handsome edition of *Don Quixote* to please her. But he reluctantly, and most unwisely, allowed himself to be entangled in the scandalous family quarrel between Frederick, prince of Wales, and his parents. Queen Caroline was provoked into classing him and Bolingbroke, as "the two most worthless men of parts in the country." Carteret took the popular side in the outcry against Walpole for not making war on Spain. When the War of the Austrian Succession approached, his sympathies were entirely with Maria Theresa—mainly on the ground that the fall of the house of Austria would dangerously increase the power of France, even if she gained no accession of territory. These views made him welcome to George II., who gladly accepted him as secretary of state in 1742. In 1743 he accompanied the king of Germany, and was present at the battle of Dettingen on the 27th of June. He held the secretaryship till November 1744. He succeeded in promoting an agreement between Maria Theresa and Frederick. He understood the relations of the European states, and the interests of Great Britain among them. But the defects which had rendered him unable to baffle the intrigues of Walpole made him equally unable to contend with the Pelhams. His support of the king's policy was denounced as subservience to Hanover. Pitt called him "an execrable, a sole minister who had renounced the British nation." A few years later Pitt adopted an identical policy, and professed that whatever he knew he had learnt from Carteret. On the 18th of October 1744 Carteret became Earl Granville on the death of his mother. His first wife died in June 1743 at Aschaffenburg, and in April 1744 he married Lady Sophia Fermor, daughter of Lord Pomfret —a fashionable beauty and "reigning toast" of London society, who was younger than his daughters. "The nuptials of our great Quixote and the fair Sophia," and Granville's ostentatious performance of the part of lover, were ridiculed by Horace Walpole. The countess Granville died on the 7th of October 1745, leaving one daughter Sophia, who married Lord Shelburne, 1st marquis of Lansdowne. This marriage may have done something to increase Granville's reputation for eccentricity. In February 1746 he allowed himself to be entrapped by the intrigues of the Pelhams into accepting the secretaryship, but resigned in forty-eight hours. In June 1751 he became president of the council, and was still liked and trusted by the king, but his share in government did not go beyond giving advice, and endeavouring to forward ministerial arrangements. In 1756 he was asked by Newcastle to become prime minister as the alternative to Pitt, but Granville, who perfectly understood why the offer was made, declined and supported Pitt. When in October 1761 Pitt, who had information of the signing of the "Family Compact" wished to declare war on Spain, and declared his intention to resign unless his advice was accepted, Granville replied that "the opinion of the majority (of the Cabinet) must decide." He spoke in complimentary terms of Pitt, but resisted his claim to be considered as a "sole minister" or, in the modern phrase, "a prime minister." Whether he used the words attributed to him in the Annual Register for 1761 is more than doubtful, but the minutes of council show that they express his meaning. Granville remained in office as president till his death. His last act was to listen while on his death-bed to the reading of the preliminaries of the treaty of Paris. He was so weak that the under-secretary, Robert Wood, author of an essay on *The Original Genius of Homer*, would have postponed the business, but Granville said that it "could not prolong his life to neglect his duty," and quoted the speech of Sarpedon from *Iliad* xii. 322-328, repeating the last word (ἴομεν) "with a calm and determined resignation." He died in his house in Arlington Street, London, on the 22nd of January 1763. The title of Granville descended to his son Robert, who died without issue in 1776, when the earldom of this creation became extinct.

A somewhat partisan life of Granville was published in 1887, by Archibald Ballantyne, under the title of *Lord Carteret, a Political Biography*.

GRANVILLE, a town of Cumberland county, New South Wales, 13 m. by rail W. of Sydney. Pop. (1901) 5094. It is an important railway junction and manufacturing town, producing agricultural implements, tweed, pipes, tiles and bricks; there are also tanneries, flour-mills, and kerosene and meat export works. It became a municipality in 1885.

GRANVILLE, a fortified sea-port and bathing-resort of north-western France, in the department of Manche, at the mouth of the Bosq, 85 m. S. by W. of Cherbourg by rail. Pop. (1906) 10,530. Granville consists of two quarters, the upper town built on a promontory jutting into the sea and surrounded by ramparts, and the lower town and harbour lying below it. The barracks and the church of Notre-Dame, a low building of granite, partly Romanesque, partly late Gothic in style, are in the upper town. The port consists of a tidal harbour, two floating basins and a dry dock. Its fleets take an active part in deep sea fishing, including the cod-fishing off Newfoundland, and oyster-fishing is carried on. It has regular communication with Guernsey and Jersey, and with the islands of St Pierre and Miquelon. 364
The principal exports are eggs, vegetables and fish; coal, timber and chemical manures are imported. The industries include ship-building, fish-salting, the manufacture of cod-liver oil, the preserving of vegetables, dyeing, metal-founding, rope-making and the manufacture of chemical manures. Among the public institutions are a tribunal and a chamber of commerce. In the commune are included the Iles Chausey about 7½ m. N.W. of Granville (see Channel Islands). Granville, before an insignificant village, was fortified by the English in 1437, taken by the French in 1441, bombarded and burned by the English in 1695, and unsuccessfully besieged by the Vendean troops in 1793. It was again bombarded by the English in 1803.

GRANVILLE, a village in Licking county, Ohio, U.S.A., in the township of Granville, about 6 m. W. of Newark and 27 m. E. by N. of Columbus. Pop. of the village (1910) 1394; of the township (1910) 2442. Granville is served by the Toledo & Ohio Central and the Ohio Electric railways, the latter reaching Newark (where it connects with the Pittsburg, Cincinnati, Chicago & St Louis and the Baltimore & Ohio railways), Columbus, Dayton, Zanesville and Springfield. Granville is the seat of Denison University, founded in 1831 by the Ohio Baptist Education Society and opened as a manual labour school, called the Granville Literary and Theological Institution. It was renamed Granville College in 1845, and took its present name in 1854 in honour of William S. Denison of Adamsville, Ohio, who had given $10,000 to the college. The university comprised in 1907-1908 five departments: Granville College (229 students), the collegiate department for men; Shepardson College (246 students, including 82 in the preparatory department), the collegiate department for women, founded as the Young Ladies' Institute of Granville in 1859, given to the Baptist denomination in 1887 by Dr Daniel Shepardson, its principal and owner, and closely affiliated for scholastic purposes, since 1900, with the university, though legally it is still a distinct institution; Doane Academy (137 students), the preparatory department for boys, established in 1831, named Granville Academy in 1887, and renamed in 1895 in honour of William H. Doane of Cincinnati, who gave to it its building; a conservatory of music (137 students); and a school of art (38 students).

In 1805 the Licking Land Company, organized in the preceding year in Granville, Massachusetts, bought 29,040 acres of land in Ohio, including the site of Granville; the town was laid out, and in the last months of that year settlers from Granville, Mass., began to arrive. By January 1806 the colony numbered 234 persons; the township was incorporated in

1806 and the village was incorporated in 1831. There are several remarkable Indian mounds near Granville, notably one shaped like an alligator.

See Henry Bushnell, *History of Granville, Ohio* (Columbus, O., 1889).

GRAPE, the fruit of the vine (*q.v.*). The word is adopted from the O. Fr. *grape*, mod. *grappe*, bunch or cluster of flowers or fruit, *grappes de raisin*, bunch of grapes. The French word meant properly a hook; cf. M.H.G. *krapfe*, Eng. "grapnel," and "cramp." The development of meaning seems to be vine-hook, cluster of grapes cut with a hook, and thence in English a single grape of a cluster. The projectile called "grape" or "grape-shot," formerly used with smooth-bore ordnance, took its name from its general resemblance to a bunch of grapes. It consisted of a number of spherical bullets (heavier than those of the contemporary musket) arranged in layers separated by thin iron plates, a bolt passing through the centre of the plates binding the whole together. On being discharged the projectile delivered the bullets in a shower somewhat after the fashion of case-shot.

GRAPHICAL METHODS, devices for representing by geometrical figures the numerical data which result from the quantitative investigation of phenomena. The simplest application is met with in the representation of tabular data such as occur in statistics. Such tables are usually of single entry, *i.e.* to a certain value of one variable there corresponds one, and only one, value of the other variable. To construct the graph, as it is called, of such a table, Cartesian co-ordinates are usually employed. Two lines or axes at right angles to each other are chosen, intersecting at a point called the origin; the horizontal axis is the axis of abscissae, the vertical one the axis of ordinates. Along one, say the axis of abscissae, distances are taken from the origin corresponding to the values of one of the variables; at these points perpendiculars are erected, and along these ordinates distances are taken corresponding to the related values of the other variable. The curve drawn through these points is the graph. A general inspection of the graph shows in bold relief the essential characters of the table. For example, if the world's production of corn over a number of years be plotted, a poor yield is represented by a depression, a rich one by a peak, a uniform one over several years by a horizontal line and so on. Moreover, such graphs permit a convenient comparison of two or more different phenomena, and the curves render apparent at first sight similarities or differences which can be made out from the tables only after close examination. In making graphs for comparison, the scales chosen must give a similar range of variation, otherwise the correspondence may not be discerned. For example, the scales adopted for the average consumption of tea and sugar must be ounces for the former and pounds for the latter. Cartesian graphs are almost always yielded by automatic recording instruments, such as the barograph, meteorograph, seismometer, &c. The method of polar co-ordinates is more rarely used, being only specially applicable when one of the variables is a direction or recorded as an angle. A simple case is the representation of photometric data, *i.e.* the value of the intensity of the light emitted in different directions from a luminous source (see LIGHTING).

The geometrical solution of arithmetical and algebraical problems is usually termed graphical analysis; the application to problems in mechanics is treated in MECHANICS, § 5, *Graphic Statics*, and DIAGRAM. A special phase is presented in VECTOR ANALYSIS.

GRAPHITE, a mineral species consisting of the element carbon crystallized in the rhombohedral system. Chemically, it is thus indentical with the cubic mineral diamond, but between the two there are very wide differences in physical characters. Graphite is black

and opaque, whilst diamond is colourless and transparent; it is one of the softest (H = 1) of minerals, and diamond the hardest of all; it is a good conductor of electricity, whilst diamond is a bad conductor. The specific gravity is 2.2, that of diamond is 3.5. Further, unlike diamond, it never occurs as distinctly developed crystals, but only as imperfect six-sided plates and scales. There is a perfect cleavage parallel to the surface of the scales, and the cleavage flakes are flexible but not elastic. The material is greasy to the touch, and soils everything with which it comes into contact. The lustre is bright and metallic. In its external characters graphite is thus strikingly similar to molybdenite (*q.v.*).

The name graphite, given by A. G. Werner in 1789, is from the Greek γράφειν, "to write," because the mineral is used for making pencils. Earlier names, still in common use, are plumbago and black-lead, but since the mineral contains no lead these names are singularly inappropriate. Plumbago (Lat. *plumbum*, lead) was originally used for an artificial product obtained from lead ore, and afterwards for the ore (galena) itself; it was confused both with graphite and with molybdenite. The true chemical nature of graphite was determined by K. W. Scheele in 1779.

Graphite occurs mainly in the older crystalline rocks—gneiss, granulite, schist and crystalline limestone—and also sometimes in granite: it is found as isolated scales embedded in these rocks, or as large irregular masses or filling veins. It has also been observed as a product of contact-metamorphism in carbonaceous clay-slates near their contact with granite, and where igneous rocks have been intruded into beds of coal; in these cases the mineral has clearly been derived from organic matter. The graphite found in granite and in veins in gneiss, as well as that contained in meteoric irons, cannot have had such an origin. As an artificial product, graphite is well known as dark lustrous scales in grey pig-iron, and in the "kish" of iron furnaces: it is also produced artificially on a large scale, together with 365
carborundum, in the electric furnace (see below). The graphite veins in the older crystalline rocks are probably akin to metalliferous veins and the material derived from deep-seated sources; the decomposition of metallic carbides by water and the reduction of hydrocarbon vapours have been suggested as possible modes of origin. Such veins often attain a thickness of several feet, and sometimes possess a columnar structure perpendicular to the enclosing walls; they are met with in the crystalline limestones and other Laurentian rocks of New York and Canada, in the gneisses of the Austrian Alps and the granulites of Ceylon. Other localities which have yielded the mineral in large amount are the Alibert mine in Irkutsk, Siberia and the Borrowdale mine in Cumberland. The Santa Maria mines of Sonora, Mexico, probably the richest deposits in the world, supply the American lead pencil manufacturers. The graphite of New York, Pennsylvania and Alabama is "flake" and unsuitable for this purpose.

Graphite is used for the manufacture of pencils, dry lubricants, grate polish, paints, crucibles and for foundry facings. The material as mined usually does not contain more than 20 to 50% of graphite: the ore has therefore to be crushed and the graphite floated off in water from the heavier impurities. Even the purest forms contain a small percentage of volatile matter and ash. The Cumberland graphite, which is especially suitable for pencils, contains about 12% of impurities.

(L. J. S.)

Artificial Manufacture.—The alteration of carbon at high temperatures into a material resembling graphite has long been known. In 1893 Girard and Street patented a furnace and a process by which this transformation could be effected. Carbon powder compressed into a rod was slowly passed through a tube in which it was subjected to the action of one or more electric arcs. E. G. Acheson, in 1896, patented an application of his carborundum process to graphite manufacture, and in 1899 the International Acheson Graphite Co. was formed, employing electric current from the Niagara Falls. Two procedures are adopted: (1) graphitization of moulded carbons; (2) graphitization of anthracite *en masse*. The former includes electrodes, lamp carbons, &c. Coke, or some other form of amorphous carbon, is mixed with a little tar, and the required article moulded in a press or by a die. The articles are stacked transversely in a furnace, each being packed in granular coke and covered with carborundum. At first the current is 3000 amperes at 220 volts, increasing to 9000 amperes at 20 volts after 20 hours. In graphitizing *en masse* large lumps of anthracite are treated in the electric furnace. A soft, unctuous form results on treating carbon with ash or silica in special furnaces, and this gives the so-called "deflocculated" variety when treated with gallotannic acid. These two modifications are valuable lubricants. The massive graphite is very easily machined and is widely used for electrodes, dynamo brushes, lead pencils and the like.

See "Graphite and its Uses," *Bull. Imperial Institute*, (1906) P. 353. (1907) p. 70; F. Cirkel,

Graphite (Ottawa, 1907).

(W. G. M.)

GRAPTOLITES, an assemblage of extinct zoophytes whose skeletal remains are found in the Palaeozoic rocks, occasionally in great abundance. They are usually preserved as branching or unbranching carbonized bodies, tree-like, leaf-like or rod-like in shape, their edges regularly toothed or denticulated. Most frequently they occur lying on the bedding planes of black shales; less commonly they are met with in many other kinds of sediment, and when in limestone they may retain much of their original relief and admit of a detailed microscopic study.

Each Graptolite represents the common horny or chitinous investment or supporting structure of a colony of zooids, each tooth-like projection marking the position of the sheath or *theca* of an individual zooid. Some of the branching forms have a distinct outward resemblance to the polyparies of *Sertularia* and *Plumularia* among the recent Hydroida (*Calyptoblastea*); in none of the unbranching forms, however, is the similarity by any means close.

The Graptolite polyparies vary considerably in size: the majority range from 1 in. to about 6 in. in length; few examples have been met with having a length or more than 30 in.

Very different views have been held as to the systematic place and rank of the Graptolites. Linnaeus included them in his group of false fossils (*Graptolithus* = written stone). At one time they were referred by some to the Polyzoa (Bryozoa), and later, by almost general consent, to the Hydroida (Calyptoblastea) among the Hydrozoa (Hydromedusae). Of late years an opinion is gaining ground that they may be regarded as constituting collectively an independent phylum of their own (*Graptolithina*).

There are two main groups, or sub-phyla: the *Graptoloidea* or Graptolites proper, and the *Dendroidea* or tree-like Graptolites; the former is typified by the unbranched genus *Monograptus* and the latter by the many-branched genus *Dendrograptus*.

A *Monograptus* makes its first appearance as a minute dagger-like body (the *sicula*), which represents the flattened covering of the primary or embryonic zooid of the colony. This sicula, which had originally the shape of a hollow cone, is formed of two portions or regions —an upper and smaller (*apical* or embryonic) portion, marked by delicate longitudinal lines, and having a fine tabular thread (the *nema*) proceeding from its apex; and a lower (thecal or *apertural*) portion, marked by transverse lines of growth and widening in the direction of the mouth, the lip or apertural margin of which forms the broad end of the sicula. This margin is normally furnished with a perpendicular spine (*virgella*) and occasionally with two shorter lateral spines or lobes.

A bud is given off from the sicula at a variable distance along its length. From this bud is developed the first zooid and first serial theca of the colony. This theca grows in the direction of the apex of the sicula, to which it adheres by its dorsal wall. Thus while the mouth of the sicula is directed downwards, that of the first serial theca is pointed upwards, making a theoretical angle of about 180° with the direction of that of the sicula.

From this first theca originates a second, opening in the same direction, and from the second a third, and soon, in a continuous linear series until the polypary is complete. Each zooid buds from the one immediately preceding it in the series, and intercommunication is effected by all the budding orifices (including that in the wall of the sicula) remaining permanently open. The sicula itself ceases to grow soon after the earliest theca have been developed; it remains permanently attached to the dorsal wall of the polypary, of which it forms the proximal end, its apex rarely reaching beyond the third or fourth theca.

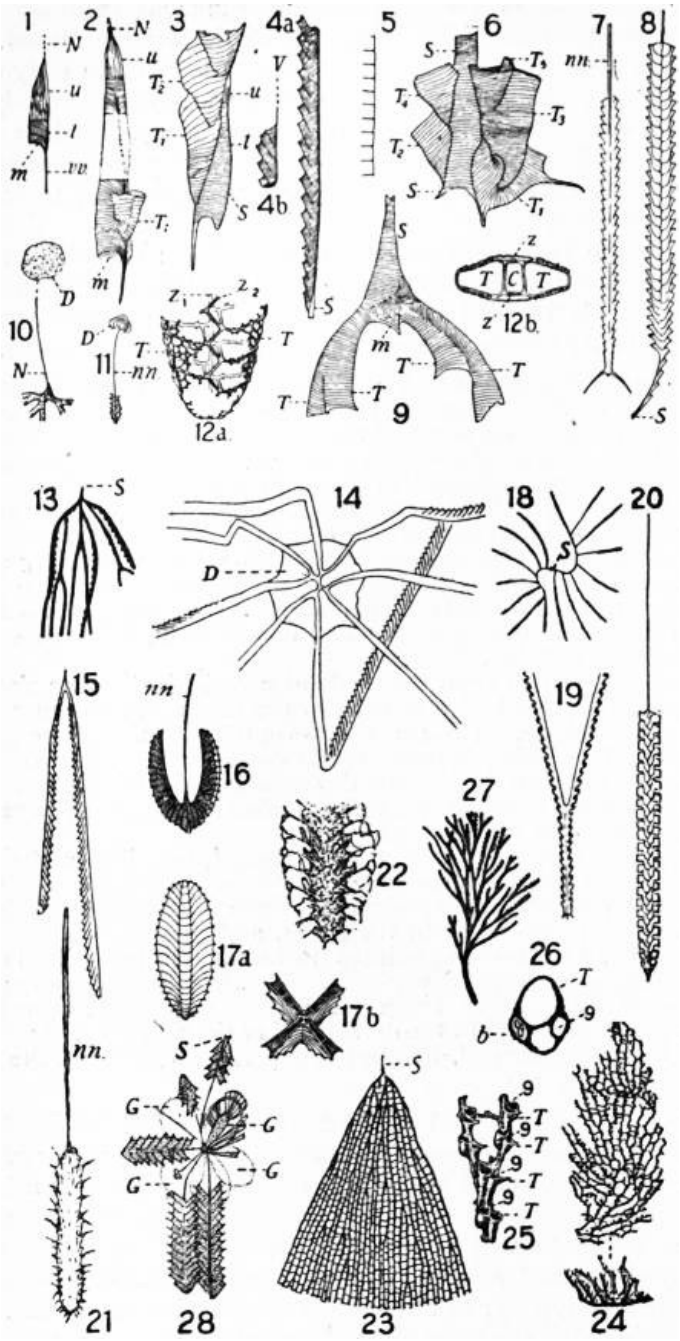
A fine cylindrical rod or fibre (the so-called solid axis or *virgula*) becomes developed in a median groove in the dorsal wall of the polypary, and is sometimes continued distally as a naked rod. It was formerly supposed that a virgula was present in all the Graptoloidea; hence the term *Rhabdophora* sometimes employed for the Graptoloidea in general, and *rhabdosome* for the individual polypary; but while the virgula is present in many (Axonophora) it is absent as such in others (Axonolipa).

The Graptoloidea are arranged in eight families, each named after a characteristic genus: (1) Dichograptidae; (2) Leptograptidae; (3) Dicranograptidae; (4) Diplograptidae; (5)

Glossograptidae (sub-family, Lasiograptidae); (6) Retiolitidae; (7) Dimorphograptidae; (8) Monograptidae.

In all these families the polypary originates as in *Monograptus* from a nema-bearing sicula, which invariably opens downwards and gives off only a single bud, such branching as may take place occurring at subsequent stages in the growth of the polypary. In some species young examples have been met with in which the nema ends above in a small membranous disk, which has been interpreted as an organ of attachment to the underside of floating bodies, probably sea weeds, from which the young polypary hung suspended.

Broadly speaking, these families make their first appearance in time in the order given above, and show a progressive morphological evolution along certain special lines. There is a tendency for the branches to become reduced in number, and for the serial thecae to become directed more and more upwards towards the line of the nema. In the oldest family —Dichograptidae—in which the branching polypary is bilaterally symmetrical and the thecae uniserial (*monoprionidian*)—there is a gradation from earlier groups with many branches to later groups with only two; and from species in which all the branches and their thecae are directed downwards, through species in which the branches become bent back more and more outwards and upwards, until in some the terminal thecae open almost vertically. In the genus *Phyllograptus* the branches have become reduced to four and these coalesce by their dorsal walls along the line of the nema, and the sicula becomes embedded in the base of the polypary. In the family of the Diplograptidae the branches are reduced to two; these also coalesce similarly by their dorsal walls, and the polypary thus becomes biserial (*diprionidian*), and the line of the nema is taken by a long axial tube-like structure, the *nemacaulus* or virgular tube. Finally, in the latest family, the Monograptidae, the branches are theoretically reduced to one, the polypary is uniserial throughout, and all the thecae are directed outwards and upwards.



1, *Diptograptus*, young sicula.

2, *Monograptus dubius*, sicula and first serial theca (partly restored).

3, Young form (all above after Wiman).

4*a*, Older form.

4*b*, Showing virgula (after Holm).

5, *Rastrites distans.*

6, Base of Diptograptus (after Wiman).

7, D. calcaratus.

8, Dimorphograptus.

9, Base of *Didymograptus minulus* (after Holm).

10, Young *Dictyograptus*, with primary disk.

11, Ibid. *Diptograptus* (after Ruedemann).

12 *a-b*, Base and transverse section, *Retiolites Geinitzianus* (after Holm).

13, *Bryograptus Kjerulfi*.

14, *Dichograptus octobrachiatus*, with

21, *Glossograptus Hincksii*.

22, *Lasiograptus costatus* (after Elles and Wood).

23, *Dictyonema* (*-graptus*) *flabelliforme* (*-is*).

24, *Dictyonema* (*-dendron*) *peltatum* with base of attachment.

25, *D. cervicorne*, branches (after Holm).

26, *D. rarum* (section after Wiman).

27, *Dendrograptus Hallianus*.

28, Synrhabdosome of *Diptograptus* (after Ruedemann).

S, Sicula.

u, Upper or apical portion.

l, Lower or apertural.

m, Mouth.

N, Nema.

nn, Nemacaulus or virgular tube.

V, Virgula.

vv, Virgella.

zz, Septal strands.

central disk.
15, *Didymograptus Murchisoni*.
16, *D. gibberulus*.
17 *a-b*, *Phyllograptus* and transverse section.
18, *Nemagraptus gracilis*.
19, *Dicranograptus ramosus*.
20, *Climacograptus Scharenbergi*.

T, Theca.
C, Common canal (in Retiolites).
G, Gonangium.
g, Gonotheca.
b, Budding theca.

The thecae in the earliest family—Dichograptidae—are so similar in form to the sicula itself that the polypary has been compared to a colony of siculae; there is the greatest variation in shape in those of the latest family—Monograptidae—in some species of which the terminal portion of each theca becomes isolated (*Rastrites*) and in some coiled into a rounded lobe. The thecae in several of the families are occasionally provided with spines or lateral processes: the spines are especially conspicuous at the base in some biserial forms: in the Lasiograptidae the lateral processes originate a marginal meshwork surrounding the polypary.

Histologically, the perisarc or *test* in the Graptoloidea appears to be composed of three layers, a middle layer of variable structure, and an overlying and an underlying layer of remarkable tenuity. The central layer is usually thick and marked by lines of growth; but in *Glossograptus* and *Lasiograptus* it is thinned down to a fine membrane stretched upon a skeleton framework of lists and fibres, and in *Retiolites* this membrane is reduced to a delicate network. The groups typified by these three genera are sometimes referred to, collectively, as the *Retioloidea*, and the structure as *retioloid*.

It is the general practice of palaeontologists to regard each graptolite polypary (*rhabdosome*) developed from a single sicula as an individual of the highest order. Certain American forms, however, which are preserved as stellate groups, have been interpreted as complex umbrella-shaped colonial stocks, individuals of a still higher order (*synrhabdosomes*), composed of a number of biserial polyparies (each having a sicula at its outer extremity) attached by their nemacauli to a common centre of origin, which is provided with two disks, a swimming bladder and a ring of capsules.

In the Dendroidea, as a rule, the polypary is non-symmetrical in shape and tree-like or shrub-like in habit, with numerous branches irregularly disposed, and with a distinct stem-like or short basal portion ending below in root-like fibres or in a membranous disk or sheet of attachment. An exception, however, is constituted by the comprehensive genus *Dictyonema*, which embraces species composed of a large number of divergent and sub-parallel branches, united by transverse dissepiments into a symmetrical cone-like or funnel-shaped polypary, and includes some forms (*Dictyograptus*) which originate from a nema-bearing sicula and have been claimed as belonging to the Graptoloidea.

Of the early development of the polypary in the Dendroidea little is known, but the more mature stages have been fully worked out. In *Dictyonema* the branches show thecae of two kinds: (1) the ordinary tubular thecae answering to those of the Graptoloidea and occupied by the nourishing zooids; and (2) the so-called *bithecae*, birdnest-like cups (regarded by their discoverers as gonothecae) opening alternately right and left of the ordinary thecae. Internally, there existed a third set of thecae, held to have been inhabited by the budding individuals. In the genus *Dendrograptus* the gonothecae open within the walls of the ordinary thecae, and the branches present an outward resemblance to those of the uniserial Graptoloidea. But in striking contrast to what obtains among the Graptoloidea in general, the budding orifices in the Dendroidea become closed, and all the various cells shut off from each other.

The classification of the Dendroidea is as yet unsatisfactory: the families most conspicuous are those typified by the genera *Dendrograptus*, *Dictyonema*, *Inocaulis* and *Thamnograptus*.

As regards the *modes of reproduction among the Graptolites* little is known. In the Dendroidea, as already pointed out, the bithecae were possibly gonothecae, but they have been interpreted by some as nematophores. In the Graptoloidea certain lateral and vesicular appendages of the polypary in the Lasiograptidae have been looked upon as connected with the reproductive system; and in the umbrella-shaped *synrhabdosomes* already referred to, the common centre is surrounded by a ring of what have been regarded as ovarian capsules. The theory of the gonangial nature of the vesicular bodies in the Graptoloidea is, however, disputed by some authorities, and it has been suggested that the zooid of the sicula itself is

not the product of the normal or sexual mode of propagation in the group, but owes its origin to a peculiar type of budding or non-sexual reproduction, in which, as temporary resting or protecting structures, the vesicular bodies may have had a share.

As respects the *mode of life of the Graptolites* there can be little doubt that the Dendroidea were, with some exceptions, sessile or benthonic animals, their polyparies, like those of the recent Calyptoblastea, growing upwards, their bases remaining attached to the sea floor or to foreign bodies, usually fixed. The Graptoloidea have also been regarded by some as benthonic organisms. A more prevalent view, however, is that the majority were pseudo-planktonic or drifting colonies, hanging from the underside of floating seaweeds; their polyparies being each suspended by the nema in the earliest stages of growth, and, in later stages, some by the nemacaulus, while others became adherent above by means of a central disk or by parts of their dorsal walls. Some of these ancient seaweeds may have remained permanently rooted in the littoral regions, while others may have become broken off and drifted, like the recent Sargassum, at the mercy of the winds and currents, carrying the attached Graptolites into all latitudes. The more complex umbrella-shaped colonies of colonies (synrhabdosomes) described as provided with a common swimming bladder (pneumatophore?) may have attained a holo-planktonic or free-swimming mode of existence.

The *range of the Graptolites in time* extends from the Cambrian to the Carboniferous. The Dendroidea alone, however, have this extended range, the Graptoloidea becoming extinct at the close of Silurian time. Both groups make their first appearance together near the end of the Cambrian; but while in the succeeding Ordovician and Silurian the Dendroidea are comparatively rare, the Graptoloidea become the most characteristic and, locally, the most abundant fossils of these systems.

The species of the Graptoloidea have individually a remarkably short range in geological time; but the geographical distribution of the group as a whole, and that of many of its species, is almost world-wide. This combination of circumstances has given the Graptoloidea a paramount stratigraphical importance as palaeontological indices of the detailed sequence and correlation of the Lower Palaeozoic rocks in general. Many *Graptolite zones*, showing a constant uniformity of succession, paralleled in this respect only by the longer known Ammonite zones of the Jurassic, have been distinguished in Britain and northern Europe, each marked by a characteristic species. Many British species and associations of genera and species, occurring on corresponding horizons to those on which they are found in Britain, have been met with in the graptolite-bearing Lower Palaeozoic formations of other parts of Europe, in America, Australia, New Zealand and elsewhere.

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(C. L.*)

GRASLITZ (Czech, *Kraslice*), a town of Bohemia, on the Zwodau, 145 m. N.W. of Prague by rail. Pop. (1900) 11,803, exclusively German. Graslitz is one of the most important industrial towns of Bohemia, its specialities being the manufacture of musical instruments, carried on both as a factory and a domestic industry, and lace-making. Next in importance are cotton-spinning and weaving, machine embroidery, brewing, and the mother-of-pearl industry.

GRASMERE, a village and lake of Westmorland, in the heart of the English Lake District. The village (pop. of urban district in 1901, 781) lies near the head of the lake, on the small river Rothay and the Keswick-Ambleside road, 12½ m. from Keswick and 4 from Ambleside. The scenery is very beautiful; the valley about the lakes of Grasmere and Rydal Water is in great part wooded, while on its eastern flank there rises boldly the range of hills which includes Rydal Fell, Fairfield and Seat Sandal, and, farther north, Helvellyn. On the west side are Loughrigg Fell and Silver How. The village has become a favourite centre for tourists, but preserves its picturesque and sequestered appearance. In a house still standing William Wordsworth lived from 1799 to 1808, and it was subsequently occupied by Thomas de Quincey and by Hartley Coleridge. Wordsworth's tomb, and also that of Coleridge, are in the churchyard of the ancient church of St Oswald, which contains a memorial to Wordsworth with an inscription by John Keble. A festival called the Rushbearing takes place on the Saturday within the octave of St Oswald's day (August 5th), when a holiday is observed and the church decorated with rushes, heather and flowers. The festival is of early origin, and has been derived by some from the Roman *Floralia*, but appears also to have been made the occasion for carpeting the floors of churches, unpaved in early times, with rushes. Moreover, in a procession which forms part of the festivities at Grasmere, certain Biblical stories are symbolized, and in this a connexion with the ancient miracle plays may be found (see H. D. Rawnsley, *A Rambler's Note-Book at the English Lakes*, Glasgow, 1902). Grasmere is also noted for an athletic meeting in August.

The lake of Grasmere is just under 1 m. in length, and has an extreme breadth of 766 yds. A ridge divides the basin from north to south, and rises so high as to form an island about the middle. The greatest depth of the lake (75 ft.) lies to the east of this ridge.

GRASS AND GRASSLAND, in agriculture. The natural vegetable covering of the soil in most countries is "grass" (for derivation see Grasses) of various kinds. Even where dense forest or other growth exists, if a little daylight penetrates to the ground grass of some sort or another will grow. On ordinary farms, or wherever farming of any kind is carried out, the proportion of the land not actually cultivated will either be in grass or will revert naturally to grass in time if left alone, after having been cultivated.

Pasture land has always been an important part of the farm, but since the "era of cheap corn" set in its importance has been increased, and much more attention has been given to the study of the different species of grass, their characteristics, the improvement of a pasture generally, and the "laying down" of arable land into grass where tillage farming has not paid. Most farmers desire a proportion of grass-land on their farms—from a third to a half of the area—and even on wholly arable farms there are usually certain courses in the rotation of crops devoted to grass (or clover). Thus the Norfolk 4-course rotation is corn, roots, corn, clover; the Berwick 5-course is corn, roots, corn, grass, grass; the Ulster 8-course, corn, flax, roots, corn, flax, grass, grass, grass; and so on, to the point where the grass remains down for 5 years, or is left indefinitely.

Permanent grass may be grazed by live-stock and classed as pasture pure and simple, or it may be cut for hay. In the latter case it is usually classed as "meadow" land, and often forms an alluvial tract alongside a stream, but as grass is often grazed and hayed in alternate years, the distinction is not a hard and fast one.

There are two classes of pasturage, temporary and permanent. The latter again consists of two kinds, the permanent grass natural to land that has never been cultivated, and the pasture that has been laid down artificially on land previously arable and allowed to remain and improve itself in the course of time. The existence of ridge and furrow on many old pastures in Great Britain shows that they were cultivated at one time, though perhaps more than a century ago. Often a newly laid down pasture will decline markedly in thickness and quality about the fifth and sixth year, and then begin to thicken and improve year by year afterwards. This is usually attributed to the fact that the unsuitable varieties die out, and the "naturally" suitable varieties only come in gradually. This trouble can be largely prevented, however, by a judicious selection of seed, and by subsequently manuring with phosphatic manures, with farmyard or other bulky "topdressings," or by feeding sheep with cake and corn over the field.

All the grasses proper belong to the natural order *Gramineae* (see Grasses), to which order

also belong all the “corn” plants cultivated throughout the world, also many others, such as bamboo, sugar-cane, millet, rice, &c. &c., which yield food for mankind. Of the grasses which constitute pastures and hay-fields over a hundred species are classified by botanists in Great Britain, with many varieties in addition, but the majority of these, though often forming a part of natural pastures, are worthless or inferior for farming purposes. The grasses of good quality which should form a “sole” in an old pasture and provide the bulk of the forage on a newly laid down piece of grass are only about a dozen in number (see below), and of these there are only some six species of the very first importance and indispensable in a “prescription” of grass seeds intended for laying away land in temporary or permanent pasture. Dr W. Fream caused a botanical examination to be made of several of the most celebrated pastures of England, and, contrary to expectation, found that their chief constituents were ordinary perennial ryegrass and white clover. Many other grasses and legumes were present, but these two formed an overwhelming proportion of the plants.

In ordinary usage the term grass, pasturage, hay, &c., includes many varieties of clover and other members of the natural order *Leguminosae* as well as other “herbs of the field,” which, though not strictly “grasses,” are always found in a grass field, and are included in mixtures of seeds for pasture and meadows. The following is a list of the most desirable or valuable agricultural grasses and clovers, which are either actually sown or, in the case of old pastures, encouraged to grow by draining, liming, manuring, and so on:—

Grasses.

Alopecurus pratensis	Meadow foxtail.
Anthoxanthum odoratum	Sweet vernal grass.
Avena elatior	Tall oat-grass.
Avena flavescens	Golden oat-grass.
Cynosurus cristatus	Crested dogstail.
Dactylis glomerata	Cocksfoot.
Festuca duriuscula	Hard fescue.
Festuca elatior	Tall fescue.
Festuca ovina	Sheep’s fescue.
Festuca pratensis	Meadow fescue.
Lolium italicum	Italian ryegrass.
Phleum pratense	Timothy or catstail.
Poa nemoralis	Wood meadow-grass.
Poa pratensis	Smooth meadow-grass.
Poa trivialis	Rough meadow-grass.

Clovers, &c.

Medicago lupulina	Trefoil or “Nonsuch.”
Medicago sativa	Lucerne (Alfalfa).
Trifolium hybridum	Alsike clover.
Trifolium pratense	Broad red clover.
Trifolium pratense Trifolium perennne	Perennial clover.
Trifolium incarnatum	Crimson clover or “Trifolium.”
Trifolium procumbens	Yellow Hop-trefoil.
Trifolium repens	White or Dutch clover.
Achillea Millefolium	Yarrow or Milfoil.
Anthyllis vulneraria	Kidney-vetch.
Lotus major	Greater Birdsfoot Trefoil.
Lotus corniculatus	Lesser Birdsfoot Trefoil.
Carum petroselinum	Field parsley.
Plantago lanceolata	Plantain.
Cichorium intybus	Chicory.
Poterium officinale	Burnet.

The predominance of any particular species is largely determined by climatic circumstances, the nature of the soil and the treatment it receives. In limestone regions sheep’s fescue has been found to predominate; on wet clay soil the dog’s bent (*Agrostis canina*) is common; continuous manuring with nitrogenous manures kills out the leguminous

plants and stimulates such grasses as cocksfoot; manuring with phosphates stimulates the clovers and other legumes; and so on. Manuring with basic slag at the rate of from 5 to 10 cwt. per acre has been found to give excellent results on poor clays and peaty soils. Basic slag is a by-product of the Bessemer steel process, and is rich in a soluble form of phosphate of lime (tetra-phosphate) which specially stimulates the growth of clovers and other legumes, and has renovated many inferior pastures.

In the Rothamsted experiments continuous manuring with “mineral manures” (no nitrogen) on an old meadow has reduced the grasses from 71 to 64% of the whole, while at the same time it has increased the *Leguminosae* from 7% to 24%. On the other hand, continuous use of nitrogenous manure in addition to “minerals” has raised the grasses to 94% of the total and reduced the legumes to less than 1%.

As to the best kinds of grasses, &c., to sow in making a pasture out of arable land, experiments at Cambridge, England, have demonstrated that of the many varieties offered by seedsmen only a very few are of any permanent value. A complex mixture of tested seeds was sown, and after five years an examination of the pasture showed that only a few varieties survived and made the “sole” for either grazing or forage. These varieties in the order of their importance were:—

Cocksfoot	26
Perennial rye grass	16
Meadow fescue	13
Hard fescue	9
Crested dogstail	8
Timothy	6
White clover	4
Meadow foxtail	2

The figures represent approximate percentages.

Before laying down grass it is well to examine the species already growing round the hedges and adjacent fields. An inspection of this sort will show that the Cambridge experiments are very conclusive, and that the above species are the only ones to be depended on. Occasionally some other variety will be prominent, but if so there will be a special local reason for this.

On the other hand, many farmers when sowing down to grass like to have a good bulk of forage for the first year or two, and therefore include several of the clovers, lucerne, Italian ryegrass, evergreen ryegrass, &c., knowing that these will die out in the course of years and leave the ground to the more permanent species.

There are also several mixtures of “seeds” (the technical name given on the farm to grass-seeds) which have been adopted with success in laying down permanent pasture in some localities.

	Young.	De Laune.	Leicester.	Elliot.	Cambridge average.	General purpose mixture.
Cocksfoot	..	8	4	8	8	4
Perennial ryegrass	..	..	2	6	10	10
Meadow fescue	..	6	2	..	5	..
Hard fescue	..	1	1	2	3	..
Crested dogstail	3	2	..	1	3	..
Timothy	..	3	1	..	2	2
Meadow foxtail	..	10	..	..	1	1
Tall fescue	..	3	1	3½	..	2
Tall oat grass	..	..	1	3	..	..
Italian ryegrass	..	..	2	..	..	5
Smooth meadow grass	..	..	..	1	..	..
Rough meadow grass	..	1	..	1	..	..
Golden oat grass	..	..	¼	1	..	..
Sheep’s fescue	..	1	..	..	..	..
Broad red clover	..	1	..	..	..	2
Perennial red clover	..	1	..	1½	..	2
Alsike	..	1	1½	1	..	2
Lucerne (Alfalfa)	..	..	..	..	..	8
White clover	4	1	1	2	2	2
Kidney vetch	6	..	..	2½	..	..
Sheep’s parsley	..	..	..	1	..	..
Yarrow	1	1	¼	1	..	..

Burnet	8	..	..	8	..	..
Chicory	4	..	..	2½	..	..
Plantain	4	..	..	..	..	..
Total lb per acre	30	40	17	40	30	40

Arthur Young more than 100 years ago made out one to suit chalky hillsides; Mr Faunce de Laune (Sussex) in our days was the first to study grasses and advocated leaving out ryegrass of all kinds; Lord Leicester adopted a cheap mixture suitable for poor land with success; Mr Elliot (Kelso) has introduced many deep-rooted “herbs” in his mixture with good results. Typical examples of such mixtures are given on preceding page.

Temporary pastures are commonly resorted to for rotation purposes, and in these the bulky fast-growing and short-lived grasses and clovers are given the preference. Three examples of temporary mixtures are given below.

	One year.	Two years.	Three or four years.
Italian ryegrass	14	10	6
Cocksfoot	2	4	6
Timothy	..	2	3
Broad red clover	8	5	3
Alsike	3	2	2
Trefoil	3	2	2
Perennial ryegrass	..	5	10
Meadow fescue	..	2	2
Perennial red clover	..	2	2
White clover	..	1	2
Meadow foxtail	..	1	2
Total lb per acre	30	36	40

Where only a one-year hay is required, broad red clover is often grown, either alone or mixed with a little Italian ryegrass, while other forage crops, like trefoil and trifolium, are often grown alone.

In Great Britain a heavy clay soil is usually preferred for pasture, both because it takes most kindly to grass and because the expense of cultivating it makes it unprofitable as arable land when the price of corn is low. On light soil the plant frequently suffers from drought in summer, the want of moisture preventing it from obtaining proper root-hold. On such soil the use of a heavy roller is advantageous, and indeed on any soil excepting heavy clay frequent rolling is beneficial to the grass, as it promotes the capillary action of the soil-particles and the consequent ascension of ground-water.

In addition, the grass on the surface helps to keep the moisture from being wasted by the sun’s heat.

The graminaceous crops of western Europe generally are similar to those enumerated. Elsewhere in Europe are found certain grasses, such as Hungarian brome, which are suitable for introduction into the British Isles. The grasses of the American prairies also include many plants not met with in Great Britain. Some half-dozen species are common to both countries: Kentucky “blue-grass” is the British *Poa pratensis*; couch grass (*Triticum repens*) grows plentifully without its underground runners; bent (*Agrostis vulgaris*) forms the famous “red-top,” and so on. But the American buffalo-grass, the Canadian buffalo-grass, the “bunch” grasses, “squirrel-tail” and many others which have no equivalents in the British Islands, form a large part of the prairie pasturage. There is not a single species of true clover found on the prairies, though cultivated varieties can be introduced.

(P. McC.)

GRASSE, FRANÇOIS JOSEPH PAUL, Marquis de Grassetilly, Comte de (1722-1788), French sailor, was born at Bar, in the present department of the Alpes Maritimes. In 1734 he took service on the galleys of the order of Malta, and in 1740 entered the service of France, being promoted to chief of squadron in 1779. He took part in the naval operations of the American War of Independence, and distinguished himself in the battles of Dominica and

Saint Lucia (1780), and of Tobago (1781). He was less fortunate at St Kitts, where he was defeated by Admiral Hood. Shortly afterwards, in April 1782, he was defeated and taken prisoner by Admiral Rodney. Some months later he returned to France, published a *Mémoire justificatif*, and was acquitted by a court-martial (1784). He died at Paris in January 1788.

His son Alexandre de Grasse, published a *Notice bibliographique sur l'amiral comte de Grasse d'après les documents inédits* in 1840. See G. Lacour-Gayet, *La Marine militaire de la France sous le règne de Louis XV* (Paris, 1902).

GRASSE, a town in the French department of the Alpes Maritimes (till 1860 in that of the Var), 12½ m. by rail N. of Cannes. Pop. (1906) town, 13,958; commune, 20,305. It is built in a picturesque situation, in the form of an amphitheatre and at a height o£ 1066 ft. above the sea, on the southern slope of a hill, facing the Mediterranean. In the older (eastern) part of the town the streets are narrow, steep and winding, but the new portion (western) is laid out in accordance with modern French ideas. It possesses a remarkably mild and salubrious climate, and is well supplied with water. That used for the purpose of the factories comes from the fine spring of Foux. But the drinking water used in the higher portions of the town flows, by means of a conduit, from the Foulon stream, one of the sources of the Loup. Grasse was from 1244 (when the see was transferred hither from Antibes) to 1790 an episcopal see, but was then included in the diocese of Fréjus till 1860, when politically as well as ecclesiastically, the region was annexed to the newly-formed department of the Alpes Maritimes. It still possesses a 12th-century cathedral, now a simple parish church; while an ancient tower, of uncertain date, rises close by near the town hall, which was formerly the bishop's palace (13th century). There is a good town library, containing the muniments of the abbey of Lérins, on the island of St Honorat opposite Cannes. In the chapel of the old hospital are three pictures by Rubens. The painter J. H. Fragonard (1732-1806) was a native of Grasse, and some of his best works were formerly to be seen here (now in America). Grasse is particularly celebrated for its perfumery. Oranges and roses are cultivated abundantly in the neighbourhood. It is stated that the preparation of attar of roses (which costs nearly £100 per 2 lb) requires alone nearly 7,000,000 roses a year. The finest quality of olive oil is also manufactured at Grasse.

(W. A. B. C.)

GRASSES,[1] a group of plants possessing certain characters in common and constituting a family (Gramineae) of the class Monocotyledons. It is one of the largest and most widespread and, from an economic point of view, the most important family of flowering plants. No plant is correctly termed a grass which is not a member of this family, but the word is in common language also used, generally in combination, for many plants of widely different affinities which possess some resemblance (often slight) in foliage to true grasses; *e.g.* knot-grass (*Polygonum aviculare*), cotton-grass (*Eriophorum*), rib-grass (*Plantago*), scorpion-grass (*Myosotis*), blue-eyed grass (*Sisyrinchium*), sea-grass (*Zostera*). The grass-tree of Australia (*Xanthorrhoea*) is a remarkable plant, allied to the rushes in the form of its flower, but with a tall, unbranched, soft-woody, palm-like trunk bearing a crown of long, narrow, grass-like leaves and stalked heads of small, densely-crowded flowers. In agriculture the word has an extended signification to include the various fodder-plants, chiefly leguminous, often called "artificial grasses." Indeed, formerly *grass* (also spelt *gwrs*, *gres*, *gyrs* in the old herbals) meant any green herbaceous plant of small size.

Yet the first attempts at a classification of plants recognized and separated a group of *Gramina*, and this, though bounded by nothing more definite than habit and general appearance, contained the Gramineae of modern botanists. The older group, however, even with such systematists as Ray (1703), Scheuchzer (1719), and Micheli (1729), embraced in addition the Cyperaceae (Sedge family), Juncaceae (Rush family), and some other monocotyledons with inconspicuous flowers. Singularly enough, the sexual system of Linnaeus (1735) served to mark off more distinctly the true grasses from these allies, since very nearly all of the former then known fell under his Triandria Digynia, whilst the latter

found themselves under his other classes and orders.

I. Structure.—The general type of true grasses is familiar in the cultivated cereals of temperate climates—wheat, barley, rye, oats, and in the smaller plants which make up pastures and meadows and form a principal factor of the turf of natural downs. Less familiar are the grains of warmer climates—rice, maize, millet and sorgho, or the sugar-cane. Still farther removed are the bamboos of the tropics, the columnar stems of which reach to the height of forest trees. All are, however, formed on a common plan.

Root.—Most cereals and many other grasses are annual, and possess a tuft of very numerous slender root-fibres, much branched and of great length. The majority of the members of the family are of longer duration, and have the roots also fibrous, but fewer, thicker and less branched. In such cases they are very generally given off from just above each node (often in a circle) of the lower part of the stem or rhizome, perforating the leaf-sheaths. In some bamboos they are very numerous from the lower nodes of the erect culms, and pass downwards to the soil, whilst those from the upper nodes shrivel up and form circles of spiny fibres.

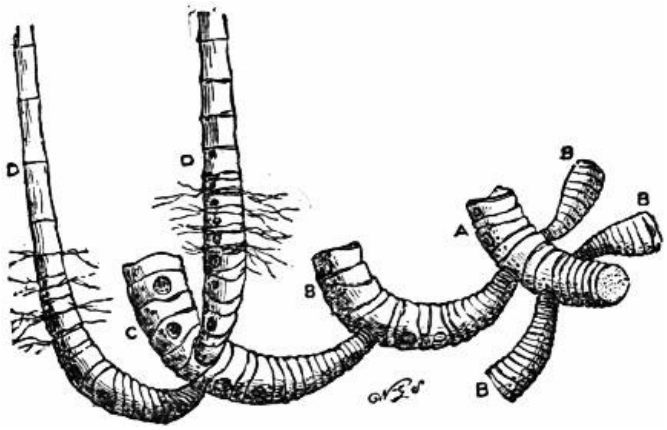


Fig. 1.—Rhizome of Bamboo. A, B, C, D, successive series of axes, the last bearing aerial culms. Much reduced.

Stem.—The underground stem or rootstock (rhizome) of perennial grasses is usually well developed, and often forms very long creeping or subterranean rhizomes, with elongated internodes and sheathing scales; the widely-creeping, slender rhizomes in Marram-grass (*Psamma*), *Agropyrum junceum*, *Elymus arenarius*, and other sand-loving plants render them useful as sand-binders. It is also frequently short, with the nodes crowded. The turf-formation, which is characteristic of open situations in cool temperate climates, results from an extensive production of short stolons, the branches and the fibrous roots developed from their nodes forming the dense “sod.” The very large rhizome of the bamboos (fig. 1) is also a striking example of “definite” growth; it is much branched, the short, thick, curved branches being given off below the apex of the older ones and at right angles to them, the whole forming a series of connected arched axes, truncate at their ends, which were formerly continued into leafy culms. The rhizome is always solid, and has the usual internal structure of the monocotyledonous stem. In the cases of branching just cited the branches break directly through the sheath of the leaf in connexion with which they arise. In other cases the branches grow upwards through the sheaths which they ultimately split from above, and emerging as aerial shoots give a tufted habit to the plant. Good examples are the oat, cock’s-foot (*Dactylis*) and other British grasses. This mode of growth is the cause of the “tillering” of cereals, or the production of a large number of erect growing branches from the lower nodes of the young stem. Isolated tufts or tussocks are also characteristic of steppe—and savanna—vegetation and open places generally in the warmer parts of the earth.

The aerial leaf-bearing branches (culms) are a characteristic feature of grasses. They are generally numerous, erect, cylindrical (rarely flattened) and conspicuously jointed with evident nodes. The nodes are solid, a strong plate of tissue passing across the stem, but the internodes are commonly hollow, although examples of completely solid stems are not uncommon (*e.g.* maize, many Andropogons, sugar-cane). The swollen nodes are a characteristic feature. In wheat, barley and most of the British native grasses they are a development, not of the culm, but of the base of the leaf-sheath. The function of the nodes is to raise again culms which have become bent down; they are composed of highly turgescent tissue, the cells of which elongate on the side next the earth when the culm is placed in a horizontal or oblique position, and thus raise the culm again to an erect position. The internodes continue to grow in length, especially the upper ones, for some time; the increase

takes place in a zone at the extreme base, just above the node. The exterior of the culms is more or less concealed by the leaf-sheaths; it is usually smooth and often highly polished, the epidermal cells containing an amount of silica sufficient to leave after burning a distinct skeleton of their structure. Tabasheer is a white substance mainly composed of silica, found in the joints of several bamboos. A few of the lower internodes may become enlarged and sub-globular, forming nutriment-stores, and grasses so characterized are termed “bulbous” (*Arrhenatherum*, *Poa bulbosa*, &c.). In internal structure grass-culms, save in being hollow, conform to that usual in monocotyledons; the vascular bundles run parallel in the internodes, but a horizontal interlacement occurs at the nodes. In grasses of temperate climates branching is rare at the upper nodes of the culm, but it is characteristic of the bamboos and many tropical grasses. The branches are strictly distichous. In many bamboos they are long and spreading or drooping and copiously ramified, in others they are reduced to hooked spines. One genus (*Dinochloa*, a native of the Malay archipelago) is scandent, and climbs over trees 100 ft. or more in height, *Olyra latifolia*, a widely-spread tropical species, is also a climber on a humbler scale.

Grass-culms grow with great rapidity, as is most strikingly seen in bamboos, where a height of over 100 ft. is attained in from two to three months, and many species grow two, three or even more feet in twenty-four hours. Silicic hardening does not begin till the full height is nearly attained. The largest bamboo recorded is 170 ft., and the diameter is usually reckoned at about 4 in. to each 50 ft.

Leaves.—These present special characters usually sufficient for ordinal determination. They are solitary at each node and arranged in two rows, the lower often crowded, forming a basal tuft. They consist of two distinct portions, the sheath and the blade. The sheath is often of great length, and generally completely surrounds the culm, forming a firm protection for the internode, the younger basal portion of which, including the zone of growth, remains tender for some time. As a rule it is split down its whole length, thus differing from that of Cyperaceae which is almost invariably (*Eriospora* is an exception) a complete tube; in some grasses, however (species of *Poa*, *Bromus* and others), the edges are united. The sheaths are much dilated in *Alopecurus vaginatus* and in a species of *Potamochloa*, in the latter, an East Indian aquatic grass, serving as floats. At the summit of the sheath, above the origin of the blade, is the *ligule*, a usually membranous process of small size (occasionally reaching 1 in. in length) erect and pressed around the culm. It is rarely quite absent, but may be represented by a tuft of hairs (very conspicuous in *Pariana*). It serves to prevent rain-water, which has run down the blade, from entering the sheath. *Melica uniflora* has in addition to the ligule, a green erect tongue-like process, from the line of junction of the edges of the sheath.

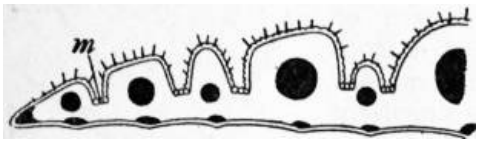


Fig. 2.—Magnified transverse section of one-half of a leaf-blade of *Festuca rubra*. The dark portions represent supporting and conducting tissue; the upper face bears furrows, at the bottom of each of which are seen the motor cells *m*.

The blade is frequently wanting or small and imperfect in the basal leaves, but in the rest is long and set on to the sheath at an angle. The usual form is familiar—sessile, more or less ribbon-shaped, tapering to a point, and entire at the edge. The chief modifications are the articulation of the deciduous blade on to the sheath, which occurs in all the Bambuseae (except *Planotia*) and in *Spartina stricta*; and the interposition of a petiole between the sheath and the blade, as in bamboos, *Leptaspis*, *Pharus*, *Pariana*, *Lophatherum* and others. In the latter case the leaf usually becomes oval, ovate or even cordate or sagittate, but these forms are found in sessile leaves also (*Olyra*, *Panicum*). The venation is strictly parallel, the midrib usually strong, and the other ribs more slender. In *Anomochloa* there are several nearly equal ribs and in some broad-leaved grasses (*Bambuseae*, *Pharus*, *Leptaspis*) the venation becomes tesselated by transverse connecting veins. The tissue is often raised above the veins, forming longitudinal ridges, generally on the upper face; the stomata are in lines in the intervening furrows. The thick prominent veins in *Agropyrum* occupy the whole upper surface of the leaf. Epidermal appendages are rare, the most frequent being marginal, saw-like, cartilaginous teeth, usually minute, but occasionally (*Danthonia scabra*, *Panicum serratum*) so large as to give the margin a serrate appearance. The leaves are occasionally woolly, as in *Alopecurus lanatus* and one or two *Panicums*. The blade is often twisted, frequently so much so that the upper and under faces become reversed. In dry-country grasses the blades are often folded on the midrib, or rolled up. The rolling is effected by bands of large wedge-shaped cells—motor-cells—between the nerves, the loss of turgescence by which, as the air dries, causes the blade to curl towards the face on which they occur. The

rolling up acts as a protection from too great loss of water, the exposed surface being specially protected to this end by a strong cuticle, the majority or all of the stomata occurring on the protected surface. The stiffness of the blade, which becomes very marked in dry-country grasses, is due to the development of girders of thick-walled mechanical tissue which follow the course of all or the principal veins (fig. 2).

FIG. 3.—One-flowered spikelet of *Agrostis*.

FIG. 4.—Two-flowered spikelet of *Aira*.

b, Barren glumes; *f*, flowering glumes. (Both Enlarged.)

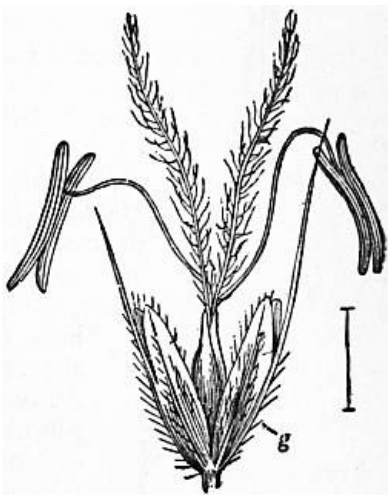
Inflorescence.—This possesses an exceptional importance in grasses, since, their floral envelopes being much reduced and the sexual organs of very great uniformity, the characters employed for classification are mainly derived from the arrangement of the flowers and their investing bracts. Various interpretations have been given to these glumaceous organs and different terms employed for them by various writers. It may, however, be considered as settled that the whole of the bodies known as glumes and paleae, and distichously arranged externally to the flower, form no part of the floral envelopes, but are of the nature of bracts. These are arranged so as to form *spikelets* (locustae), and each spikelet may contain one, as in *Agrostis* (fig. 3) two, as in *Aira* (fig. 4) three, or a great number of flowers, as in *Briza* (fig. 5) *Triticum* (fig. 6); in some species of *Eragrostis* there are nearly 60. The flowers are, as a rule, placed laterally on the axis (*rachilla*) of the spikelet, but in one-flowered spikelets they appear to be terminal, and are probably really so in *Anthoxanthum* (fig. 7) and in two anomalous genera, *Anomochloa* and *Streptochaeta*.

FIG. 5.—Spikelet of *Briza*.

FIG. 6.—Spikelet of *Triticum*.

(Both enlarged.)

In immediate relation with the flower itself, and often entirely concealing it, is the *palea* or *pale* ("upper pale" of most systematic agrostologists). This organ (fig. 13, 1) is peculiar to grasses among Glumiflorae (the series to which belong the two families Gramineae and Cyperaceae), and is almost always present, certain *Oryzeae* and *Phalarideae* being the only exceptions. It is of thin membranous consistence, usually obtuse, often bifid, and possesses no central rib or nerve, but has two lateral ones, one on either side; the margins are frequently folded in at the ribs, which thus become placed at the sharp angles. This structure was formerly regarded as pointing to the fusion of two organs, and the pale was considered by Robert Brown to represent two portions soldered together of a trimerous perianth-



whorl, the third portion being the “lower pale.” The pale is now generally considered to represent the single bracteole, characteristic of Monocotyledons, the binerved structure being the result of the pressure of the axis of the spikelet during the development of the pale, as in *Iris* and others.

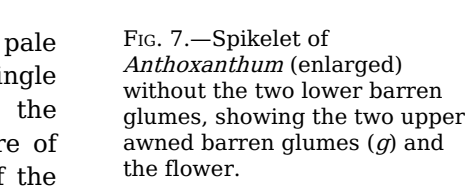


FIG. 7.—Spikelet of *Anthoxanthum* (enlarged) without the two lower barren glumes, showing the two upper awned barren glumes (*g*) and the flower.

The flower with its pale is sessile, and is placed in the axis of another bract in such a way that the pale is exactly opposed to it, though at a slightly higher level. It is this second bract or flowering glume which has been generally called by systematists the “lower pale,” and with the “upper pale” was formerly considered to form an outer floral envelope (“calyx,” Jussieu; “perianthium,” Brown). The two bracts are, however, on different axes, one secondary to the other, and cannot therefore be parts of one whorl of organs. They are usually quite unlike one another, but in some genera (*e.g.* most *Festuceae*) are very similar in shape and appearance.

FIG. 8.—Spikelet of *Stipa pennata*. The pair of barren glumes (*b*) are separated from the flowering glume, which bears a long awn, twisted below the knee and feathery above. About ¾ nat. size.

The flowering glume has generally a more or less boat-shaped form, is of firm consistence, and possesses a well-marked central midrib and frequently several lateral ones. The midrib in a large proportion of genera extends into an appendage termed the *awn* (fig. 4), and the lateral veins more rarely extend beyond the glume as sharp points (*e.g. Pappophorum*). The form of the flowering glume is very various, this organ being plastic and extensively modified in different genera. It frequently extends downwards a little on the rachilla, forming with the latter a swollen callus, which is separated from the free portion by a furrow. In *Leptaspis* it is formed into a closed cavity by the union of its edges, and encloses the flower, the styles projecting through the pervious summit. Valuable characters for distinguishing genera are obtained from the awn. This presents itself variously developed from a mere subulate point to an organ several inches in length, and when complete (as in *Andropogoneae*, *Aveneae* and *Stipeae*) consists of two well-marked portions, a lower twisted part and a terminal straight portion, usually set in at an angle with the former, sometimes trifid and occasionally beautifully feathery (fig. 8). The lower part is most often suppressed, and in the large group of the *Paniceae* awns of any sort are very rarely seen. The awn may be either terminal or may come off from the back of the flowering glume, and Duval Jouve’s observations have shown that it represents the blade of the leaf of which the portion of the flowering glume below its origin is the sheath; the twisted part (so often suppressed) corresponds with the petiole, and the portion of the glume extending beyond the origin of the awn (very long in some species, *e.g.* of *Danthonia*) with the ligule of the developed foliage-leaf. When terminal the awn has three fibro-vascular bundles, when dorsal only one; it is covered with stomate-bearing epidermis.

The flower with its palea is thus sessile in the axil of a floriferous glume, and in a few grasses (*Leersia* (fig. 9), *Coleanthus*, *Nardus*) the spikelet consists of nothing more, but usually (even in uniflorous spikelets) other glumes are present. Of these the two placed distichously opposite each other at the base of the

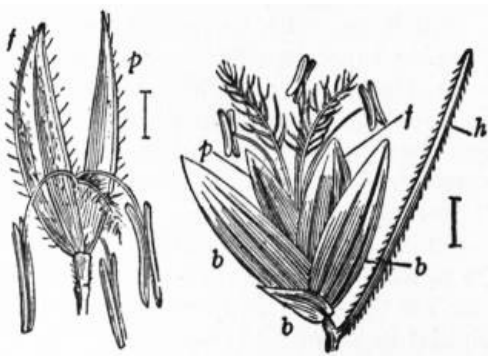


FIG. 9 (left).—Spikelet of *Leersia*. *f*, Flowering glume; *p*, pale.

FIG. 10 (right).—Spikelet of *Setaria*, with an abortive branch (*h*) beneath it. *b*, Barren glumes; *f*, flowering glume; *p*, pale.

spikelet never bear any flower in their axils, and are called the *empty* or *barren glumes* (figs. 3, 8). They are the “glumes” of most writers, and together form what was called the “gluma” by R. Brown. They rarely differ much from one another, but one may be smaller or quite absent (*Panicum*, *Setaria* (fig. 10), *Paspalum*, *Lolium*), or both be altogether suppressed, as above noticed. They are commonly firm and strong, often enclose the spikelet, and are rarely provided with long points or imperfect awns. Generally speaking they do not share in the special modifications of the flowering glumes, and rarely themselves undergo modification, chiefly in hardening of portions (*Sclerachne*, *Manisuris*, *Anthephora*, *Peltophorum*), so as to afford greater protection to the flowers or fruit. But it is usual to find, besides the basal glumes, a few other empty ones, and these are in two- or more-flowered spikelets (see *Triticum*, fig. 6) at the top of the rhachilla (numerous in *Lophatherum*), or in uniflorous ones (fig. 10) below and interposed between the floral glume and the basal pair.

The axis of the spikelet is frequently jointed and breaks up into articulations above each flower. Tufts or borders of hairs are frequently present (*Calamagrostis*, *Phragmites*, *Andropogon*), and are often so long as to surround and conceal the flowers (fig. 11). The axis is often continued beyond the last flower or glume as a bristle or stalk.

Involucres or organs outside the spikelets also occur, and are formed in various ways. Thus in *Setaria* (fig. 10), *Pennisetum*, &c., the one or more circles of simple or feathery hairs represent abortive branches of the inflorescence; in *Cenchrus* (fig. 12) these become consolidated, and the inner ones flattened so as to form a very hard globular spiny case to the spikelets. The cup-shaped involucre of *Cornucopia* is a dilatation of the axis into a hollow receptacle with a raised border. In *Cynosurus* (Dog’s tail) the pectinate involucre which conceals the spikelet is a barren or abortive spikelet. Bracts of a more general character subtending branches of the inflorescence are singularly rare in Gramineae, in marked contrast with Cyperaceae, where they are so conspicuous. They however occur in a whole section of *Andropogon*, in *Anomochloa*, and at the base of the spike in *Sesleria*. The remarkable ovoid involucre of *Coix*, which becomes of stony hardness, white and polished (then known as “Job’s tears,” *q.v.*), is also a modified bract or leaf-sheath. It is closed except at the apex, and contains the female spikelet, the stalks of the male inflorescence and the long styles emerging through the small apical orifice.

FIG. 11.—Spikelet of Reed (*Phragmites communis*) opened out.

a, *b*, Barren glumes.
c, *c*, Fertile glumes, each enclosing one flower with its pale *d*.
Note the zigzag axis (*rhachilla*) bearing long silky hairs.

FIG. 12.—Spikelet of *Cenchrus echinatus* enclosed in a bristly involucre.

Any number of spikelets may compose the inflorescence, and their arrangement is very various. In the spicate forms, with sessile spikelets on the main axis, the latter is often dilated and flattened (*Paspalum*), or is more or less thickened and hollowed out (*Stenotaphrum*, *Rottboellia*, *Tripsacum*), when the spikelets are sunk and buried within the cavities. Every variety of racemose and paniculate inflorescence obtains, and the number of spikelets composing those of the large kinds is often immense. Rarely the inflorescence consists of very few flowers; thus *Lygeum Spartum*, the most anomalous of European grasses, has but two or three large uniflorous spikelets, which are fused together at the base, and have no basal glumes, but are enveloped in a large, hooded, spathe-like bract.

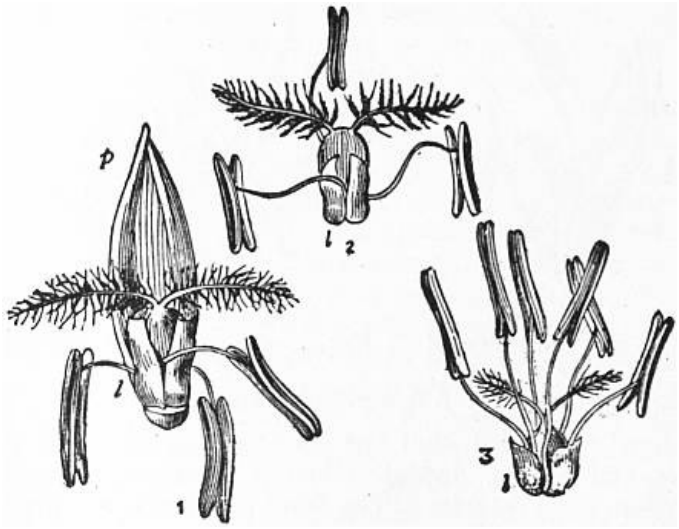


FIG. 13.—Flowers of Grasses (enlarged). 1, *Piptatherum*, with the palea *p*; 2, *Poa*; 3, *Oryza*; *l*, Lodicule.

Flower.—This is characterized by remarkable uniformity. The perianth is represented by very rudimentary, small, fleshy scales arising below the ovary, called *lodicules*; they are elongated or truncate, sometimes fringed with hairs, and are in contact with the ovary. Their usual number is two, and they are placed collaterally at the anterior side of the flower (fig. 13,) that is, within the flowering glume. They are generally considered to represent the inner whorl of the ordinary monocotyledonous (liliaceous) perianth, the outer whorl of these being suppressed as well as the posterior member of the inner whorl. This latter is present almost constantly in *Stipeae* and *Bambuseae*, which have three lodicules, and in the latter group they are occasionally more numerous. In *Anomochloa* they are represented by hairs. In *Streptochaeta* there are six lodicules, alternately arranged in two whorls. Sometimes, as in *Anthoxanthum*, they are absent. In *Melica* there is one large anterior lodicule resulting presumably from the union of the two which are present in allied genera. Professor E. Hackel, however, regards this as an undivided second pale, which in the majority of the grasses is split in halves, and the posterior lodicule, when present, as a third pale. On this view the grass-flower has no perianth. The function of the lodicules is the separation of the pale and glume to allow the protrusion of stamens and stigmas; they effect this by swelling and thus exerting pressure on the base of these two structures. Where, as in *Anthoxanthum*, there are no lodicules, pale and glume do not become laterally separated, and the stamens and stigmas protrude only at the apex of the floret (fig. 7). Grass-flowers are usually hermaphrodite, but there are very many exceptions. Thus it is common to find one or more imperfect (usually male) flowers in the same spikelet with bisexual ones, and their relative position is important in classification. *Holcus* and *Arrhenatherum* are examples in English grasses; and as a rule in species of temperate regions separation of the sexes is not carried further. In warmer countries monoecious and dioecious grasses are more frequent. In such cases the male and female spikelets and inflorescence may be very dissimilar, as in maize, Job's tears, *Euchlaena*, *Spinifex*, &c.; and in some dioecious species this dissimilarity has led to the two sexes being referred to different genera (*e.g. Anthephora axilliflora* is the female of *Buchloe dactyloides*, and *Neurachne paradoxa* of a species of *Spinifex*). In other grasses, however, with the sexes in different plants (*e.g. Brizopyrum*, *Distichlis*, *Eragrostis capitala*, *Gynerium*), no such dimorphism obtains. *Amphicarpum* is remarkable in having cleistogamic flowers borne on long radical subterranean peduncles which are fertile, whilst the conspicuous upper paniculate ones, though apparently perfect, never produce fruit. Something similar occurs in *Leersia oryzoides*, where the fertile spikelets are concealed within the leaf-sheaths.

Androecium.—In the vast majority there are three stamens alternating with the lodicules, and therefore one anterior, *i.e.* opposite the flowering glume, the other two being posterior and in contact with the palea (fig. 13, 1 and 2). They are hypogynous, and have long and very delicate filaments, and large, linear or oblong two-celled anthers, dorsifixed and ultimately very versatile, deeply indented at each end, and commonly exserted and pendulous. Suppression of the anterior stamen sometimes occurs (*e.g. Anthoxanthum*, fig. 7), or the two posterior ones may be absent (*Uniola*, *Cinna*, *Phippsia*, *Festuca bromoides*). There is in some genera (*Oryza*, most *Bambuseae*) another row of three stamens, making six in all (fig. 13, 3); and *Anomochloa* and *Tetrarrhena* possess four. The stamens become numerous (ten to forty) in the male flowers of a few monoecious genera (*Pariana*, *Luziola*). In *Ochlandra* they vary from seven to thirty, and in *Gigantochloa* they are monadelphous.

Gynoecium.—The pistil consists of a single carpel, opposite the pale in the median plane of

the spikelet. The ovary is small, rounded to elliptical, and one-celled, and contains a single slightly bent ovule sessile on the ventral suture (that is, springing from the back of the ovary); the micropyle points downwards. It bears usually two lateral styles which are quite distinct or connate at the base, sometimes for a greater length (fig. 14, 1), each ends in a densely hairy or feathery stigma (fig. 14). Occasionally there is but a single style, as in *Nardus* (fig. 14, 7), which corresponds to the midrib of the carpel. The very long and apparently simple stigma of maize arises from the union of two. Many of the bamboos have a third, anterior, style.

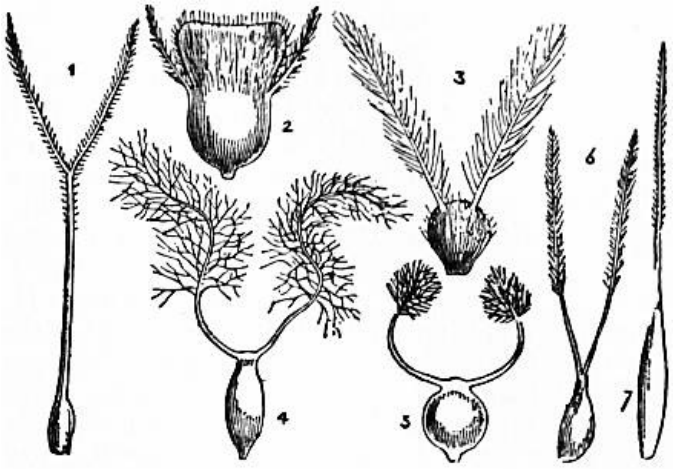


FIG. 14.—Pistils of grasses (much enlarged). 1, *Alopecurus*; 2, *Bromus*; 3, *Arrhenatherum*; 4, *Glyceria*; 5, *Melica*; 6, *Mibora*; 7, *Nardus*.

Comparing the flower of Gramineae with the general monocotyledonous plan as represented by Liliaceae and other families (fig. 15), it will be seen to differ in the absence of the outer row and the posterior member of the inner row of the perianth-leaves, of the whole inner row of stamens, and of the two lateral carpels, whilst the remaining members of the perianth are in a rudimentary condition. But each or any of the usually missing organs are to be found normally in different genera, or as occasional developments.

Pollination.—Grasses are generally wind-pollinated, though self-fertilization sometimes occurs. A few species, as we have seen, are monoecious or dioecious, while many are polygamous (having unisexual as well as bisexual flowers as in many members of the tribes *Andropogoneae*, fig. 18, and *Paniceae*), and in these the male flower of a spikelet always blooms later than the hermaphrodite, so that its pollen can only effect cross-fertilization upon other spikelets in the same or another plant. Of those with only bisexual flowers, many are strongly protogynous (the stigmas protruding before the anthers are ripe), such as *Alopecurus* and *Anthoxanthum* (fig. 7), but generally the anthers protrude first and discharge the greater part of their pollen before the stigmas appear. The filaments elongate rapidly at flowering-time, and the lightly versatile anthers empty an abundance of finely granular smooth pollen through a longitudinal slit. Some flowers, such as rye, have lost the power of effective self-fertilization, but in most cases both forms, self- and cross-fertilization, seem to be possible. Thus the species of wheat are usually self-fertilized, but cross-fertilization is possible since the glumes are open above, the stigmas project laterally, and the anthers empty only about one-third of their pollen in their own flower and the rest into the air. In some cultivated races of barley, cross-fertilization is precluded, as the flowers never open. Reference has already been made to cleistogamic species which occur in several genera.

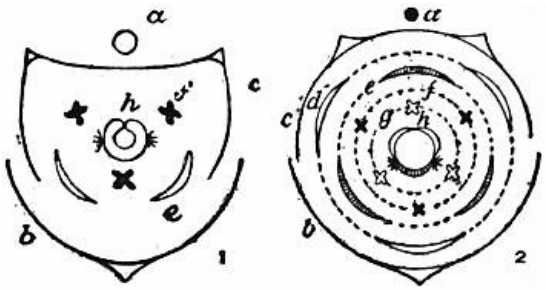


FIG. 15.—Diagrams of the ordinary Grass-flower.

1, Actual condition;
2, Theoretical, with the suppressed organs supplied.
a, Axis.
b, Flowering glume.
c, Palea.
d, Outer row of perianth leaves.
e, Inner row.
f, Outer row of stamens.
g, Inner row.
h, Pistil.

Fruit and Seed.—The ovary ripens into a usually small ovoid or rounded

FIG. 16.—Fruit of *Sporobolus*, showing the dehiscent pericarp and seed.

fruit, which is entirely occupied by the single large seed, from which it is not to be distinguished, the thin pericarp being completely united to its surface. To this peculiar fruit the term *caryopsis* has been applied (more familiarly "grain"); it is commonly furrowed longitudinally down one side (usually the inner, but in *Coix* and its allies, the outer), and an additional covering is not unfrequently provided by the adherence of the persistent palea, or even also of the flowering glume ("chaff" of cereals). From this type are a few deviations; thus in *Sporobolus*, &c. (fig. 16), the pericarp is not united with the seed but is quite distinct, dehisces, and allows the loose seed to escape. Sometimes the pericarp is membranous, sometimes hard, forming a nut, as in some genera of *Bambuseae*, while in other *Bambuseae* it becomes thick and fleshy, forming a berry often as large as an apple. In *Melocanna* the berry forms an edible fruit 3 or 4 in. long, with a pointed beak of 2 in. more; it is indehiscent, and the small seed germinates whilst the fruit is still attached to the tree, putting out a tuft of roots and a shoot, and not falling till the latter is 6 in. long. The position of the embryo is plainly visible on the front side at the base of the grain. On the other, posterior, side of the grain is a more or less evident, sometimes punctiform, sometimes elongated or linear mark, the hilum, the place where the ovule was fastened to the wall of the ovary. The form of the hilum is constant throughout a genus, and sometimes also in whole tribes.

The testa is thin and membranous but occasionally coloured, and the embryo small, the great bulk of the seed being occupied by the hard farinaceous endosperm (albumen) on which the nutritive value of the grain depends. The outermost layer of endosperm, the aleuron-layer, consists of regular cells filled with small proteid granules; the rest is made up of large polygonal cells containing numerous starch-grains in a matrix of proteid which may be continuous (horny endosperm) or granular (mealy endosperm). The embryo presents many points of interest. Its position is remarkable, closely applied to the surface of the endosperm at the base of its outer side. This character is absolute for the whole order, and effectually separates Gramineae from Cyperaceae. The part in contact with the endosperm is plate-like, and is known as the *scutellum*; the surface in contact with the endosperm forms an absorptive epithelium. In some grasses there is a small scale-like appendage opposite the scutellum, the *epiblast*. There is some difference of opinion as to which structure or structures represent the cotyledon. Three must be considered: (1) the scutellum, connected by vascular tissue with the vascular cylinder of the main axis of the embryo which it more or less envelops; it never leaves the seed, serving merely to prepare and absorb the food-stuff in the endosperm; (2) the cellular outgrowth of the axis, the epiblast, small and inconspicuous as in wheat, or larger as in *Stipa*; (3) the pileole or germ-sheath, arising on the same side of the axis and above the scutellum, enveloping the plumule in the seed and appearing above ground as a generally colourless sheath from the apex of which the plumule ultimately breaks (fig. 17, 4, *b*). The development of these structures (which was investigated by van Tieghem), especially in relation to the origin of the vascular bundles which supply them, favours the view that the scutellum and pileole are highly differentiated parts of a single cotyledon, and this view is in accord with a comparative study of the seedling of grasses and of other monocotyledons. The epiblast has been regarded as representing a second cotyledon, but this is a very doubtful interpretation.

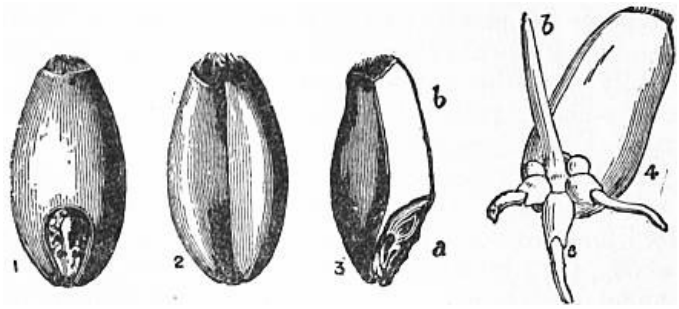


FIG. 17.—A Grain of Wheat. 1, back, and 2, front view; 3, vertical section, showing (*b*) the endosperm, and (*a*) embryo; 4, beginning of germination, showing (*b*) the pileole and (*c*) the radicle and secondary rootlets surrounded by their coleorrhizae.

Germination.—In germination the coleorhiza lengthens, ruptures the pericarp, and fixes the grain to the ground by developing numerous hairs. The radicle then breaks through the coleorhiza, as do also the secondary rootlets where, as in the case of many cereals, these have been formed in the embryo (fig. 17, 4). The germ-sheath grows vertically upwards, its

stiff apex pushing through the soil, while the plumule is hidden in its hollow interior. Finally the plumule escapes, its leaves successively breaking through at the tip of the germ-sheath. The scutellum meanwhile feeds the developing embryo from the endosperm. The growth of the primary root is limited; sooner or later adventitious roots develop from the axis above the radicle which they ultimately exceed in growth.

Means of Distribution.—Various methods of scattering the grain have been adopted, in which parts of the spikelet or inflorescence are concerned. Short spikes may fall from the culm as a whole; or the axis of a spike or raceme is jointed so that one spikelet falls with each joint as in many *Andropogoneae* and *Hordeae*. In many-flowered spikelets the rachilla is often jointed and breaks into as many pieces as there are fruits, each piece bearing a glume and pale. One-flowered spikelets may fall as a whole (as in the tribes *Paniceae* and *Andropogoneae*), or the axis is jointed above the barren glumes so that only the flowering glume and pale fall with the fruit. These arrangements are, with few exceptions, lacking in cultivated cereals though present in their wild forms, so far as these are known. Such arrangements are disadvantageous for the complete gathering of the fruit, and therefore varieties in which they are not present would be preferred for cultivation. The persistent bracts (glume and pale) afford an additional protection to the fruit; they protect the embryo, which is near the surface, from too rapid wetting and, when once soaked, from drying up again. They also decrease the specific gravity, so that the grain is more readily carried by the wind, especially when, as in *Briza*, the glume has a large surface compared with the size of the grain, or when, as in *Holcus*, empty glumes also take part; in Canary grass (*Phalaris*) the large empty glumes bear a membranous wing on the keel. In the sugar-cane (*Saccharum*) and several allied genera the separating joints of the axis bear long hairs below the spikelets; in others, as in *Arundo* (a reed-grass), the flowering glumes are enveloped in long hairs. The awn which is frequently borne on the flowering glume is also a very efficient means of distribution, catching into fur of animals or plumage of birds, or as often in *Stipa* (fig. 8) forming a long feather for wind-carriage. In *Tragus* the glumes bear numerous short hooked bristles. The fleshy berries of some *Bambuseae* favour distribution by animals.

The awn is also of use in burying the fruit in the soil. Thus in *Stipa*, species of *Avena*, *Heteropogon* and others the base of the glume forms a sharp point which will easily penetrate the ground; above the point are short stiff upwardly pointing hairs which oppose its withdrawal. The long awn, which is bent and closely twisted below the bend, acts as a driving organ; it is very hygroscopic, the coils untwisting when damp and twisting up when dry. The repeated twisting and untwisting, especially when the upper part of the awn has become fixed in the earth or caught in surrounding vegetation, drives the point deeper and deeper into the ground. Such grasses often cause harm to sheep by catching in the wool and boring through the skin.

A peculiar method of distribution occurs in some alpine and arctic grasses, which grow under conditions where ripening of the fruit is often uncertain. The entire spikelet, or single flowers, are transformed into small-leaved shoots which fall from the axes and readily root in the ground. Some species, such as *Poa stricta*, are known only in this viviparous condition; others, like our British species *Festuca ovina* and *Poa alpina*, become viviparous under the special climatic conditions.

II. Classification.—Gramineae are sharply defined from all other plants, and there are no genera as to which it is possible to feel a doubt whether they should be referred to it or not. The only family closely allied is Cyperaceae, and the points of difference between the two may be here brought together. The best distinctions are found in the position of the embryo in relation to the endosperm—lateral in grasses, basal in Cyperaceae—and in the possession by Gramineae of the 2-nerved palea below each flower. Less absolute characters, but generally trustworthy and more easily observed, are the feathery stigmas, the always distichous arrangement of the glumes, the usual absence of more general bracts in the inflorescence, the split leaf-sheaths, and the hollow, cylindrical, jointed culms—some or all of which are wanting in all Cyperaceae. The same characters will distinguish grasses from the other glumiferous orders, Restiaceae, and Eriocaulonaceae, which are besides further removed by their capsular fruit and pendulous ovules. To other monocotyledonous families the resemblances are merely of adaptive or vegetative characters. Some Commelinaceae and Marantaceae approach grasses in foliage; the leaves of *Allium*, &c., possess a ligule; the habit of some palms reminds one of the bamboos; and Juncaceae and a few Liliaceae possess an inconspicuous scarious perianth. There are about 300 genera containing about 3500 well-defined species.

The great uniformity among the very numerous species of this vast family renders its *classification* very difficult. The difficulty has been increased by the confusion resulting from

the multiplication of genera founded on slight characters, and from the description (in consequence of their wide distribution) of identical plants under several different genera.

No characters for main divisions can be obtained from the flower proper or fruit (with the exception of the character of the hilum), and it has therefore been found necessary to trust to characters derived from the usually less important inflorescence and bracts.

Robert Brown suggested two primary divisions—Paniceae and Poaceae, according to the position of the most perfect flower in the spikelet; this is the upper (apparently) terminal one in the first, whilst in the second it occupies the lower position, the more imperfect ones (if any) being above it. Munro supplemented this by another character easier of verification, and of even greater constancy, in the articulation of the pedicel in the Paniceae immediately below the glumes; whilst in Poaceae this does not occur, but the axis of the spikelet frequently articulates *above* the pair of empty basal glumes. Neither of these great divisions will well accommodate certain genera allied to *Phalaris*, for which Brown proposed tentatively a third group (since named *Phalarideae*); this, or at least the greater part of it, is placed by Bentham under the Poaceae.

The following arrangement has been proposed by Professor Eduard Hackel in his recent monograph on the order.

A. Spikelets one-flowered, rarely two-flowered as in Zea, falling from the pedicel entire or with certain joints of the rachis at maturity. Rachilla not produced beyond the flowers.

a. Hilum a point; spikelets not laterally compressed.

α Fertile glume and pale hyaline; empty glumes thick, membranous to coriaceous or cartilaginous, the lowest the largest. Rachis generally jointed and breaking up when mature.

1. Spikelets unisexual, male and female in separate inflorescences or on different parts of the same inflorescence.

1. *Maydeae*.

2. Spikelets bisexual, or male and bisexual, each male standing close to a bisexual.

2. *Andropogoneae*.

β Fertile glume and pale cartilaginous, coriaceous or papery; empty glumes more delicate, usually herbaceous, the lowest usually smallest. Spikelets falling singly from the unjointed rachis of the spike or the ultimate branches of the panicle.

3. *Paniceae*.

b. Hilum a line; spikelets laterally compressed.

4. *Oryzeae*.

B. Spikelets one- to indefinite-flowered; in the one-flowered the rachilla frequently produced beyond the flower; rachilla generally jointed above the empty glumes, which remain after the fruiting glumes have fallen. When more than one-flowered, distinct internodes are developed between the flowers.

a. Culm herbaceous, annual; leaf-blade sessile, and not jointed to the sheath.

α Spikelets upon distinct pedicels and arranged in panicles or racemes.

I. Spikelets one-flowered.

i. Empty glumes 4. 5. *Phalarideae*.
ii. Empty glumes 2. 6. *Agrostideae*.

II. Spikelets more than one-flowered.

i. Fertile glumes generally shorter than the empty glumes, usually with a bent awn on the back.

7. *Aveneae*.

ii. Fertile glumes generally longer than the empty, unawned or with a straight, terminal awn.

9. *Festuceae*.

β Spikelets crowded in two close rows, forming a one-sided spike or raceme with a

continuous (not jointed) rachis.

8. *Chlorideae*.

γ Spikelets in two opposite rows forming an equal-sided spike.

10. *Hordeae*.

b. Culm woody, at any rate at the base, leaf-blade jointed to the sheath, often with a short, slender petiole.

11. *Bambuseae*.

Tribe 1. *Maydeae* (7 genera in the warmer parts of the earth). *Zea Mays* (maize, *q.v.*, or Indian corn) (*q.v.*). *Tripsacum*, 2 or 3 species in subtropical America north of the equator; *Tr. dactyloides* (gama grass) extends northwards to Illinois and Connecticut; it is used for fodder and as an ornamental plant. *Coix Lacryma-Jobi* (Job's tears) *q.v.*

Tribe 2. *Andropogoneae* (25 genera, mainly tropical). The spikelets are arranged in spike-like racemes, generally in pairs consisting of a sessile and stalked spikelet at each joint of the rachis (fig. 18). Many are savanna grasses, in various parts of the tropics, for instance the large genus *Andropogon*, *Elionurus* and others. *Saccharum officinarum* (sugar-cane) (*q.v.*). *Sorghum*, an important tropical cereal known as black millet or *durra* (*q.v.*). *Miscanthus* and *Erianthus*, nearly allied to *Saccharum*, are tall reed-like grasses, with large silky flower-panicles, which are grown for ornament. *Imperata*, another ally, is a widespread tropical genus; one species *I. arundinacea* is the principal grass of the alang-alang fields in the Malay Archipelago; it is used for thatch. *Vossia*, an aquatic grass, often floating, is found in western India and tropical Africa. In the swampy lands of the upper Nile it forms, along with a species of *Saccharum*, huge floating grass barriers. *Elionurus*, a widespread savanna grass in tropical and subtropical America, and also in the tropics of the old world, is rejected by cattle probably on account of its aromatic character, the spikelets having a strong balsam-like smell. Other aromatic members are *Andropogon Nardus*, a native of India, but also cultivated, the rhizome, leaves and especially the spikelets of which contain a volatile oil, which on distillation yields the citronella oil of commerce. A closely allied species, *A. Schoenanthus* (lemon-grass), yields lemon-grass oil; a variety is used by the negroes in western Africa for haemorrhage. Other species of the same genus are used as stimulants and cosmetics in various parts of the tropics. The species of *Heteropogon*, a cosmopolitan genus in the warmer parts of the world, have strongly awned spikelets. *Themeda Forskalii*, which occurs from the Mediterranean region to South Africa and Tasmania, is the kangaroo grass of Australia, where, as in South Africa, it often covers wide tracts.

FIG. 18.—A pair of spikelets of *Andropogon*.

Tribe 3. *Paniceae* (about 25 genera, tropical to subtropical; a few temperate), a second flower, generally male, rarely hermaphrodite, is often present below the fertile flower. *Paspalum*, is a large tropical genus, most abundant in America, especially on the pampas and campos; many species are good forage plants, and the grain is sometimes used for food. *Amphicarpum*, native in the south-eastern United States, has fertile cleistogamous spikelets on filiform runners at the base of the culm, those on the terminal panicle are sterile. *Panicum*, a very polymorphic genus, and one of the largest in the order, is widely spread in all warm countries; together with species of *Paspalum* they form good forage grasses in the South American savannas and campos. *Panicum Crus-galli* is a polymorphic cosmopolitan grass, which is often grown for fodder; in one form (*P. frumentaceum*) it is cultivated in India for its grain. *P. plicatum*, with broad folded leaves, is an ornamental greenhouse grass. *P. miliaceum* is millet (*q.v.*), and *P. altissimum*, Guinea grass. In the closely allied genus *Digitaria*, which is sometimes regarded as a section of *Panicum*, the lowest barren glume is reduced to a point; *D. sanguinalis* is a very widespread grass, in Bohemia it is cultivated as a food-grain; it is also the crab-grass of the southern United States, where it is used for fodder.

In *Setaria* and allied genera the spikelet is subtended by an involucre of bristles or spines which represent sterile branches of the inflorescence. *Setaria italica*, Hungarian grass, is extensively grown as a food-grain both in China and Japan, parts of India and western Asia, as well as in Europe, where its culture dates from prehistoric times; it is found in considerable quantity in the lake dwellings of the Stone age.

In *Cenchrus* the bristles unite to form a tough spiny capsule (fig. 12); *C. tribuloides* (bur-grass) and other species are troublesome weeds in North and South America, as the

involucre clings to the wool of sheep and is removed with great difficulty. *Pennisetum typhoideum* is widely cultivated as a grain in tropical Africa. *Spinifex*, a dioecious grass, is widespread on the coasts of Australia and eastern Asia, forming an important sand-binder. The female heads are spinose with long pungent bracts, fall entire when ripe and are carried away by wind or sea, becoming finally anchored in the sand and falling to pieces.

Tribe 4. *Oryzeae* (16 genera, mainly tropical and subtropical). The spikelets are sometimes unisexual, and there are often six stamens. *Leersia* is a genus of swamp grasses, one of which *L. oryzoides* occurs in the north temperate zone of both old and new worlds, and is a rare grass in Surrey, Sussex and Hampshire. *Zizania aquatica* (Tuscarora or Indian rice) is a reed-like grass growing over large areas on banks of streams and lakes in North America and north-east Asia. The Indians collect the grain for food. *Oryza sativa* (rice) (*q.v.*). *Lygeum Spartum*, with a creeping stem and stiff rush-like leaves, is common on rocky soil on the high plains bordering the western Mediterranean, and is one of the sources of esparto.

Tribe 5. *Phalarideae* (6 genera, three of which are South African and Australasian; the others are more widely distributed, and represented in our flora). *Phalaris arundinacea*, is a reed-grass found on the banks of British rivers and lakes; a variety with striped leaves known as ribbon-grass is grown for ornament. *P. canariensis* (Canary grass, a native of southern Europe and the Mediterranean area) is grown for bird-food and sometimes as a cereal. *Anthoxanthum odoratum*, the sweet vernal grass of our flora, owes its scent to the presence of coumarin, which is also present in the closely allied genus *Hierochloe* (fig. 19), which occurs throughout the temperate and frigid zones.

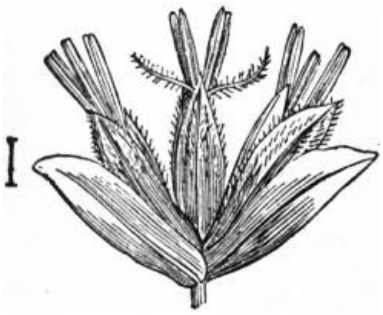


FIG. 19.—*Phalarideae.* Spikelet of Hierochloe.

Tribe 6. *Agrostideae* (about 35 genera, occurring in all parts of the world; eleven are British). *Aristida* and *Stipa* are large and widely distributed genera, occurring especially on open plains and steppes; the conspicuously awned persistent flowering glume forms an efficient means of dispersing the grain. *Stipa pennata* is a characteristic species of the Russian steppes. *St. spartea* (porcupine grass) and other species are plentiful on the North American prairies. *St. tenacissima* is the Spanish esparto grass (*q.v.*), known in North Africa as halfa or alfa. *Phleum* has a cylindrical spike-like inflorescence; *P. pratense* (timothy) is a valuable fodder grass, as also is *Alopecurus pratensis* (foxtail). *Sporobolus*, a large genus in the warmer parts of both hemispheres, but chiefly America, derives its name from the fact that the seed is ultimately expelled from the fruit. *Agrostis* is a large world-wide genus, but especially developed in the north temperate zone, where it includes important meadow-grasses. *Calamagrostis* and *Deyeuxia* are tall, often reed-like grasses, occurring throughout the temperate and arctic zones and upon high mountains in the tropics. *Ammophila arundinacea* (or *Psamma arenaria*) (Marram grass) with its long creeping stems forms a useful sand-binder on the coasts of Europe, North Africa and the Atlantic states of America.

Tribe 7. *Aveneae* (about 24 genera, seven of which are British). *Holcus lanatus* (Yorkshire fog, soft grass) is a common meadow and wayside grass with woolly or downy leaves. *Aira* is a genus of delicate annuals with slender hair-like branches of the panicle. *Deschampsia* and *Trisetum* occur in temperate and cold regions or on high mountains in the tropics; *T. pratense* (*Avena flavescens*) with a loose panicle and yellow shining spikelets is a valuable fodder-grass. *Avena fatua* is the wild oat and *A. sativa* the cultivated oat (*q.v.*). *Arrhenatherum avenaceum*, a perennial field grass, native in Britain and central and southern Europe, is cultivated in North America.

Tribe 8. *Chlorideae* (about 30 genera, chiefly in warm countries). The only British representative is *Cynodon Dactylon* (dog's tooth, Bermuda grass) found on sandy shores in the south-west of England; it is a cosmopolitan, covering the ground in sandy soils, and forming an important forage grass in many dry climates (Bermuda grass of the southern United States, and known as durba, dub and other names in India). Species of *Chloris* are grown as ornamental grasses. *Bouteloua* with numerous species (mesquite grass, grama grass) on the plains of the south-western United States, afford good grazing. *Eleusine indica* is a common tropical weed; the nearly allied species *E. Coracana* is a cultivated grain in the warmer parts of Asia and throughout Africa. *Buchloe dactyloides* is the buffalo grass of the North American prairies, a valuable fodder.

Tribe 9. *Festuceae* (about 83 genera, including tropical, temperate, arctic and alpine forms) many are important meadow-grasses; 15 are British. *Gynerium*

argenteum (pampas grass) is a native of southern Brazil and Argentina. *Arundo* and *Phragmites* are tall reed-grasses (see Reed). Several species of *Triodia* cover large areas of the interior of Australia, and from their stiff, sharply pointed leaves are very troublesome. *Eragrostis*, one of the larger genera of the order, is widely distributed in the warmer parts of the earth; many species are grown for ornament and *E. abyssinica* is an important food-plant in Abyssinia. *Koeleria cristata* is a fodder-grass. *Briza media* (quaking grass) is a useful meadow-grass. *Dactylis glomerata* (cock's-foot), a perennial grass with a dense panicle, common in pastures and waste places is a useful meadow-grass. It has become naturalized in North America, where it is known as orchard grass, as it will grow in shade. *Cynosurus cristatus* (dog's tail) is a common pasture-grass. *Poa*, a large genus widely distributed in temperate and cold countries, includes many meadow and alpine grasses; eight species are British; *P. annua* (fig. 20) is the very common weed in paths and waste places; *P. pratensis* and *P. trivialis* are also common grasses of meadows, banks and pastures, the former is the "June grass" or "Kentucky blue grass" of North America; *P. alpina* is a mountain grass of the northern hemisphere and found also in the Arctic region. The largest species of the genus is *Poa flabellata* which forms great tufts 6-7 ft. high with leaves arranged like a fan; it is a native of the Falkland and certain antarctic islands where it is known as tussock grass. *Glyceria fluitans*, manna-grass, so-called from the sweet grain, is one of the best fodder grasses for swampy meadows; the grain is an article of food in central Europe. *Festuca* (fescue) is also a large and widely distributed genus, but found especially in the temperate and cold zones; it includes valuable pasture grasses, such as *F. ovina* (sheep's fescue), *F. rubra*; nine species are British. The closely allied genus *Bromus* (brome grass) is also widely distributed but most abundant in the north temperate zone; *B. erectus* is a useful forage grass on dry chalky soil.

Fig. 20.—*Poa annua.* Plant in Flower; about ½ nat. size. 1, one spikelet.

Tribe 10. *Hordeae* (about 19 genera, widely distributed; six are British). *Nardus stricta* (mat-weed), found on heaths and dry pastures, is a small perennial with slender rigid stem and leaves, it is a useless grass, crowding out better sorts. *Lolium perenne*, ray- (or by corruption rye-) grass, is common in waste places and a valuable pasture-grass; *L. italicum* is the Italian ray-grass; *L. temulentum* (darnel) contains a narcotic principle in the grain. *Secale cereale*, rye (*q.v.*), is cultivated mainly in northern Europe. *Agropyrum repens* (couch grass) has a long creeping underground stem, and is a troublesome weed in cultivated land; the widely creeping stem of *A. junceum*, found on sandy sea-shores, renders it a useful sand-binder. *Triticum sativum* is wheat (*q.v.*) (fig. 21), and *Hordeum sativum*, barley (*q.v.*). *H. murinum*, wild barley, is a common grass in waste places. *Elymus arenarius* (lyme grass) occurs on sandy sea-shores in the north temperate zone and is a useful sand-binder.

Fig. 21.—Spike of Wheat

Tribe 11. *Bambuseae*. Contains 23 genera, mainly tropical. See Bamboo.

III. Distribution.—Grasses are the most universally diffused of all flowering plants. There is no district in which they do not occur, and in nearly all they are a leading feature of the flora. In number of species Gramineae comes considerably after Compositae and Leguminosae, the two most numerous orders of phanerogams, but in number of individual plants it probably far exceeds either; whilst from the wide extension of many of its species, the

(*Triticum sativum*). About ⅔ nat. size.

proportion of Gramineae to other orders in the various floras of the world is much higher than its number of species would lead one to expect. In tropical regions, where Leguminosae is the leading order, grasses closely follow as the second, whilst in the warm and temperate regions of the northern hemisphere, in which Compositae takes the lead, Gramineae again occupies the second position.

While the greatest number of species is found in the tropical zone, the number of individuals is greater in the temperate zones, where they form extended areas of turf. Turf- or meadow-formation depends upon uniform rainfall. Grasses also characterize steppes and savannas, where they form scattered tufts. The bamboos are a feature of tropical forest vegetation, especially in the monsoon region. As the colder latitudes are entered the grasses become relatively more numerous, and are the leading family in Arctic and Antarctic regions. The only countries where the order plays a distinctly subordinate part are some extra-tropical regions of the southern hemisphere, Australia, the Cape, Chili, &c. The proportion of graminaceous species to the whole phanerogamic flora in different countries is found to vary from nearly ¼th in the Arctic regions to about $\frac{1}{25}$th at the Cape; in the British Isles it is about $\frac{1}{12}$th.

The principal climatic cause influencing the number of graminaceous species appears to be amount of moisture. A remarkable feature of the distribution of grasses is its uniformity; there are no great centres for the order, as in Compositae, where a marked preponderance of endemic species exists; and the genera, except some of the smallest or monotypic ones, have usually a wide distribution.

The distribution of the tropical tribe *Bambuseae* is interesting. The species are about equally divided between the Indo-Malayan region and tropical America, only one species being common to both. The tribe is very poorly represented in tropical Africa; one species *Oxytenanthera abyssinica* has a wide range, and three monotypic genera are endemic in western tropical Africa. None is recorded for Australia, though species may perhaps occur on the northern coast. One species of *Arundinaria* reaches northwards as far as Virginia, and the elevation attained in the Andes by some species of *Chusquea* is very remarkable,—one, *C. aristata*, being abundant from 15,000 ft. up to nearly the level of perpetual snow.

Many grasses are almost cosmopolitan, such as the common reed, *Phragmites communis*; and many range throughout the warm regions of the globe, *e.g. Cynodon Dactylon*, *Eleusine indica*, *Imperata arundinacea*, *Sporobolus indicus*, &c., and such weeds of cultivation as species of *Setaria*, *Echinochloa*. Several species of the north temperate zone, such as *Poa nemoralis*, *P. pratensis*, *Festuca ovina*, *F. rubra* and others, are absent in the tropics but reappear in the antarctic regions; others (*e.g. Phleum alpinum*) appear in isolated positions on high mountains in the intervening tropics. No tribe is confined to one hemisphere and no large genus to any one floral region; facts which indicate that the separation of the tribes goes back to very ancient times. The revision of the Australian species by Bentham well exhibits the wide range of the genera of the order in a flora generally so peculiar and restricted as that of Australia. Thus of the 90 indigenous genera (many monotypic or very small) only 14 are endemic, 1 extends to South Africa, 3 are common to Australia and New Zealand, 18 extend also into Asia, whilst no fewer than 54 are found in both the Old and New Worlds; 26 being chiefly tropical and 28 chiefly extra-tropical.

Of specially remarkable species *Lygeum* is found on the sea-sand of the eastern half of the Mediterranean basin, and the minute *Coleanthus* occurs in three or four isolated spots in Europe (Norway, Bohemia, Austria, Normandy), in North-east Asia (Amur) and on the Pacific coast of North America (Oregon, Washington). Many remarkable endemic genera occur in tropical America, including *Anomochloa* of Brazil, and most of the large aquatic species with separated sexes are found in this region. The only genus of flowering plants peculiar to the arctic regions is the beautiful and rare grass *Pleuropogon Sabinii*, of Melville Island.

Fossil Grasses.—While numerous remains of grass-like leaves are a proof that grasses were widespread and abundantly developed in past geological ages, especially in the Tertiary period, the fossil remains are in most cases too fragmentary and badly preserved for the determination of genera, and conclusions based thereon in explanation of existing geographical distribution are most unsatisfactory. There is, however, justification for referring some specimens to *Arundo*, *Phragmites*, and to the *Bambuseae*.

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1 The word "grass" (O. Eng. *gærs*, *græs*) is common to Teutonic languages, cf. Dutch Ger. Goth, *gras*, Dan. *græs*; the root is the O. Teut. *gra-*, *gro-*, to increase, whence "grow," and "green," the typical colour of growing vegetation. The Indo-European root is seen in Lat. *gramen*. The O. Eng. *grasian*, formed from *græs*, gives "to graze," of cattle feeding on growing herbage, also "grazier," one who grazes or feeds cattle for the market; "to graze," to abrade, to touch lightly in passing, may be a development of this from the idea of close cropping; if it is to be distinguished a possible connexion may be found with "glace" (Fr. *glacer*, glide, slip, Lat. *glacies*, ice), to glance off, the change in form being influenced by "grate," to scrape, scratch (Fr. *gratter*, Ger. *kratzen*).

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