

in Paris or in travels of considerable extent to Spain, the Netherlands, Italy, Turkey, England, Algeria, and Russia, all undertaken with a more or less definite purpose of book making. Having absolutely no political opinions, he had no difficulty in accepting the second empire, and received from it considerable favours, in return for which, however, he in no way prostituted his pen, but remained a literary man pure and simple. He died in October 1872. Accounts of his travels, criticisms of the theatrical and literary works of the day, obituary notices of his contemporaries, and above all art criticism, occupied him in turn. In the last department he has never had a superior, nor perhaps, except in the cases of Diderot and a great living English critic, an equal. It has sometimes been deplored that this engagement in journalism should have diverted Gautier from the performance of more capital work in literature. Perhaps, however, this regret springs from a certain misconception. Gautier's power was literary power pure and simple, and it is as evident in his slightest sketches and criticisms as in *Émanx et Camées* or *La Morte Amoureuse*. On the other hand, his weakness, if he had a weakness, lay in his almost total indifference to the matters which usually supply subjects for art and therefore for literature. He was neither immoral, irreligious, nor unduly subservient to despotism, but morals, religion, and politics (to which we may add science and material progress) were matters of no interest to him. He was to all intents a humanist, as the word was understood in the 15th century. But he was a humorist as well, and this combination, joined to his singularly kindly and genial nature, saved him from some dangers and deprivations as well as some absurdities to which the humanist temper is exposed. As time goes on it may be predicted that, though Gautier may not be widely read, yet his writings will never cease to be full of indescribable charm and of very definite instruction to men of letters. Besides those of his works which have been already cited, we may notice *Une larme du Diable* (1839), a charming mixture of humour and tenderness; *Les Grotesques*, a volume of early criticisms on some oddities of 17th century literature; *Caprices et Zigzags*, miscellanies dealing in part with English life; *Constantinople, Voyage in Russie, Voyage in Espagne*, brilliant volumes of travel; *Ménagerie Intime* (1869), and *Tableaux de Siège* (1872), his two latest works, which display his incomparable style in its quietest but not least happy form. (G. SA.)

GAUZE, a light, transparent, silken fabric, woven in an open manner with very fine yarn. It is said to have been originally made at Gaza in Palestine, whence the name. In the weaving of gauze the warp threads, in addition to being crossed as in plain weaving, are twisted in pairs from left to right and from right to left alternately, after each shot of weft, thereby keeping the weft threads at equal distances apart, and retaining them in their parallel position. The textures are woven either plain, striped, or figured; and the material receives many designations, according to its appearance and the purposes to which it is devoted. A thin cotton fabric, woven in the same way, is known as leno, to distinguish it from muslin made by plain weaving. Silk gauze was a prominent and extensive industry in the west of Scotland during the second half of the 18th century, but on the introduction of cotton weaving it greatly declined. In addition to its use for dress purposes silk gauze is much employed for bolting or sifting flour and other finely ground substances. The term gauze is applied generally to transparent fabrics of whatever fibre made, and to the fine woven wire-cloth used in safety-lamps, sieves, window-blinds, &c.

GAVARNI, French caricaturist, was born at Paris in 1801, and died in 1866. His true name was Chevalier (Sulpice Guillaume), and he is said to have taken the *nom de plume* under which he is known from the place where he

made his first published sketch. His parents were poor, and he started in life as a workman in an engine-building factory. At the same time he attended the free school of drawing. Here his natural talent was developed, and he acquired that training of the hand without which an artist is unable to work up his best inspirations. In his first attempts to turn his abilities to some account he met with many disappointments, but was at last entrusted with the drawing of some illustrations for a journal of fashion. Gavarni was then thirty-four years of age. His sharp and witty pencil gave to these generally commonplace and unartistic figures a life likeness and an expression which soon won for him a name in fashionable circles. Gradually he gave greater attention to this more congenial work, and finally ceased working as an engineer to become the director of the journal *Les Geni du Monde*. His ambition rising in proportion to his success, Gavarni from this time followed the real bent of his inclination, and began a series of lithographed sketches, in which he portrayed the most striking characteristics, foibles, and vices of the various classes of French society. The letterpress explanations attached to his drawings were always short, but were forcible and highly humorous, it sometimes trivial, and were admirably adapted to the particular subjects. The different stages through which Gavarni's talent passed, always elevating and refining itself, are well worth being noted. At first he confined himself to the study of Parisian manners, more especially those of the Parisian youth. To this vein belong *les Lorettes, les Actrices, les Coulisses, les Fashionables, les Gentilshommes bourgeois, les Artistes, les Débardeurs, Olichy, les Étudiants de Paris, les Baliverneries Parisiennes, les Plaisirs Champêtres, les Bals masqués, le Carnaval, les Souvenirs du Carnaval, les Souvenirs du Bal Chicard, la Vie des jeunes hommes, les Patois de Paris*. He had now ceased to be director of *Les Gens du Monde*; but he was engaged as ordinary caricaturist of *Le Charivari*, and, whilst making the fortune of the paper, he made his own. His name was exceedingly popular, and his illustrations for books were eagerly sought for by publishers. *Le Juif Errant*, by Eugène Sue (1843, 4 vols. 8vo), the French translation of Hoffmann's tales (1843, 8vo), the first collective edition of Balzac's works (Paris, Houssiaux, 1850, 20 vols. 8vo), *Le Diable à Paris* (1844-46, 2 vols. 4to), *Les Français peints par eux-mêmes* (1840-43, 9 vols. 8vo), the collection of *Physiologies* published by Aubert in 38 vols. 18mo (1840-42),—all owed a great part of their success at the time, and are still sought for, on account of the clever and telling sketches contributed by Gavarni. A single frontispiece or vignette was sometimes enough to secure the sale of a new book. Always desiring to enlarge the field of his observations, Gavarni soon abandoned his once favourite topics. He no longer limited himself to such types as the *lorette* and the Parisian student, or to the description of the noisy and popular pleasures of the capital, but turned his mirror to the grotesque sides of family life and of humanity at large. *Les Enfants terribles, les Parents terribles, les Fourberies de femmes, la Politique des femmes, les Maris vengés, les Nuances du sentiment, les Rêves, les Petits Jeux de Société, les Petits malheurs du bonheur, les Impressions de ménage, les Interjections, les Traductions en langue vulgaire, les Propos de Thomas Vireloque, &c.*, were composed at this time, and are his most elevated productions. But whilst showing the same power of irony as his former works, enhanced by a deeper insight into human nature, they generally bear the stamp of a bitter and even sometimes gloomy philosophy. This tendency was still more strengthened by a visit to England in 1849. He returned from London deeply impressed with the scenes of misery and degradation which he had observed among the lower classes of that city. In the

midst of the cheerful atmosphere of Paris he had been struck chiefly by the ridiculous aspects of vulgarity and vice, and he had laughed at them. But the debasement of human nature which he saw in London appears to have affected him so forcibly that from that time the cheerful caricaturist never laughed, or made others laugh again. What he had witnessed there became the almost exclusive subject of his drawings, as powerful, as impressive as ever, but better calculated to be appreciated by cultivated minds than by the public, which had in former years granted him so wide a popularity. Most of these last compositions appeared in the weekly paper *L'Illustration*. In 1857 he published in one volume the series entitled *Masques and Visages* (1 vol. 12mo), and in 1869, about two years after his death, his last artistic work, *Les Douze Mois* (1 vol. fol.), was given to the world. Gavarni was much engaged, during the last period of his life, in scientific pursuits, and this fact must perhaps be connected with the great change which then took place in his manner as an artist. He sent several communications to the Académie des Sciences, and till his death, which happened on the 23d of November 1866, he was eagerly interested in the question of aerial navigation. It is said that he made experiments on a large scale with a view to find the means of directing balloons; but it seems that he was not so successful in this line as his fellow-artist, the caricaturist and photographer, Nadar.

Gavarni's *Œuvres choisies* were edited in 1845 (4 vols. 4to) with letterpress by J. Janin, Th. Gautier, and Balzac, followed in 1850 by two other volumes named *Perles et Parures*; and some essays in prose and in verse written by him were collected by one of his biographers, Ch. Yriarte, and published in 1869. The book written by E. and J. de Gonwurt, *Gavarni, l'homme et l'œuvre* (1873, 8vo), must be mentioned here. J. Claretie has also devoted to the great French caricaturist a curious and interesting essay. A catalogue raisonné of Gavarni's works has been published by J. Armelhaul and E. Bocher, Paris, 1873, 8vo.

GAVELKIND is a peculiar system of tenure prevailing chiefly in the county of Kent, but found also in other parts of England. In Kent all land is presumed to be holden by this tenure until the contrary is proved. It is more correctly described as socage tenure, subject to the custom of gavelkind. The chief peculiarities of the custom are the following. (1.) A tenant can alienate his lands by feoffment at fifteen years of age. (2.) There is no escheat on attainder for felony, or as it is expressed in the old rhyme—

"The father to the bough,
The son to the plough."

(3.) Generally the tenant could always dispose of his lands by will. (4.) In case of intestacy the estate descends not to the eldest son but to all the sons in equal shares. "Every son is as great a gentleman as the eldest son is." It is to this remarkable peculiarity that gavelkind no doubt owes its local popularity. The 4 & 5 Vict. c. 35, for commuting manorial rights in respect of lands of copyhold and customary tenure, contains a clause specially exempting from the operation of the Act "the custom of gavelkind as the same now exists and prevails in the county of Kent." Gavelkind is one of the most interesting examples of the customary law of England, and it is no doubt correctly traced to the Saxon land-law prevailing before the Conquest. Its survival in this instance in one part of the country is regarded as a concession extorted from the Conqueror by the superior bravery of the men of Kent.

GAVIAL. See CROCODILE.

GAY, JOHN (1688-1732), one of the most eminent of the secondary English poets, was a native of Devonshire, born in 1688 at Frithelstock, near Torrington, where his family had been long settled. His father dying when the future poet was only about six years of age, and leaving four children, the prospects of the family were unpromising

and John, after receiving his education at the grammar school of Barnstaple, was put apprentice to a silk mercer in London. He disliked the employment, obtained his discharge, and embarked in a literary life, varied only by incessant efforts to obtain the patronage of the great. How he lived up to his twenty-second year is not stated. In 1710 he published his poem of *Wine*, an enumeration of the charms of the "enlivening grape," written in the grave, mock-heroic, and minutely descriptive style, which he afterwards displayed with greater power in his *Trivia*. In 1712 he was received into the household of the duchess of Monmouth in the capacity of secretary. Next year he published his *Rural Sports*, inscribed to Pope; and this seems to have led to a friendship between the poets uninterrupted and sincere. The superiority of Pope was freely conceded. There could be no rivalry on the part of Gay, and Pope appears to have exerted himself on every occasion to serve his friend. Gay's ambition was limited to a life of ease, fine-dressing, and a luxurious table, in all of which he had marvellous success, but little contentment. In the years 1713 and 1714, besides the *Rural Sports*, he produced a comedy, *The Wife of Bath*, which was acted only three nights; *The Fan*, a poem; and *The Shepherd's Week*, a series of six pastorals drawn from English rustic life. Pope is believed to have incited his friend to this task in order to cast ridicule on the Arcadian pastorals of Ambrose Philips, who had been lavishly praised in the *Guardian* (ignoring the claims of Pope) as the first pastoral writer of the age, and the true English Theocritus. The malicious wit was completely successful, but Gay's ludicrous pictures of the English swains and their loves were found to be interesting and amusing without reference to their sarcastic origin. The poem was popular, and the author's reputation considerably advanced. In this fortunate year Gay was appointed secretary to the earl of Clarendon, ambassador to the court of Hanover; but the death of Queen Anne, August 1, 1714, soon put an end to his hopes of permanent official employment. He then tried the drama, and produced his farce of *What d'ye Call it!* which was acted with little success in February 1714-15. In 1716 appeared his *Trivia, or the Art of Walking the Streets of London*, a poem in three books, for which he acknowledged having received several hints from Swift. It is an excellent town poem, containing graphic and humorous descriptions of the London of that period. In January 1716-17 the comedy of *Three Hours after Marriage* was brought on the stage, and emphatically condemned. In this piece Gay was assisted by Pope and Arbuthnot. Pope is distinctly visible in his allusions to Dennis the critic; and it is remarkable that three such men should have produced a play so dull, unnatural, and gross. Gay was taken to Aix by Mr Pulteney in 1717. In 1720 he collected his poems and published them by subscription, by which he is said to have realized £1000. Secretary Craggs also presented him with some South Sea stock; and Gay called in his friends to advise as to the investment of his riches. Erasmus Lewis, according to Johnson, advised him to intrust his money to the funds, and live upon the interest; Arbuthnot bade him intrust it to Providence, and live upon the principal; while Pope directed him, and was seconded by Swift, to purchase an annuity. This was Pope's own prudent system; but Gay, like many others who ask advice, followed none, but took his own way. He embarked all in South Sea stock; and, refusing to sell out before the bubble burst, he lost the actual principal as well as the anticipated profit. The calamity overwhelmed him; his life was despaired of; but his friends exerted themselves to cheer and succour the desponding bard. Lord Burlington entertained him for months in his princely house at Chiswick; and Pope Arbuthnot and the other members of the circle were

unceasing in their attentions. By the beginning of 1724 he had a new play ready, a tragedy called the *Captives*, which was patronized by the Princess (afterward Queen) Caroline and the Prince of Wales. In 1726 he published his famous *Fifty-one Fables in Verse*. His next work was the *Beggar's Opera*, performed in 1727, written in ridicule of the Italian Opera, which for a time it drove off the English stage. Swift suggested the subject, and Pope is believed to have added some poignancy to the satirical songs; but Gay's own *bonhomie* and voluptuous style colour the whole. The play ran to the end of the season, sixty-two nights, four of which were for the benefit of the author, and produced to him the handsome sum of £693, 13s. 6d. The same year he sold his copyright of the *Opera*, with that of the *Fables*, for 90 guineas. The success of *The Beggar's Opera* induced Gay to attempt a continuation of the operatic style. He wrote another piece, *Polly*, with no satirical design, as he states; but the lord chamberlain prohibited its representation. The poet then resorted in 1729 to publication by subscription; his friends were again active—the duchess of Queensberry even bearding royalty in resentment of the refusal of the licence; and Gay must have cleared above £1000 by what was deemed his oppression. The duke of Queensberry received Gay into his house, and the duchess treated him with equal respect for his talents and character. This clever, beautiful, and eccentric woman—the idol of the poets—appears nowhere to more advantage than in her affectionate patronage of Gay, and her long-cherished regret for his loss. The poet died, after a short illness, December 4, 1732, and the duke and duchess of Queensberry honoured his remains with a splendid funeral and monument in Westminster Abbey. A week before his death another opera, *Achilles*, had been brought out with applause, and this, with a new volume of *Fables*, was published in 1733, the profits going to his sisters, two widow ladies, who inherited by the poet's death no less than £6000. As late as 1743 appeared the posthumous comedy of *The Distrest Wife*, and the farce of *The Rehearsal at Gotham* in 1753. Pope and Swift—always ready to blame the court and courtiers, though far from averse to their society—have censured Mrs Howard, afterwards countess of Suffolk, for not more zealously promoting the interests of Gay by her supposed influence with the king. One offer was made to the poet,—the situation of gentleman-usher to the Princess Louisa, a child,—but he declined it on account of his being, as he writes to Swift, so far advanced in life. He was only thirty-nine; but all Gay's friends seem to have treated the offer as an indignity. When the queen's establishment was made up in 1727, they expected some more important office for their favourite associate, though it is not easy to discover what appointment about the court could have been better adapted to one so easy, so natural, and helpless. Mrs Howard, it is now known, had very little influence with her royal master. The real power was in the hands of the queen, and the philosophical Caroline was content that his Majesty (who hated *thoetry* and *bhainting*, and looked upon poets as mechanics) should possess what mistresses he pleased, provided that the state power and patronage continued with herself and Walpole. But it may be safely said that no man could have acquired such a body of great and accomplished friends as those which rallied round Gay and mourned his loss, without the possession of many valuable and endearing qualities. His poetry is neither high nor pure; but he had humour, a fine vein of fancy, and powers of observation and local painting which bespeak the close poetical student and the happy literary artist.

GAY, MARIE FRANCOISE SOPHIE, MADAME (1776-1852), daughter of M. Nichault de Lavalette (who was attached to the household of Monsieur, afterwards Louis XVIII.), and

of Francesca Peretti, a Florentine lady, was born at Paris 1st July 1776. Under the guidance of her father, a man of taste and culture, she received a very careful education. In 1793 she was married to M. Liottier, an exchange broker, but she was divorced from him in 1799, and shortly afterwards was married to M. Gay, receiver-general of the department of the Roër or Ruhr. This union brought her into more intimate relations with many distinguished personages whom she had previously known; and her circle of acquaintanceship gradually extended, until her *salon* came to be frequented by all the distinguished litterateurs, musicians, actors, and painters of the time, among whom she made herself remarked by her beauty, her vivacity, and her sprightly wit tempered by fine tact and genuine amiability. Her first literary production was a letter written in 1802 to the *Journal de Paris*, in defence of Madame de Staël's novel *Delphin*; and in the same year she published anonymously her first novel *Laure d'Estell*. *Léonie de Montbreuse*, which appeared in 1813, is considered by Sainte-Beuve her best work; but *Anatolie*, which appeared in 1815, has perhaps a higher reputation. These and several of her other works, amongst which may be specially named *Les Salons célèbres*, possess an interest beyond their intrinsic merits—chief of which are purity and elegance of style—for their portraits of French society especially during the period of the directory and the consulate, and of many of the distinguished personages whose intimacy she enjoyed. Madame Gay wrote several theatrical pieces which had considerable success. She was also an accomplished player on the pianoforte and harp, and composed both the words and music of a number of romances. For an account of her daughter Delphine Gay, Madame de Girardin, see GIRARDIN.

Besides the works already mentioned, she is the author of *Les Malheurs d'un amant heureux*, 1818; *Théobald, épisode de la guerre de Russie*, 1828; *Le Moqueur amoureux*, 1830; *Un Mariage sous l'Empire*, 1832; *Scènes du jeune âge*, 1833; *Physiologie du ridicule*, 1833; *La Duchesse de Châteauroux*, 1834; *Souvenirs d'une vieille femme*, 1834; *La Comtesse d'Égmont*, 1836; *Marie de Mancini*, 1840; *Marie-Louise d'Orléans*, 1842; *Ellénore*, 1844-46; *Le Faux Frère*, 1845; *Le Comte de Guiche*, 1845; and *Le Mari confident*, 1849. See Theophile Gautier, *Portraits Contemporains*; and Sainte-Beuve, *Causeries du Lundi*, vol. vi.

GAYÁ, a district of British India in the Patná division, under the lieutenant-governor of Bengal, situated between 24° 17' and 25° 19' N. lat., and between 84° 4' and 86° 5' E. long. It is bounded on the N. by Patná, on the E. by Monghyr, on the S.E. and S. by Hazáribágh, and on the W. by Sháhábád districts. Generally speaking, Gayá consists of a level plain, with a ridge of prettily wooded hills along the southern boundary, whence the country falls with a gentle slope towards the Ganges. Rocky hills occasionally occur, either detached or in groups, the loftiest being Máher hill about 12 miles S.E. of Gayá town; with an elevation of 1620 feet above sea-level. The eastern part of the district is highly cultivated; the portions to the north and west are less fertile; while in the south, the country is thinly peopled, and consists of hills, the jungles on which are full of wild animals. The principal river is the Son, which marks the boundary between Gayá and Sháhábád, navigable by small boats throughout the year, and by craft of 20 tons burden in the rainy season. The other rivers are the Pimpún, Phálgú, and Jamná, and a number of smaller streams. Two branches of the Son canal system, the eastern main canal and the Patná canal, intersect the district.

The census of 1872 takes the area of Gayá district at 4718 square miles, and returns the population at 954,129 males and 995,621 females,—total, 1,949,750, residing in 6530 villages or towns, and 327,845 houses. Classified according to religion, there are 1,729,890 Hindus, 219,332

Mahometans, 203 Christians, and 316 "others." Amongst the higher castes there is an unusually large proportion of Bráhmans, a circumstance due to the number of sacred places which the district contains. The Gayáwáls, or priests in charge of the holy places, are held in high esteem by the pilgrims; but they are not pure Bráhmans, and are looked down upon by those who are. They live an idle and dissolute life, but are very wealthy, from contributions extorted from the pilgrims. The ruined city of Buddha Gayá, about 6 miles south of Gayá town, marks the residence of Sakya Sinha, the founder of the Buddhist religion, who flourished in the 6th century B.C., and an ancient tree is pointed out as the identical fig tree under which the sage sat in abstraction for five years, until he attained to the state of Buddha. Another place of religious interest is a temple of great antiquity, which crowns the highest peak of the Baraber hills, and at which a religious fair is held each September, attended by from 10,000 to 20,000 pilgrims. At the foot of the hill are numerous rock caves excavated about 200 B.C.

Seven towns in Gayá district contain upwards of 5000 inhabitants, viz., Gayá, 66,843; Jahánábád, 21,022; Dáudnagar, 10,058; Tikári, 8178; Phergháti, 7033; Hasúá, 6119; and Rajáuli, 5012. About four-fifths of the surface is cultivated. Rice forms the great agricultural staple, the area under cultivation being estimated at about 900,000 acres, yielding an outturn of over 400,000 tons. Wheat occupies about 170,000 acres, producing a crop of 60,000 tons, of which one-half is exported. Oil seeds are grown on about 35,000 acres, and opium on between 60,000 and 70,000 acres. Cotton, sugar-cane, chilies, and vegetables are also grown. Droughts are common, and in the famine of 1866 Gayá suffered severely. The scarcity of 1873-74 did not affect the district to any great extent. Manufactures consist of common brass utensils, black stone ornaments, pottery, *tasar* silk cloth. Formerly cloth-weaving and paper-making were important manufactures in the district, but these industries have now almost entirely died out. The chief exports are food grains, oil seeds, indigo, crude opium (sent to Patná for manufacture), saltpetre, sugar, blankets, brass utensils, &c. The imports are salt, piece goods, cotton, timber, bamboos, tobacco, lac, iron, spices, and fruits. The principal trade route is along the Patná branch road. The total net revenue of the district in 1876-77 was £188,426, of which £136,692 was derived from the land; the net civil expenditure, £23,878. The district and municipal police of all ranks numbered 923, besides a rural force of 6790 men paid by the landholders and villagers. The number of schools in 1873-74 was 446, attended by 8139 pupils. The climate of Gayá is dry and healthy,—the average annual temperature being about 80° F., and average annual rainfall 35.59 inches.

GAYÁ, the chief town and administrative headquarters of the above district; situated on the bank of the Phálgú river, lat. 24° 47' 15" N., long. 85° 3' 10" E. The population in 1872 numbered 66,843:—Hindus, 52,265; Mahometans, 14,444; Christians, 134. The municipal income in 1871 was £2716, and the expenditure £2351. The town consists of two distinct parts, adjoining each other; the part containing the residences of the priests is Gayá proper; and the other, which is the business quarter, is called Sáhírganj. The civil offices and residences of the European inhabitants are situated here. Gayá derives its sanctity from incidents in the life of Buddha connected with the adjoining district. But a local legend also exists concerning a pagan monster of great sanctity, named Gayá, who wickedly tried to save sinners from deserved perdition. Brahma in order to get rid of Gayá induced him to lie down in order that a feast might be held on his body; and once down, he placed a large stone on him to keep him there. The tricked demon struggled violently, and, in order to pacify him, Brahma promised that the gods should take up their permanent residence in him, and that any one who made a pilgrimage to the spot were he lay should be delivered from the terrors of the Hindu place of torment. This may possibly be a Brahmanic rendering of Buddha's life and work. There are forty-five sacred spots in and around town, which are visited by from 100,000 to 200,000 pilgrims annually.

GAY-LUSSAC, JOSEPH LOUIS (1778-1850), one of the most distinguished of modern physicists and chemists, was born at St Léonard, in the department of Haute Vienne, on the 6th of December 1778. His father, Antoine Gay, who was procureur du roi and judge at Pont-de-Noblac, had added to the common family name the distinctive title Lussac, from a small property he had in the neighbourhood of St Léonard. The family consisted of two sons, of whom Joseph Louis was the elder, and three daughters. Intended for the bar, young Gay-Lussac prosecuted his early studies in Latin and other elementary subjects at home, under the superintendence of the Abbé Bourdeix and other masters, until 1794, when he was sent to Paris, where he worked very hard for three years preparing for admission to the École Polytechnique. After a brilliant examination he was received into this institution on December 27, 1797, whence on the 22d of November 1800 he was transferred to the school Des Ponts et Chaussées. Shortly afterwards he was assigned to Berthollet, who had returned from Napoleon's Egyptian expedition, and who was desirous of having an able student from the École Polytechnique to aid him in his researches. The results expected by the author of the *Statique Chimique* were not verified by his assistant's experiments, which seem to have been recorded without any consideration of the theorizer's feelings. It was on this occasion, according to Arago, that Berthollet, at first nettled to find that his ideas were not confirmed, delivered himself as follows: "Young man, it is your destiny to make discoveries. You shall be henceforth my companion. I wish—it is a title of which I am sure I shall have cause some day to be proud—I wish to be your father in science."

Gay-Lussac accordingly entered on a long series of researches upon certain physical phenomena, which though of constant recurrence in experimental inquiries, had up to this time been very imperfectly examined. In his first memoir (*Ann. de Chimie*, t. xliii., 1802) he shows that different gases are dilated in the same proportion when heated from 0° to 80° (Réaumur). He does not seem to have been aware of Dalton's experiments on this subject, which were indeed very far from being accurate; but he states in a footnote that "le cit. Charles¹ avait remarqué depuis 15 ans la même propriété dans ces gaz; mais, n'ayant jamais publié ses résultats, c'est par le plus grand hasard que je les ai connus." In return for his having thus rescued from oblivion the remark which his fellow-citizen, probably wisely, did not think worth recording, some recent authors have changed the title of the law from that of Gay-Lussac to that of Charles. The investigations recorded in this memoir were followed by experiments on the improvements of thermometers and barometers, on the tension of vapours, their mixture with gases, and the determination of their density, evaporation, hygrometry, and capillarity. In course of these researches, which engaged him for a couple of years, he acquired not only dexterity in manipulation and the contrivance of experiments, but a great deal of valuable knowledge of physics. During the interval, in the year 1802, he had been nominated Fourcroy's demonstrator at the École Polytechnique, and as he had in this capacity to lecture frequently for the professor, he was beginning to acquire reputation as a teacher and expounder of chemistry and physics, by the clearness, precision, and care which his lectures evinced. In 1803-4 certain results respecting terrestrial magnetism had been obtained during two balloon ascents, which appeared of so much interest that the French Academy was desirous of having them repeated. Through Berthollet and Chaptal the balloon which had been used in Egypt was obtained, and fitted up with various instruments; the observations were entrusted to Gay-Lussac and Biot,

¹ The inventor of the "Charlière," or hydrogen balloon.

who made their first ascent from the garden of the Conservatoire des Arts et Metiers, on August 24, 1804. In this ascent an altitude of 4000 metres was attained, but unexpected difficulties were encountered, and the results were not decisive. Not satisfied with the expedition, Gay-Lussac got a larger balloon provided with every requisite, and made an ascent by himself on September 16 of the same year. On this occasion the balloon rose to a height of 7016 metres, an altitude greater than any which had been formerly reached, and surpassed only by a few later ascents. At this great elevation of nearly 23,000 feet, and with the thermometer at $9\frac{1}{2}^{\circ}$ C. below freezing, Gay-Lussac remained for a considerable time making observations on temperature, on the moisture of the air, on magnetism, and other points. He observed particularly that he had considerable difficulty in breathing, that his pulse was quickened, and that by the absence of moisture in the air his mouth and throat became so parched that it was painful to swallow even a piece of bread. The experiments on magnetism for which the ascent was primarily made were imperfect, but they led him to the conclusion that the magnetic effect at all attainable elevations above the earth's surface remains constant.¹ Having collected samples of air at different elevations he, on his return to Paris, proceeded to analyse them; and in conjunction with Alexander von Humboldt, whom he had associated with himself in this investigation, he published several papers on eudiometric analysis and related topics. The memoir, which was read to the Institute on October 1, 1804, contained the germ of what was afterwards Gay-Lussac's most important generalization. The authors observed that when oxygen and hydrogen combine together by volume, it is in the proportion of one volume of the former to two volumes of the latter. Prior to this the numerous experiments on the volume composition of water had always brought out various complicated ratios, though approaching the simple one more or less closely. It was not, however, till 1808, that Gay-Lussac announced the law of combination by volume in its general form. Shortly after these investigations were completed, Gay-Lussac got leave of absence to accompany Von Humboldt on a scientific journey to Switzerland, Italy, and Germany. Provided with physical and meteorological instruments, they left Paris March 12, 1805, and travelled by Lyons, Chambery, and Mont Cenis to Genoa, and thence to Rome, where they arrived on July 5. After a short stay at Rome in the residence of William von Humboldt, during which Gay-Lussac made a few chemical analyses, they departed for Naples in company with Leopold von Buch, afterwards so eminent as a geologist. During this visit Gay-Lussac had the opportunity of studying on the spot volcanic eruptions and earthquakes. Vesuvius, which was in violent action, he ascended six times. After this the party went back to Rome, and then started for Florence on September 17, 1805. A few days having been spent there, they went on to Bologna and thence to Milan, which they reached on October 1, and there they had the pleasure of meeting Volta. The party crossed the St Gotthard on October 14-15, in the midst of a storm which prevented their seeing anything, and after some delay reached Göttingen, where they were received with much attention by Blumenbach, the famous naturalist. On November 16 they arrived at Berlin, where the winter and the following spring were spent. In this way Gay-Lussac became acquainted with the best society in Berlin, and was especially intimate with Klaproth and Erman. In spring he hurriedly returned to Paris. The death of an Academician had left a vacant place, and he was hopeful that he might be elected to fill it. Arago remarks that it is curious

¹ The numerous observations made in both ascents are recorded in the *Journal de Physique* for 1804, vol. 59.

that Gay-Lussac should have found it necessary to be on the spot to ensure success. What he had already done for science might have been considered sufficient, apart from personal considerations, but there were prejudices which might have acted unfavourably, if he had not been present to meet them. These were, however, successfully overcome, and he entered the Academy in 1806. In the following year was inaugurated the Société d'Arcueil, a small group of scientific men who used to assemble at Berthollet's house. Gay-Lussac was an original member of this society, which is of interest chiefly on account of its having been the means of publishing some papers which have since proved of great historical interest. The results of his magnetic observations made along with Humboldt were published in vol. i. of its *Mémoires* (1807); and vol. ii. (1809) contains the important memoir on gaseous combination, in which he pointed out that, when gases combine with one another by volume or by measure, they do so in the very simplest proportions, 1 to 1, 1 to 2, 2 to 3, and so on, and that the volume of the product in the gaseous state bears a very simple ratio to that of the constituents. This law, which, along with Humboldt, he had shown to be true of water, he extended to several other gases, and he even deduced from the vapour density of compounds that of certain elements, more particularly, carbon, mercury, and iodine, which had not been ascertained by direct experiment.

It would take too much space to give in detail the criticism which the enunciation of the principle evoked, more particularly from Dalton, who would not accept Gay-Lussac's position, and affirmed his belief that "gases do not unite in equal or exact measures in any one instance; when they appear to do so, it is owing to the inaccuracy of our experiments."² There was at that time the difficulty that the specific gravity of gases and vapours had been imperfectly determined, and the necessary consequence of Gay-Lussac's law, that the specific gravity and combining weight of elements should be expressed by the same number, could not be experimentally confirmed. Moreover, Dalton rested combination on atomic and not on combining weights, and the numbers he employed were in almost every instance very different from those which more accurate analysis has since determined. But the imperfect character of the then available data, and the amount of seemingly adverse experimental evidence, only throw a stronger light on the genius of Gay-Lussac in divining a law which, as science has progressed, has been duly confirmed, and which not only forms the most important control of the combining weight of chemical substances, but, when interpreted by the kinetic theory of gases, shows that the physical molecules (that is to say, the portions of the substance which are not broken up into smaller parts during the motion which we call heat) exist in equal numbers in equal volumes of different gases at the same temperature and pressure. This law, which has as high a claim as the other to bear the name of Gay-Lussac, is also sometimes deprived of that honour, and called the law of Avogadro, who, long afterwards, by his more extended researches, caused the importance of the law to be recognized by chemists.

The next events in Gay-Lussac's scientific career are connected with what may be called his rivalry with Davy, who in matter of age (b. December 17, 1778) was almost exactly his contemporary. In 1808 when Davy, having isolated potassium and sodium, was awarded Napoleon's prize for the most important discovery in voltaic electricity, the emperor is said to have asked how it was that these discoveries were made abroad and French prizes were carried away. Having

² *New System of Chemical Philosophy*, Manchester, 1810, part ii., p. 559.

been informed that there was no battery of power equal to that used by Davy, he caused a very large one to be made, and presented it to the École Polytechnique. While waiting for it, Gay-Lussac and Thénard succeeded in preparing potassium by a direct chemical action, in which fused potash was brought in contact with red-hot iron. This method enabled chemists to prepare the alkali metals in quantity, and Gay-Lussac and Thénard availed themselves of it to examine the properties of potassium very completely, and not only so, but also to use it as a means of decomposing other substances. It was in this way that they separated boron from boracic acid, an element which was also prepared by Davy with the same materials. It is worth notice that Davy admitted the advantage of the method of Gay-Lussac and Thénard, though he seems to have subsequently regarded their appropriation of the newly-discovered metal as not altogether warranted.¹ The researches with the great battery after it was made did not come up to their expectations; the power fell far short of what had been anticipated, and they confined themselves rather to an examination of the phenomena presented by the apparatus itself, than to using it as an engine for effecting important decompositions.

In 1809 was published the second investigation parallel to one by Davy, namely, upon hydrochloric (or, as it was then called, muriatic) acid, and chlorine, then called oxymuriatic acid. This memoir was read to the Institute, and was also published in the second volume of the *Mémoires d'Arcueil*. Gay-Lussac and Thénard describe a crowd of reactions they had tried for determining the characters of these bodies. They pointed out differences between the muriatic and other acids, and indicated that the anomalies which it presented were explicable either on the hypothesis of water being an essential constituent of the acid, or on that of the oxymuriatic acid being a simple gas. At the end of their memoir, however, they decided in favour of oxymuriatic acid being compound, although they had failed to get oxygen from it by heating it with carbon. The explanation of this decision seems to be that, while they themselves were influenced to some extent by Lavoisier's oxygen theory of acids, some of the other members of the Arcueil Society, such as Laplace and Berthollet, were keen Lavoisierians, and were prepared to oppose any criticism which might lead to a modification of the great Frenchman's opinion on so vital a point. To admit the existence of an acid without oxygen might have led to a loss of the whole scientific position which France had gained by Lavoisier's defeat of phlogiston. Davy, who was not under the same influence, declared, as the result of his inquiries, that oxymuriatic acid gas was simple, and that therefore there may be acids without oxygen. Sometime after, Gay-Lussac and Thénard agreed with this view, which they could do with less hesitation, as they had themselves indicated it in their own memoir.

Among the investigations which Gay-Lussac undertook with Thénard in the years 1810-1811, and which ultimately yielded most valuable results, must be mentioned those upon organic chemistry, and especially upon the analysis of fixed organic compounds. Before this time

¹ Gay-Lussac and Thénard made no claim, of course, to the discovery of potassium and sodium, though several important discoveries followed from their experiments. Thus, in addition to boron, they got also the fluoride of boron; and by the rapid combustion of the alkali metals in dry oxygen they got their peroxides, by means of which Thénard subsequently prepared the peroxide of hydrogen. At first, however, they seem to have thought that the alkali metals contained hydrogen, and it was not for a couple of years that they accepted Davy's view of their simplicity. Indeed, about this time there appears to have been considerable uncertainty about the elemental character of the metals, it being thought that they contained hydrogen, an idea which, on account of its retrograde nature, was criticized by Davy as a kind of phlogistic revival.

the only way of determining the composition of organic substances was to explode them with oxygen, and as this method was practicable only in the case of bodies which were gaseous, or could be readily volatilized, the great majority of fixed organic substances still remained unexamined. Gay-Lussac and Thénard introduced the plan of adding some oxidizing agent to the substance and burning it in a tube. They used chlorate of potassium, and the products of combustion were collected over mercury. The results obtained were in some cases very accurate, but the process was difficult of execution, and it is singular that the authors should have preferred it to combustion with oxide of copper, which they also tried. In 1815, however, Gay-Lussac employed the latter agent for the examination of cyanogen, and the other method was abandoned. The final improvements were made some years later by Liebig, when working in Gay-Lussac's laboratory. By their original method Gay-Lussac and Thénard determined the composition of fifteen organic substances, including sugar, starch, gum, wax, oil, various woods, resin; mucic, oxalic, tartaric, citric, and acetic acids; and albumen, fibrin, gelatin, and casein. Gay-Lussac succeeded also, in 1811, in obtaining pure hydrocyanic acid. He described its physical properties, but did not announce anything about its composition till 1815, when he published his celebrated memoir in which he described cyanogen as a compound radical, prussic acid as a compound of this radical with hydrogen alone, and the prussiates as compounds of the radical with metals. He also showed how to prepare free cyanogen, and explained Berthollet's oxyproussic acid to be really chloride of cyanogen. The proof that prussic acid contains hydrogen and no oxygen was a most important support to the hydrogen acid theory, while the isolation of the radical cyanogen was of equal importance for the subsequent epoch of compound radicals in organic chemistry.

In 1813-14 Gay-Lussac published his memoirs on iodine. This was the third investigation which involved a rivalry with Davy, and it was also that about which there was most feeling. Courtois had discovered the substance in 1811, and had given some of it for examination to Clément-Désormes. He had only published a brief notice of it when Davy arrived in Paris, having obtained express permission of Napoleon to pass through France on his way to Italy. Davy got a few fragments of this curious substance, and after a brief examination with a very limited portable laboratory which he had with him, perceived its analogy to chlorine, and drew the conclusion that it must be a simple body of similar character. Gay-Lussac, it is said, having heard of Davy's making experiments with it, went off to Courtois, got a specimen, and proceeded to examine it. He also saw its likeness to chlorine, but his previous decision respecting that body hampered him, and it was with some hesitation that he ultimately acknowledged its elemental character. Whether or not Gay-Lussac was actuated by the motive ascribed to him by Arago—that it would be a reflexion on French science were the settlement of the characters of this substance to be left to a foreigner visiting Paris—it is not necessary to enquire; but Davy seems to have felt that Gay-Lussac was competing, and not altogether fairly, with him. In a letter to Clément he gives a brief account of his work, and lays claim to the first revelation of the elemental character of iodine, and again in a subsequent letter to his brother, which contains a short review of the Parisian chemists and their reception of him, the only complaint he makes is that Gay-Lussac had played him a trick in trying to appropriate the discovery of the character of iodine and of hydriodic acid. Quite apart, however, from this claim on Gay-Lussac's part, the memoirs remain models of investigation and description. Davy quite freely admitted that full light might be expected on the subject from its

having been taken in hand by so able and accurate a chemist as Gay-Lussac.

The year 1815 saw the completion of the research on cyanogen already referred to, and with it concludes the period of Gay-Lussac's most important discoveries. Having now attained a leading if not the foremost place among the scientific men in the French capital, his advice was often required on important questions. His attention was thus turned in part from purely scientific subjects to points of practical interest. In these new fields, however, he displayed the same powers which he had exercised so sedulously in the pursuit of scientific truth; in fact he was now to introduce and establish scientific accuracy where there had been previously only practical approximations. The most important of these later discoveries were the method of estimating the amount of real alkali in potash and soda by the volume of standard acid required for neutralization; the method of estimating the amount of available chlorine in bleaching powder by a solution of arsenious acid; directions for the use of the centesimal alcoholometer, published in 1824, and specially commended by the commission of the Institute appointed to report on it, as displaying all the accuracy and exhaustive treatment of the author; and lastly, the perfecting of the method of assaying silver by a standard solution of common salt, a volume on which was published in 1833. This last has superseded the old method of assaying silver by cupellation, as being more rapid, more accurate, and easier of execution; and indeed all these processes are so complete and satisfactory, and are besides so identified with their author's name, that his reputation is secured by them, quite independently of his earlier work. In what has been said above, only the more important of Gay-Lussac's discoveries have been alluded to. To enter into an account, however brief, of all his labours, would occupy more space than can be allowed here. Indeed the list of his papers in the Royal Society's catalogue amounts to 148, besides those of which he was joint-author with Von Humboldt, Thénard, Welter, and Liebig; and they embrace every department of the science as cultivated fifty years ago. Among his later researches may be mentioned those on fermentation, and those executed by Liebig in conjunction with him, after the young German chemist had gained the coveted admission to Gay-Lussac's private laboratory during the years 1823-24. The latter include improvements on organic analysis, and the examination of fulminic acid. Gay-Lussac continued his work, and published the results in the *Annales de Chimie*, of which he had been joint-editor for some thirty years, up till almost his death, which took place at Paris on May 9, 1850.

Some of the appointments he held have been already referred to. After having acted as Fourcroy's demonstrator, he was made professor of chemistry at the École Polytechnique. From 1808 to 1832 he was professor of physics at the Sorbonne, and he only resigned that office when he was made professor of chemistry at the Jardin des Plantes. Besides being on the commission of arts and manufactures, and the "administration" of gunpowder and nitre, he was appointed assayer for the mint in 1829. In 1831 he was elected to the chamber of deputies as member for Haute Vienne, and finally, in 1839, entered the chamber of peers.

Gay-Lussac's scientific work is remarkable not only for its range but for its intrinsic worth, its accuracy of detail, its experimental ingenuity, its descriptive clearness, and the soundness of its inferences. He did not hesitate to criticize his own results, and replace them by others more accurate either of his own or of another's discovery; he improved and invented physical and chemical apparatus: the barometer, thermometer, cathetometer, alcoholometer, and the

burette, which still bears his name, all bear witness to his ingenuity and practical skill. He devised new analytical methods; he discovered new substances, such as fluoride of boron, and iodic, hydrosulphocyanic, dithionic, and hyposulphurous acids; he enlarged and corrected the knowledge of those already discovered; he examined the physical conditions of chemical action; he searched into the causes of chemical combination and chemical change. That he had the power of grasping the law underlying a few facts is nowhere more evident than in the memoir on gaseous combination, his most important contribution to science. That he missed the opportunity of assigning the chief limit to Lavoisier's hypothesis, must be ascribed partly at least to the influence of others. Authority decided it, perhaps against his secret convictions.

From Arago's and other notices one gathers that Gay-Lussac was reticent, patient, persevering, accurate to punctiliousness, perhaps a little cold and reserved, and not unaware of his great ability. But he was also bold and energetic, not only in his work, but equally so in defence and support of his friends. His earliest childish adventures, as told by Arago, herald the fearless aeronaut and undaunted investigator of volcanic eruptions. The endurance he exhibited under the laboratory accidents which befell him shows the power of will with which he could face the prospect of becoming blind and useless for the prosecution of the science which was his very life, and of which he is one of the most distinguished ornaments. It was only at the very end, when the disease from which he suffered left him no hope, that he complained with some bitterness of the hardship of leaving this world when so many discoveries were making, and when so many more were likely to be made.

The more important of Gay-Lussac's papers are scattered through journals difficult of access. The most complete list of them is contained in the Royal Society's catalogue of scientific papers; lists are also given at the end of Hofer's article in the *Biographie Générale*, and in Poggenorff's *Biographisch-literarisches Handwörterbuch*, Leipzig, 1863. Accounts of various portions of Gay-Lussac's discoveries and views will be found in such works as Thomson's *History of Chemistry*, vol. ii., London, 1830; Kopp's *Geschichte der Chemie*, Brunswick, 1843-47; Kopp's *Entwicklung der Chemie*, Munich, 1871; Dumas, *Leçons sur la Philosophie Chimique*, Paris, 1837, and reprinted Paris, 1878; Ladenburg, *Vorträge über die Entwicklungsgeschichte der Chemie*, Brunswick, 1869; Forbes, *A Review of the Progress of Mathematical and Physical Science in more recent times*, Edinburgh, 1858. The chief authorities for the life of Gay-Lussac are Arago (*Ceuvres*, Paris, 1855, t. iii.); Biot (*Abstracts, Royal Society*, vol. v., 1848-50, p. 1013); P. A. Cap (*Le Muséum d'Histoire Naturelle*, Paris, 1854, pt. 1, p. 137). (J. F.)

GAZA, an ancient city of Philistia, close to the sea and to the south boundary of the Holy Land. The Hebrew is more correctly rendered in English as Azzah (Deut. ii. 23), and means "strong." The modern Arabic form of the name is Ghazze. The town stands on an isolated hill about 100 feet high, and has now a population of 1800 souls. It is divided into four quarters, the eastern suburb consisting entirely of mud houses. A magnificent grove of very ancient olives forms an avenue 4 miles long north of the city. On the south-east are a few palms. There are many lofty minarets in various parts of the town, and a fine mosque built of ancient materials. A 12th century church towards the south side of the hill has also been converted into a mosque. On the east is shown the tomb of Samson (an erroneous tradition dating back to the Middle Ages). The ancient walls are now covered up beneath green mounds of rubbish. The water supply is from wells sunk through the sandy soil to the rock; of these there are more than twenty—an unusual number for a Syrian town. The land for the 3 miles between Gaza and the sea consists principally of sand dunes. There is no natural harbour, but traces of ruins near the shore mark the site of the old

Majuma Gazæ or Port of Gaza, now called el Mineh, which in the 5th century was a separate town and episcopal see, under the title Constantia or Limena Gaza. In the 7th century there were numerous families of Samaritans in Gaza, but they became extinct at the commencement of the present century. Hâshem, the father of Mahomet, lies buried in the town. On the east are remains of a race-course, the corners marked by granite shafts with Greek inscriptions on them. To the south is a remarkable hill, quite isolated and bare, with a small mosque and a graveyard. It is called el Muntâr, "the watch tower," and is supposed to be the mountain "before (or facing) Hebron," to which Samson carried the gates of Gaza (Judg. xvi. 3). The bazaars of Gaza are considered good. An extensive pottery exists in the town, and black earthenware peculiar to the place is manufactured there. The climate is dry and comparatively healthy, but the summer temperature often exceeds 110° Fahr. The surrounding country is partly cornland, partly waste, and is inhabited by wandering Arabs. From the 5th to the 12th century Gaza was an episcopal see of the Latin Church, but even as late as the 4th century an idol named Marnas was worshipped in the town.

GAZA, THEODORUS (c. 1400-1478), one of the leaders of the revival of learning in the 15th century, was born at Thessalonica about the year 1400. On the capture of his native city by the Turks in 1430 he removed to Mantua, where he rapidly acquired a competent knowledge of Latin under the teaching of Victorino de Feltre, supporting himself meanwhile by giving lessons in Greek, and by copying manuscripts of the ancient classics. About 1440 he became professor of Greek in the newly founded university of Ferrara, to which students in great numbers from all parts of Italy were soon attracted by his fame as a teacher. He had taken some part in the councils which were held in Ferrara (1438), Florence (1439), and Siena (1440), with the object of bringing about a reconciliation between the Greek and Latin Churches; and in 1450, responding to the invitation of Pope Nicholas V., he went to Rome, where he was for some years employed by his patron in making Latin translations from Aristotle and other Greek authors. From 1456 to 1458 he lived at Naples under the patronage of Alphonso the Magnanimous; and shortly after the latter date he was appointed by Cardinal Bessarion to a benefice in the south of Italy, where the later years of his life were spent, and where he died at an advanced age in 1478. Gaza stood high in the opinion of most of his learned contemporaries, but still higher in that of the scholars of the succeeding generation. His Greek grammar, in Greek (*γραμματικὴς εἰσαγωγὴς βιβλία δ*), first printed at Venice in 1495, and afterwards partially translated by Erasmus in 1521, although in many respects defective, especially in its syntax, has done good service in the cause of sound learning. His translations were very numerous, including the *Problemata*, *De Historia Animalium*, *De Partibus Animalium*, and *De Generatione Animalium* of Aristotle, the *Historia Plantarum* and *De Causis Plantarum* of Theophrastus, the *Problemata* of Alexander Aphrodisias, the *De Instruendis Aciebus* of Ælian, and some of the *Homilies* of Chrysostom. He also turned into Greek Cicero's *De Senectute* and *Somnium Scipionis*,—with much success, in the opinion of Erasmus; with more elegance than exactitude, according to the colder judgment of modern scholars. He was the author also of two small treatises entitled *De Mensibus* and *De Origine Turcarum*.

GAZELLE. See ANTELOPE.

GAZETTE, THE LONDON, is the official newspaper of the Government, and is published every Tuesday and Friday. It contains proclamations, orders, regulations, and other acts of state, and is received as evidence thereof in legal

proceedings. It also contains notices of proceedings in bankruptcy, dissolutions of partnership, &c. The Bankruptcy Act, 1869, requires the order of adjudication to be published in the *Gazette*, and makes the *Gazette* conclusive evidence of adjudication. Other statutes, dealing with special subjects, have similar provisions. Unless by virtue of such statutes, the *Gazette* is not evidence of anything but acts of state. The Scotch law of evidence would appear not to be so stringent. *Gazettes* are also published in Edinburgh and Dublin.

GEBER. After all the research and criticism that have been expended on this the first and most interesting personage in the modern history of chemistry, little is definitely known about him, and about the origin of the works which pass under his name. It has been a very general tradition to regard Geber as an Arabian, but until the publication in recent years by European scholars of the works of Arabian historians and bibliographers, the probable source of the tradition has not been known. It seems to be pretty generally believed that the Geber of Western Europe is the same as the person who is called in full Abu Musa Dschabir (or Jabir) Ben Haijan Ben Abdallah el-Sufi el-Tarsusi el-Kufi, who was reckoned the most illustrious of the alchemists by the Arabs, and who is mentioned in the *Kitab-al-Fihrist* (10th cent.), by Ibn Khallikan (13th cent.), by Haji Khalfa (17th cent.), and other writers. If this be correct, Geber must have flourished in the 8th century, for, according to Haji Khalfa, Dschabir Ben Haijan died in the 160th year of the Hegira, which corresponds with the year beginning October 19, 776 A.D. This date is incidentally confirmed by other writers, though there are difficulties arising from the date of his teacher Kalid Ben Jezid, and his patron Dschaafar ess-Sadik. His birthplace was Tarsus, or, as others say, Kufa; and he is said to have resided at Damascus and at Kufa. This account, though apparently the most trustworthy, does not agree with the statements of D'Herbelot, quoted seemingly from native sources, that Geber was born at Harran in Mesopotamia, was a Sabæan by religion, and lived in the 3d century of the Hegira. Nor does it agree with that of Leo Africanus, who in 1526 gave a description of the Alchemical Society of Fez, in Africa, and told how the chief authority of that society was a certain Geber, a Greek, that had apostatized to Mahometanism, and lived a century after Mahomet. Leo's story has circulated very widely, but its accuracy has been impugned by Reiske and Asseman, and the works of both Leo and D'Herbelot have been rejected as authorities by Wüstenfeld. Other writers have tried to show that Geber was a native of Spain, or at least lived at Seville, but this has probably arisen from confusing Geber the chemist with other persons of the same or similar name. From the doubt encircling the personality of Geber, some have gone the length of questioning whether such a person ever existed but in name, and this view has been again expressed by Steinschneider, who mentions "Abu Musa Dschabir Ben Haijan, commonly called Geber, an almost mythical person of the earliest period of Islam, renowned as an alchemist." While Steinschneider here exhibits notable scepticism with respect to Dschabir's very existence, he exhibits equal credulity in his belief that this mythical Dschabir is identical with Geber. In the present state of the question there is no alternative but to accept the account given in the *Fihrist*, and admit the possibility of Dschabir and Geber being one and the same. Confirmation of this view is to be sought in a comparison of the works ascribed to Geber with those bearing the name of Dschabir. The latter are divisible into two classes, those mentioned in Arabic bibliographies, and those existing in manuscript in European libraries. To Dschabir is assigned the authorship of an immense