list of seventeen direct imitations of *Hudibras* in the course of a century was given in the *Retrospective Review*, and may be found in Mitford's *Butler*. Portions of it have been at different times translated into Latin with no great success. Complete translations of considerable excellence have been made into French by John Townley (London, 1757, 3 vols.), and into German by D. W. Soltau (Riga, 1787); specimens of both may be found in Bell's edition. Voltaire tried his hand at a compressed version, but not happily. (G. SA.)

BUTLER, WILLIAM ARCHER (1814–1848), a brilliant writer on theology and the history of philosophy, was born at Annerville, near Clonmel, probably in 1814. His father was a Protestant, his mother a Roman Catholic, and he was brought up in the Romish faith. At the age of nine he was sent to Clonmel school, where he distinguished himself not so much by rigid attention to his class work as by general brilliancy and power. Even when a boy he was strongly drawn towards the imaginative and poetical, and some of his early verses show an astonishing precocity. After leaving Clonmel school he entered Trinity College, Dublin. Two years before he had joined the Protestant church. His career at college was remarkably brilliant. The studies to which he specially devoted himself were the literary and metaphysical; and he was particularly noted for the extreme beauty of his style, both in speaking and in written exercises. In 1834 he gained the ethical moderatorship, newly instituted by Provost Lloyd, and continued in residence at college, pursuing his favourite studies. Many papers were about this time contributed by him to the *Dublin University Magazine;* it is to be regretted that these have not been collected. In 1837 he made up his mind to enter the church, and in the same year he was elected to the professorship of moral philosophy, specially founded for him through the exertions of Provost Lloyd. About the same time he was presented to the prebend of Clondehorka, in Donegal, and resided there when not called by his professorial duties to Dublin. In 1842 he was promoted to the rectory of Raymoghy. His lectures and his sermons were equally admired for their strength of thought and richly imaginative style. In 1845 appeared in the *Irish Ecclesiastical Journal* his *Letters on Development*, written under a great press of business, but in every way worthy of the author, and the best reply made to the famous essay of Newman which had called them forth. Butler's life was but short. He caught cold when returning one day from public service; the cold terminated in fever, which proved fatal in a few days. He died on the 5th July 1848. His *Sermons*, published in two vols. by Woodward and Jeremie, have been universally recognized as among the most important recent contributions to theology. They are remarkable not only for rare brilliancy of style, but for subtilty and force of thought. The diction is at times too ornate and rhetorical, but it is not to be forgotten that the sermons were hurriedly written, were never revised, and were all the work of a young man. Their uncommon excellence deepens the regret at the early death of the author. The *Lectures on the History of Ancient Philosophy*, edited in a masterly manner by W. Hepworth Thompson (2 vols. 1856; 2d ed., 1 vol. 1875), have taken their place as the best among the few British works on the history of philosophy. The introductory lectures, and those on the early Greek thinkers, are not of the highest value, and though they evidence wide reading, do not show the complete mastery over the material that is found in Schwegler or Zeller. The lectures on Plato, however, are of great value, and furnish a most admirable and enthusiastically conceived exposition of the Platonic system. Butler was evidently attracted by the lofty spirit of Platonism, and sets forth its main features with the warmest admiration. In details he is not altogether to be trusted, but any defects in his scholarship are amply supplied in the valuable notes of his editor.

See *Memoir of W. A. Butler*, prefixed by Rev. J. Woodward to first series of *Sermons*.

BUTO, an Egyptian goddess, called in the language *Uat* or *Uatiu*, the eponymous goddess of the town Buto in Northern Egypt, supposed to be modern Kum el Aman and Kum el gir, on the western banks of the Damietta branch of the Nile. The goddess herself personified Lower Egypt, and as such wore the *teser* or red crown, whether in her human form, or typified as a vulture, or uræus, in which respect she resembled Nat or Neith. She presided over fire, and resided in it or the solar eye, and was identified with the goddesses Bast and Sexet or Merienptah, of which she may have been another type. Buto was also considered to represent the Greek Latona, and the uræus Mahur, and this again connected her with Lower Egypt or the Delta. She was considered to be the regent and mistress of the lands Pe and Tep, districts of her nome, of the land of *Hanebu* or the Greeks, and of *Taneter*, the divine land or Arabia, also of *Anhu* the capital of *Xrut*, another of the nomes of Lower Egypt. The ideas of the Greeks that she personified darkness, and that the *mygale* or shrew-mouse was sacred to her, are incorrect; for, as already stated, *Uat* presided over the element of fire, and the shrew-mouse appears from the inscriptions on the base of figures of this little animal to have been dedicated to Horus, like the Apollo Smintheus of the Greeks. The name was also given to the capital of a nome ruled over by the deities Har or Horus and Uat or Buto. The Greeks supposed that Buto was the capital of Chemmitæ or Phthenotes close to the Boutike Lake, the present Burullos, near the old Sebennytic branch of the Nile. It contained several temples, and in that of Buto oracles were delivered, and the temple was 10 *orgyiai* or fathoms high. The most remarkable object, however, in it was the monolith shrine 40 cubits or about 60 feet square, with a roof of stone, 4 cubits or about 6 feet thick, and 5000 tons weight. It was brought from Elephantina. It appears from an inscription found at Cairo that, during the Persian occupation of Egypt, Khabash, then the ruler of Egypt, had given the nomos Phthenotes to the state of Buto, but that this arrangement was not recognized by Xerxes. Subsequently the older arrangement was restored by Ptolemy Lagus about 313 B.C.

Herodotus, ii. 155; Reinisch, *Denkmäler in Miramir*, s. 201; Wilkinson, *Mann. and Cust.*, iii. 330, 331, iv. 271–3, v. 40; Brugsch, *Geographie*, i. s. 58; Jablonski, *Panth. Ægypt.*, iii. 84–116; *Zeitschrift für aegyptische Sprache*, 1871, p. 1 and *foll.*

BUTRINTO, a fortified town of European Turkey on the coast of Albania, in the sandjak of Delvino, directly opposite the island of Corfu, and situated at the mouth of a stream which connects the Lake of Vatzindro with the bay. It has a small harbour, and is the seat of a Greek bishop. In the neighbourhood are the ruins of the ancient *Buthrotum*, consisting of a Roman wall, about a mile in circumference, and some remains of both later and Hellenic work. Buthrotum was a Roman colony in the time of Strabo, but makes little figure in ancient history. The modern city belonged to the Venetians till 1797, when it was seized by the French, who in 1799 had to yield to the Russians and Turks. Population, 1500.

BUTTER, is the fatty portion of the milk of mammalian animals. The milk of all mammals contains such fatty constituents, and butter from the milk of goats, sheep, and other animals has been and may be used; but that yielded by cow's milk is the most savoury, and it alone really constitutes the butter of commerce. The milk of the various breeds of cattle varies widely in the proportion of fatty matter it contains: its richness in this respect being greatly influenced by season, nature of food, state of the animals' health, and other considerations. While the proportion of cream to milk in the case of most breeds ranges from one-twentieth to one-tenth, in the case of the celebrated Alderney cattle it amounts to as much as from three to four-tenths. Dr Parkes (*Practical Hygiene*) gives the following as the average composition of unskimmed milk having a sp. gr. of 1·030 :—

Casein	4·0
Fat	3·7
Lactin (Sugar of Milk)	5·0
Salts	0·6
Total Solids	13·3
Water	86·7

On a low average each pint of milk ought to yield a full half-ounce of butter. The fat or butter is disseminated through freshly-drawn milk in minute, clear globules, each of which is enclosed in a thin membranous sac or bag; and being specifically lighter than the mass of the fluid, the globules gradually rise to the surface, bringing mixed with them a proportion of milky matter, and form cream. Usually the cream is skimmed off the surface of the milk for making butter, but by some the churning is performed on the milk itself without waiting for the separation of the cream. The operation of churning causes the rupture of the oil sacs, and by the coalescence of the fat so liberated butter is formed. Details regarding churning and the preparation of butter generally will be found under DAIRY.

Fresh or unsalted butter of good quality should present a rich straw-yellow colour. At ordinary temperatures it has a firm uniform consistency, while it is soft enough to cut and spread easily under the knife without breaking or crumbling. It should possess a faint sweet odour, and a bland, soft, delicate flavour, melting in the mouth without any indication of grittiness. Pure butter is a complex chemical compound, consisting in large part of fats or glycerides of the non-volatile acids, palmitic acid, and butyroleic acid, with occasionally stearic acid. With these there occur small proportions of glycerides of the volatile acids, butyric, capronic, caprylic, and caprinic acid, to which the butter owes its distinguishing flavour and characteristics, as it has the non-volatile acids in common with other fats, though in different proportions. Butter when unadulterated and prepared with ordinary care should contain at least 85 per cent. of pure fat, the remainder consisting of casein, water, and salt. The casein is derived from milk, which is never perfectly washed out, but in butter of good quality this ought not to amount to more than from 3 to 5 per cent. Water may be present to the extent of from 5 to 10 per cent. without the butter being subject to a charge of adulteration; and a small proportion of salt is commonly worked into the butter in its preparation, but in what is sold as fresh or sweet this should only be from ½ to 2 per cent. of the whole weight.

When butter is exposed to the air for some time, especially in warm weather, or in hot, confined situations, it quickly becomes rancid, acquiring thereby a distinct disagreeable odour and a biting taste, owing to the development of a volatile fatty acid under the influence of a species of fermentation, which is doubtless caused by the nitrogenous substance, casein, it contains. The more completely, therefore, all milky and curdy matter is washed out of butter the less will be the tendency to set up and develop fermentation. The preservation or curing of butter depends for its efficacy on the employment of some agency by which fermentative action may be prevented; but there are also several ways by which its development may be retarded and the material kept sweet for a considerable period. Rancidity may be corrected to some extent by melting the tainted butter and pouring it into ice-cold water. As a means also of retarding rancidity, butter is in some parts of France and the East melted up and heated till the water it may contain is evaporated, when the casein which rises as a scum to the surface is carefully skimmed off; but butter cannot be so melted without injuriously affecting its delicate flavour. By keeping fresh butter in a very cool place covered with pure water renewed daily, it will remain sweet for a considerable time. A still better method, recommended by M. Payen (*Substances Alimentaires*) is to use water acidulated with either tartaric acid or vinegar. It is also said that sugar in the form of a syrup poured over the butter is an excellent medium for retarding rancid fermentation. Butter, however, which is to be kept for a considerable length of time is "cured," or preserved by incorporating with it some substance or substances which act upon the nitrogenous material it contains, and thus prevent fermentation; and for this purpose common salt is the agent chiefly relied on. The salt used should be pure, dry, and finely powdered. About 5 per cent. of salt is sufficient for the purpose of curing; and when the quantity exceeds 8 per cent. it ought to be regarded as an adulteration. Butter very lightly salted for keeping only a short time is said to be powdered. A mixture much used for curing butter in Continental dairies is thus prepared:—One part each of sugar and nitre are mixed up with two parts of common salt and reduced to a very fine powder. This mixture is thoroughly kneaded into the butter in the proportion of about 1 oz. to every lb. After standing over for a fortnight butter so prepared will be ready for use and have a soft, agreeable taste, which it will retain a long time. In the preservation of all butter, the exclusion of air, as much as possible, is of the utmost consequence. It is, therefore, packed for sale in oaken kegs or glazed earthenware jars, filled quite full, and covered with a clean linen cloth on which salt is sprinkled. When in use the kegs should also be closely covered over, and the surface of the butter kept under brine.

Butter of good quality is a most digestible form of fat, while its flavour is so delicate and little pronounced that it is always acceptable to the palate. It is used most extensively by all classes, not only in the direct form with bread at nearly every meal, but also as entering very largely into the preparation of pastry, puddings, sauces, fancy cakes, and biscuits. Taking into account the daily consumption of this article, it is evident that the amount used in a year by a population such as that of Great Britain must be very great, an inference borne out by the fact that in 1875 the imports were 1,619,808 cwts., valued at £9,050,025, and, though no means exist of accurately estimating the home produce, it may safely be regarded as equal to the whole imports. The countries whence butter is imported into Great Britain are chiefly Germany, Holland, Denmark, and especially France. A large proportion of the French butter comes from the department of Calvados—Isigny being the centre of the best butter-making district. The value of the total produce of France in 1867 was estimated at 250 millions of francs.

Butter is a substance which affords great scope for adulteration, and its composition makes accurate detection of certain foreign matters a matter of considerable labour and difficulty. Other animal fats, such as lard, beef and mutton dripping, and tallow, with certain vegetable fats, are the chief adulterants. Such adulterations may be suspected by their characteristic smell, and detected by their different melting points, by microscopical examination, and by their ethereal solutions. Messrs Angell and Hehner have proposed a convenient method of estimating the fusing points of fat by placing a given weight of definite size on the fat, and observing the temperature at which it sinks into the substance. They find that the sinking-point for genuine butter

is remarkably constant, and that it is affected in proportion to the amount and sinking point of any adulterant fats used. Their analysis of butter depends upon the much smaller proportion of non-volatile, insoluble fatty acids it contains, as compared with fats used as adulterants.

Under the name of butterine an artificial substitute for butter has been introduced in America, and imported into England from New York. It is the same as the artificial butter or "margarine-mouries," which has been for some years manufactured in Paris according to a method made public by the eminent chemist M. Mège-Mouries. Having surmised that the formation of butter contained in milk was due to the absorption of fat contained in the animal tissues, M. Mouries was led to experiment on the splitting up of animal fat. The process he ultimately adopted consisted in heating finely-minced beef suet with water, carbonate of potash, and fresh sheep's stomachs cut up into small fragments. The mixture he raised to a temperature of 45° C. (113° Fahr.) The influence of the pepsine of the sheep's stomach with the heat separated the fat from the cellular tissue; he removed the fatty matter, and submitted it when cool to powerful hydraulic pressure, separating it into stearin and oleomargarin, which last alone he used for butter-making. Of this fat about the proportions of 10 lb with 4 pints of milk and 3 pints of water were placed in a churn, to which a small quantity of arnotto was added for colouring, and the whole churned together. The compound so obtained when well washed was in general appearance, taste, and consistency like ordinary butter, and when well freed from water it was found to keep a longer time. According to French official reports artificial butter goes much further as food than the genuine article, and forms a perfectly wholesome dietetic material. The Parisian *octroi* officials have recognized the efficiency of the substitute by imposing on it the same duties which are chargeable on ordinary butter. The company established for the manufacture in France had in 1874 seven manufactories, in which four hundred men were employed. There can be no doubt that a pure, sweet fat, such as is manufactured by the process of M Mège-Mouries is a safer and more wholesome article than the unsavoury rancid butter which is sold so freely among the poorer classes. See DAIRY.

BUTTERFLIES AND MOTHS, the common English names applied respectively to the two groups of Insects which together form the order *Lepidoptera* (Gr. λεπίς, a scale, and πτερόν, a wing), an order characterized by the constant presence, in a greater or less degree, of scales on the wings. The two groups may, as a rule, be readily distinguished from each other, although, so far as our present knowledge goes, there is nothing in the structure or habits of either group which divides it entirely from the other. All butterflies are diurnal in their flight, while moths, with many exceptions, are crepuscular or nocturnal.

The bodies of butterflies and moths, like those of all other insects, consist of three distinct parts—the head, bearing the organs of sense; the thorax, the organs of locomotion; and the abdomen, the organs of generation. On the head are placed (1) the antennæ, composed of numerous articulations, and supposed to be organs of hearing. They differ greatly in form among the *Lepidoptera*; those of butterflies, however, agreeing generally in having their ends knobbed or clubbed, hence the term Rhopalocera (ῥόπαλον, a club; κέρας, a horn), often applied to this group. The antennæ of moths assume a great variety of forms—prismatic, serrate, pectinate, moniliform, and filiform,—and are often beautifully feathered, especially in the males, whose antennæ are usually ampler than those of the females; but in no case are they knobbed, as in the great majority of butterflies. Owing to this variety in the form of their antennæ, moths have been termed Heterocera (ἕτερος, various; κέρας, a horn). In butterflies these organs are also straight, and stand out rigidly in front of the head, while in moths they are usually curved and can generally be folded back on the body. (2) The eyes in the *Lepidoptera* consist of two masses of hexagonal facets, placed one on each side of the head, and forming what are known as compound eyes. These contain in some cases no fewer than 16,000 facets each, while in many species a pair of *ocelli*, or simple eyes, are found concealed among the scales and placed between the compound organs. The hairy appearance of the eyes in many of the *Nymphalidæ* is owing to the presence of minute hairs planted at the angles of the numerous facets. Compound eyes are not found among the larvæ of butterflies and moths, but they are in most cases provided with six ocelli on each side of the head. (3) The mouth, the parts of which in insects are considered by comparative anatomists to be typically developed in the masticatory mouth of beetles (*Coleoptera*), assumes in butterflies and moths the suctorial form—the latter being merely a modification of the former; thus the mandibles, labium, and labrum, which are fully developed when the nature of the food renders mastication necessary, are in a rudimentary condition in the *Lepidoptera*, whose chief food is the nectar of flowers, while the maxillæ, on the other hand, are enormously developed; being concave on their inner sides, these by approximating form a tube known as the proboscis or tongue. This when at rest is coiled up into a ball in front of the head, and is partly concealed by the palpi projecting on both sides. In the moths belonging to the family *Bombycidæ*, the organs of the mouth are rudimentary, so that these insects after entering upon the imago state are incapable of feeding.

The thorax bears the organs of locomotion, consisting of three pairs of legs and two pairs of wings. The former are covered with hairs and scales, and terminate in hooks modified to suit the habits of the various species. Butterflies use the legs almost entirely for resting, very rarely for walking, and in some groups, as the *Nymphalidæ*, the front pair is rudimentary. The wings consist of a double layer of colourless membrane traversed by numerous nervures (Plate XXVII. fig. 1), and covered with minute scales implanted in the wing membrane by a short stalk, and placed together like tiles on a roof. The scales vary in form in different species and in different portions of the wings of the same species, while under a high power of the microscope they are seen to be minutely corrugated; and it is to these corrugations acting upon the colourless rays of light, and producing the phenomena of "interference," that many of the loveliest butterflies owe the brilliancy of their wings. The splendour of those organs in the majority of butterflies, and in some moths, is sometimes equally shared by both sexes, but more usually the females are less conspicuously coloured than the males. This difference, amounting often to total dissimilarity, Darwin, in accordance with his descent-theory, attributes in great part to the action of sexual selection. "Several males," he says, "may be seen pursuing the same female." The latter he supposes selects the most gaily-coloured, and thus the plainer-coloured males have been gradually eliminated; but there is no proof whatever that the female shows any such discrimination in selecting a mate, while many known facts seem to point in an opposite direction. Mr A. R. Wallace maintains, on the other hand, that the duller colours of the females have been acquired for protective purposes, the females requiring such protection more than the males owing to their generally slower flight, and to the fact that after impregna-