

provocation. When wounded they immediately charge in the direction from which the fire proceeded, and on his skill in avoiding this charge the life of the hunter depends. In buffalo hunting, as in bison hunting, it is specially important "to kill with a single bullet." The hide of the Cape Buffalo is made by the Kaffres into shields impervious to musket shot.

BUFFALO, an American city, the capital of Erie County, in the State of New York, U.S., about 293 miles N.W. from New York, in 42° 53' N. lat. and 78° 55' W. long. It is a port at the east end of Lake Erie, at the mouth of Buffalo River, and at the head of Niagara River, which is here crossed by a fine iron railroad bridge. The city runs for about five miles along the shore of the lake and Niagara River. In population Buffalo is the third city in New York, and the eleventh in the United States. It was founded in 1801, became a military post in 1813, and was burned by the British on the last day of the year 1813. After the war, the place was rebuilt, and in 1832 it attained the rank of a city. In 1820 it contained 2095 inhabitants. After the opening of the Erie Canal in 1825, its growth was rapid, the population being 8653 in 1830, 18,213 in 1840, 42,261 in 1850, 81,129 in 1860, 117,714 in 1870, and 134,238 in 1875. The city commands a fine view of the lake; the climate is pleasant and healthful; the streets, broad and generally lined with trees, are well paved, lighted, and supplied with sewers. There are many fine residences with attractive grounds, and numerous squares and public places. A combination of parks or pleasure grounds has been laid out, extending to over 500 acres. It comprises three sections, situated respectively in the northern, western, and eastern parts of the city, connected by boulevards which together afford a drive of nearly 10 miles. The most prominent public buildings are the City and County Hall, a granite structure, in the form of a double Roman cross, with a tower 245 feet high, just erected at a cost of over \$2,000,000; the United States Custom House and Post Office, the State Arsenal, and the Erie County Penitentiary, which is one of the six penal establishments of New York, intermediate between the reformatories and the state prisons. A state asylum for the insane is in process of construction at North Buffalo, with a front of about 2700 feet and a capacity for 600 patients. It will be one of the largest institutions of the kind in the United States, and will cost not less than \$3,000,000. The city contains 76 churches, the most imposing edifices being St Joseph's Cathedral (Roman Catholic) and St Paul's (Episcopal). The public schools comprise a central grammar school and thirty-six district schools. Four orphan-asylum schools are also maintained. One of the eight state normal schools is situated here. Among other educational institutions are Canisius College, founded by the Jesuit fathers; St Joseph's College, conducted by the Christian brothers; Martin Luther College (theological); St Mary's Academy and Industrial School for girls, and the Medical College of the University of Buffalo. The charitable institutions of the city are numerous. There are several libraries, the most important being that of the Young Men's Association, with about 30,000 volumes, and the Grosvenor Free Library, which contains about 15,000 volumes of valuable reference works. The former society has a commodious hall and library building adjoining. The Society of Natural Sciences has made an extensive collection of minerals and fossil casts, and the Buffalo Historical Society has a large library and cabinet. There are published in the city eight daily newspapers, including four in German, one tri-weekly, fourteen weeklies, four monthlies, and three quarterlies. The city is divided into thirteen wards, and is governed by a mayor and twenty-six aldermen. It has a paid fire department, with steam

fire-engines and a fire-alarm telegraph, has an efficient police, and is well supplied with water from the Niagara River. The assessed value of property in 1873 was about \$38,000,000.

The position of Buffalo on the great water and railway channels of communication between the West and the East gives it a commercial importance surpassed by that of few other American cities. Its harbour is capacious, and is protected by extensive breakwaters. The city is the centre of an important system of railroads. Besides other lines which converge here, it is the eastern terminus of the Lake Shore and Michigan Southern Railway, of the Canada Southern, and of a branch of the Grand Trunk Railway of Canada; it is the western terminus of the Erie Canal, the New York Central Railway, and a division of the Erie Railway. There has been a large decrease in the extent of the lake commerce since 1862, owing to the increase of railroad facilities. The registered marine of the port, June 30, 1874, comprised 801 vessels of 162,789 tons, of which 533 were canal boats. The annual value of the imports from Canada is between \$2,000,000 and \$3,000,000; the exports are less than \$500,000. Since 1870 Buffalo has been a port of foreign entry for imports, which are conveyed thither, in bond, by rail from New York, &c. The number of lake vessels that arrived in 1874 was 3720; the clearance numbered 3727; 7643 canal boats arrived, and about the same number cleared; the latter carried 1,448,172 tons of freight, valued at \$46,244,875. The immense quantities of grain moving from the Western States to the seaboard constitute the most important feature of the commerce of the city. The aggregate receipts (including flour) by lake and Grand Trunk and Canada Southern Railways in 1874 were 70,030,555 bushels. The receipts during the ten years ending with 1874 amounted to 522,874,944 bushels. For receiving, storing, and transferring this vast amount of produce to canal boats and railway cars, there are thirty elevators, capable together of storing 6,875,000 bushels, and of transferring no less than 2,672,000 bushels a day. Many of these elevating warehouses are costly structures of stone, or of iron and brick. Several of them have grain "driers" attached. Live-stock and lumber from the Western States and Canada, and coal from Pennsylvania, are also leading items in commerce. In 1874, 504,594 cattle, 783,800 sheep, 1,431,800 hogs, and 21,937 horses, amounting in value to nearly \$60,000,000 passed through Buffalo. For the accommodation of this traffic, extensive and well-arranged yards have been erected at the east end of the city. The receipts of lumber by lake in 1874 amounted to 145,624,639 feet, besides about 40,000,000 shingles, and 25,000,000 staves. The imports of coal comprised 800,000 tons. The coal trade is rapidly increasing. The manufacturing interests of Buffalo are extensive, and have grown with marked rapidity in recent years. The leading establishments are blast furnaces, rolling-mills, foundries, breweries, tanneries, manufactories of agricultural implements, and flour-mills. Of the last-named there are eleven, with a yearly capacity of 839,000 barrels, the average annual production of flour being about 250,000 barrels. Wooden ship-building was formerly carried on here, but it has been superseded by iron ship-building. Two extensive establishments are devoted to this industry; these have constructed the finest lake steamers, besides supplying the Government with a number of iron revenue vessels. The number of ships built at Buffalo in 1874 was thirty-seven, but they were mostly small ones. Many canal boats are also built there.

BUFFIER, CLAUDE (1661-1737), a writer on grammar and history of considerable note, but more remarkable for his researches in psychology and metaphysics, was born in

Poland May 25, 1661. of French parents, who returned to their native country shortly after their son's birth, and settled at Rouen. He was educated at the Jesuits' college there, and was received into the order at the age of nineteen. Soon after his admission a dispute with the archbishop regarding certain points in theology compelled him to leave Rouen. He went to Rome, but did not long remain there; and on his return to France he retired to the college of the Jesuits at Paris, where he spent the rest of his life, studying and writing, and fulfilling with much success his duties as a college lecturer. He seems indeed to have been an admirable teacher, having, as his works show, a great power of lucid and precise exposition. Buffier's object in his *Traité des vérités premières*, his best known philosophical work, is to discover the ultimate principles upon which all knowledge is based, to lay down "propositions so clear and obvious that they can neither be proved nor refuted by other propositions of greater perspicuity." The basis of all human knowledge and the foundation of every other truth he finds in the sense we have of our own existence and of what we feel within ourselves. He thus takes as the foundation of his philosophy substantially the same ground as Descartes, *cogito ergo sum*; but the superstructure is reared on very different principles. Descartes tried to reach a knowledge of the not-self by an *a priori* or metaphysical proof of the divine existence. Buffier rejects this sort of evidence as useless. I want, he in effect says, to obtain a certain knowledge of what is distinct from myself, and this I can never do by mere metaphysical demonstration, which only gives me the hypothetical certainty of ideas logically connected together; in order to know what exists distinct from myself I must have recourse to "common sense." Common sense he defines to be "that disposition which nature has placed in all or most men, in order to enable them, when they have arrived at the age and use of reason, to form a common and uniform judgment with respect to objects different from the internal sentiment of their own perception, which judgment is not the consequence of any anterior principle." The truths which this "disposition of nature" obliges us to accept can neither be proved nor disproved; they are admitted in all countries and at all times; and they are practically followed by all men, even by those who reject them speculatively. But Buffier does not claim for the truths of common sense the same absolute certainty as characterizes either the knowledge we have of our own existence or the logical deductions we make from our thoughts; they possess merely the highest probability, and the man who rejects them is, as he pointedly puts it, to be considered a fool, but he is not in so doing guilty of a contradiction. The greater part of the *Traité* is devoted to an enumeration and examination of those truths. They are such as the following:—"There are other beings and other men in the world besides myself;" "All men have not combined to deceive me." But axioms like " $2 + 2 = 4$," or "the whole is greater than a part" are mere logical connections of ideas, not truths of common sense. Buffier's aversion to scholastic refinements and unmeaning definitions has not unfrequently given to his writings an appearance of shallowness and want of metaphysical insight; but his merit as one of the earliest to recognize the psychological as distinguished from the metaphysical side of Descartes's principle, and to use it, with no inconsiderable skill, as the basis of an analysis of the human mind, similar to that enjoined by Locke, will always be acknowledged. In this he has anticipated the spirit and method as well as many of the results of Reid and the Scotch school. The *Traité* appeared in 1717, and was followed in 1724 by the *Eléments de Métaphysique*. Buffier also wrote a "French Grammar on a new plan," and a number of historical

essays. Most of his works appeared in a collected form in 1732, and an English translation of the *Traité* was published in 1780.

BUFFON, GEORGE LOUIS LECLERC, COMTE DE, was born on 7th September 1707, at Montbard, in Burgundy, and died at Paris on the 15th April 1788. His father, M. Leclerc de Buffon, was councillor of the Burgundian parliament, and his mother, Anne Christine Marlin, appears to have possessed considerable natural gifts. Buffon was the eldest of five children, and does not seem to have been in any way a precocious child. On the contrary, he seems from his earliest years to have been characterized more especially by great perseverance, patience, knowledge of the value of time, and exceptional powers of steady application and protracted labour. He was originally destined to his father's profession, and studied law at the college of Jesuits at Dijon; but he soon exhibited a marked predilection for the study of the physical sciences, and more particularly for mathematics. Whilst at Dijon he made the acquaintance of Lord Kingston, a young Englishman, who was at the time staying there along with his tutor, a man of ability and discernment. In this agreeable companionship, Buffon travelled through Italy, being then nineteen years of age. Returning to France, he commenced to study at Angers, still in company with Lord Kingston; but having quarrelled with a young Englishman at play, and subsequently wounded him, he was compelled to leave this town. He thereupon removed to Paris, and during his sojourn in the capital he translated Newton's *Fluxions* and Hales's *Vegetable Statics*, which he subsequently presented to the Academy of Sciences. From Paris he proceeded to England, where he remained three months; but his travels seem to have ended here. At twenty-five years of age he succeeded to a considerable property, inherited from his mother, and from this time onward his life was a completely independent one, and he was enabled to devote himself entirely to his scientific pursuits. He returned now to France, and lived partly at Montbard and partly at Paris.

Though loving pleasure, and not keeping himself free from the prevalent vices of the age in which he lived, Buffon spent the remainder of his life in regular scientific labour, employing an amanuensis, and thus securing a permanent record of his work. At first he directed his attention more especially to mathematics, physics, and agriculture, and his chief original papers are connected with these subjects. In the spring of 1739 he was elected a member of the Academy of Sciences; and at a later period of the same year he was appointed keeper of the *Jardin du Roi* and of the Royal Museum. This appears to have finally determined him to devote himself to the biological sciences in particular, and he commenced to collect materials for his *Natural History*. In the preparation of this voluminous work, he associated with himself Daubenton, to whom the descriptive and anatomical portions of the treatise were entrusted, and the first three volumes made their appearance in the year 1749. In the year 1752 (not in 1743 or 1760, as sometimes stated), he married Marie Françoise de Saint-Belin. He seems to have been fondly attached to her, and felt deeply her death, which took place at Montbard in 1769. The remainder of Buffon's life, as a private individual, presents nothing of special interest. He belonged to a very long-lived race, his father having attained the age of ninety-three, and his grandfather eighty-seven years. He died himself at the age of eighty-one, of vesical calculus, having refused to allow of any operation for his relief. He left one son, George Louis-Marie Leclerc, who was an officer in the French army, and who died by the guillotine, at the age of thirty, on the 10th July 1793 (22 Messidor, An II.), having espoused the party of the duke of Orleans.

Buffon was a member of the French Academy, perpetual treasurer of the Academy of Sciences, Fellow of the Royal Society of London, and member of the Academies of Berlin, St Petersburg, Dijon, and of most of the learned societies then existing in Europe. Of handsome person and noble presence, endowed with many of the external gifts of nature, and rejoicing in the social advantages of high rank and large possessions, he is mainly known by his published scientific writings. Without being a profound original investigator, in the modern sense of this term, Buffon possessed considerable power of generalization, along with the art of expressing his ideas in a clear and generally attractive form. His chief defects as a scientific writer are, that he was given to excessive and hasty generalization, so that his hypotheses, however seemingly brilliant, are often destitute of any sufficient basis in observed facts, whilst his literary style is not unfrequently theatrical and turgid, and a great want of method and order is commonly observable in his writings.

His great work is the *Histoire naturelle, générale et particulière*; and it can undoubtedly claim the merit of having been the first work to present the previously isolated and apparently disconnected facts of natural history in a popular and generally intelligible form. The sensation which was made by its appearance in successive parts was very great, and it certainly effected much good in its time by generally diffusing a taste for the study of nature. For a work so vast, however—aiming, as it did, at being little less than a general encyclopædia of the sciences,—Buffon's capacities, may, without disparagement, be said to have been insufficient, as is shown by the great weakness of parts of the work (such as that relating to mineralogy). The *Histoire Naturelle* passed through several editions, and was translated into various languages. The edition most highly prized by collectors, on account of the beauty of its plates, is the first, which was published in Paris (1749–1804) in forty-four quarto volumes, the publication extending over more than fifty years. In the preparation of the first fifteen volumes of this edition (1749–67) Buffon was assisted by Daubenton, and subsequently by Guéneau de Montbelliard, the Abbé Bexon, and Sonnini de Manoncourt. The following seven volumes form a supplement to the preceding, and appeared in 1774–89. These were succeeded by nine volumes on the Birds (1770–83), and these were followed by five volumes on Minerals (1783–88). The remaining eight volumes, which complete this edition, appeared after Buffon's death, and comprise Reptiles, Fishes, and Cetaceans. They were executed by Lacépède, and were published in successive volumes between 1788 and 1804. A second edition was commenced in 1774 and completed in 1804, in thirty-six volumes quarto. It is in most respects similar to the first edition, except that the anatomical descriptions are suppressed, and the supplement recast. Of the remaining editions of Buffon, the best is that which was commenced under the editorship of Lamouroux, and completed under that of Desmarests, in forty volumes octavo (1824–32). It is the only modern edition in which the anatomical descriptions of Daubenton are preserved. Though not without his enemies—scientific and clerical—Buffon had many warm friends, and his death was marked by the delivery of highly laudatory addresses, by Condorcet at the Academy of Sciences, Vicq-d'Azir at the Académie Française, and Bressonet before the Society of Agriculture. Extravagantly belauded by some, and vehemently attacked by others, we can recognize his merits without blinding ourselves to his defects.

This brief notice of his life may be fitly closed by the following quotation from Cuvier, in which the great French naturalist, whilst rejecting some speculations which recent

science has generally accepted as probable, ascribes to Buffon the honour of being the first to clearly apprehend what is now admitted as the true principle of guidance in investigating the order of the universe:—"It is impossible to defend, in all their details, either the first or the second of Buffon's theories of the earth. This comet which strikes off portions of the sun, these vitrified and incandescent planets which refrigerate by degrees, some more rapidly than others, those organized beings which appear successively on the surface of the planets, as their temperature becomes sufficiently lowered, can only be regarded as flights of fancy. But Buffon has not less the merit of having been the first to point out clearly that the actual condition of the globe is the result of a succession of changes, of which we can find the evidences to-day; and it is he who first drew the observation of all investigators to the phenomena by which these changes can be unravelled." (H. A. N.)

BUG, a name common to all the species belonging to the *Cimicidæ*, a family of Hemipterous Insects, the best known example of which is the House Bug or Bed Bug (*Cimex lectularius*). This disgusting insect is of an oval shape, of a rusty red colour, and, in common with the whole tribe to which it belongs, gives off an offensive odour when touched; unlike the others, however, it is wingless. The bug is provided with a proboscis, which when at rest lies along the inferior side of the thorax, and through which it sucks the blood of man, the sole food of this species. It is nocturnal in its habits, remaining concealed by day in crevices of bed furniture, among the hangings, or behind the wall paper, and shows considerable activity in its nightly raids in search of food. The female deposits her eggs at the beginning of summer in crevices of wood and other retired situations, and in three weeks they emerge as small, white, and almost transparent larvæ. These change their skin very frequently before undergoing metamorphosis, which in their case is "incomplete," the pupa closely resembling the perfect insect, and attaining its full development in eleven weeks. Two centuries ago it was a rare insect in Britain, and probably owes its name, which is derived from a Celtic word signifying "ghost" or "goblin," to the terror which its attacks at first inspired. Other species of bugs suck the blood of many of the lower warm-blooded animals, but the majority, as in the genus *Tingis*, confine themselves to the juices of plants.

BUGENHAGEN, JOHANN (1485–1558), surnamed Pomeranus, a German Reformer, was born at Wollin, in Pomerania, on the 24th June 1485. He was educated at the university of Greifswald, and gained high distinction as a classical scholar. In 1505 he was made rector of a school at Treptow, and was soon afterwards selected by the abbot of a neighbouring convent as one of the lecturers to the monks. In 1520 he received a copy of Luther's work on the Babylonish captivity, which speedily wrought a change in his views. He warmly embraced the principles of the Reformation, and succeeded in bringing over the aged abbot and several others. He made his way to Wittenberg in the following year, was warmly received by Luther and Melancthon, and quickly became a foremost man in the Reformation movement. He was specially qualified for organizing the new church, and his activity spread itself over a wide district. In 1528 he arranged the church affairs of Brunswick and Bamberg; in 1530 those of Lubeck and Pomerania. In 1537 he was invited to Denmark by king Christian III., and remained five years in that country, organizing the church and schools. He passed the remainder of his life at Wittenberg, braving all the perils of war and persecution rather than desert the place that was dear to him as the home of the Reformation. He died on the 20th April 1558. Among his numerous works is a history of Pomerania, which remained unpublished till 1728, *Pomerania in IV. Libros Divisa*.