mechanical irritation; indeed, hæmorrhage from the kidney is, according to Dr. Prout, "perhaps more frequently produced by an oxalate of lime than by any other form of concretion."* For this reason, the innermost strata, or those nearest the nucleus, alternate with layers of modified colouring matter of the blood.

If a combination of albumen with oxalic acid, analogous to that with phosphoric acid, or with lime, be secreted by the glandular cells of the mucous membrane, the following will be the result:—At the instant of contact of these two secretions, the feeble combination of the oxalate-albuminate is decomposed by the counter-current issuing from the papillæ, (acidulous hippurate, urate, phosphate of soda, Liebig); oxalate of lime is separated, and incrusts the glandular cells. These get impermeable, lose their vitality, and becoming detached, cohere with the loose adjunct cells, and thus form small, irregular-pointed concretions. These minute bodies, agglutinated by clots of blood—the consequence of hæmorrhage, caused by irritation of the renal papillæ, and rendered slippery, glide into the pelvis of the kidney. Here they may coalesce with similar concrete particles, which have preceded or followed them, so as to form calculi, or slip into the bladder, and constitute the smooth, so-called hemp-seed stones. Most, if not all, concretions which determine hæmorrhage of the papillæ, are mechanically lodged in the pelvis of the kidney, (mulberry-stones.) Those, however, which are spherical-shaped, pass at once into the bladder, and as they are unproductive of hæmorrhage in that situation, exhibit only a faint, greenish-yellow tinge. When renal calculi, consisting of alternate layers of oxalate and carbonate of lime, are dissolved in acids, the cellular incrustation may be detected by the colour imparted by iodine; for the membrane of the original cell resists the action of the acid.†

A strong argument in support of the above views is derived from the fact of the occurrence of oxalate of lime in the secretion of other mucous membranes—namely, in that of the biliary passages, and in the physiologically allied system of the reproductive sphere.

If fresh ox-gall be allowed to stand for a while in a cylindrical glass vessel, a slimy flocculence subsides. This is composed of amorphous mucus, epithelial cylinders, ova and embryos of the distoma and ascaris—lastly, very fine oxalate of lime octahedrons with a square base. The gall of rabbits, dogs, and of a large pike, (*Esox lucius*), as representing graminivorous, omnivorous, and carnivorous animals, gave each the same result. The gall of the last afforded crystals of remarkable beauty, one-eightieth of a line in diameter. A peculiar diathesis would seem to concur to its production, influencing one animal more readily than another. Thus, the oxalate has been searched for in vain in the biliary sediment from a cat, and met with only once in that from the human subject, notwithstanding numerous examinations. Diet and manner of living did not seem at all essential conditions, at least in so far as the pike was concerned.

A question now arises: Is oxalate of lime a necessary constituent of bile (bilate of soda)—in other words, a secretion from the cells of the liver; or is it a mere concomitant thereof—a secretion from the mucous glands of the biliary passages? In the latter case it must be present in solution; but in fresh vesical mucus directly removed through a wound in the gall-bladder, no trace of crystals could be discovered: it must therefore occur as an albuminate of the nature above described. Again: Fresh ox-gall, digested with twice its volume of alcohol, in order to separate the mucus, filtered, and placed for some days in a cylindrical vessel, afforded no trace of sediment. The same filtrate, evaporated so as to dissipate the spirit, and then dissolved in water, became turbid after some time, but no octahedral crystals could be seen after the most minute microscopic research. Mucus, on the other

hand, wiped from the interior of the gall-bladder, left in water during a few days, yielded abundance of crystals possessing all the attributes of oxalate of lime. It is thus manifest that the oxalate of lime in the gall sediments is eliminated from the mucous glands of the mucous membrane of the biliary conduits, and not from the proper cells of the liver.

The final argument adduced by Dr. Schmidt in support of the analogy betwixt oxalate and phosphate of lime, in reference to the mode of diffusion (double albuminate) through the organism and the seat of secretion, (mucous membrane,) is the constant appearance of the former in the mucous membrane of the impregnated uterus. This phenomenon was first noticed in rabbits by Reichert, about the sixth day after impregnation. The quality of the food swallowed did not seem to make the least difference. The result was uniformly the same, whether the animal was fed upon grain exclusively, or upon cabbage-leaves, grass, and trefoil.

Bloomsbury-square, July, 1847.

ON THE INFLUENCE OF THE NERVOUS CENTRES ON THE INTESTINES.

By DR. JULIUS BUDGE, of Bonn.

To the remarkable effects of the irritation of the spinal cord on the movements of the heart, mentioned in my article of last May, I will now add another example of the influence of the "centre" of the nervous system on the parts which are only involuntarily moved—namely, the intestines.

If, immediately after the death of a rabbit, the skull is opened in such a manner that the "medulla oblongata" and "cerebellum" can be well seen, then these parts, on being touched by wires communicating with the magneto-electric machine, the large intestines are forcibly moved, as long as the apparatus is applied. This effect can principally be seen on the "intestinum cæcum," which, soon after the opening of the body of the beast, ceases to be spontaneously moved. Sometimes the movement is so strong, that the excrements are emptied, when an opening is made in the intestine. The effect above mentioned is the same if, instead of the "medulla oblongata," the "cerebellum" is electrified, but the effect is not so strong; an effect, however, never appears, if, before the wires are applied, the "nervus vagus" is separated on both sides; and, lastly, the movement of the "intestinum cæcum" can also be produced, if both sides of the "nervus vagus" are electrified.

Bonn, 1847.

ON THE LAWS OF DIETING.

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(Translated from Liebig's "*Annalen der Chemie*," March, 1847, by Mr. JOHN BROWN, for THE LANCET.)

THAT the amount of calorifiant food, as distinguished from the peculiarly nutritive, as Liebig has demonstrated, is greater than that required to supply the waste of the solid matter of the body, is proved by the following table, which shows the amount of the ultimate constituents of the food of a cow during one day:—

	Food. lbs.		Fæces. lbs.		Consumption.		Nutritive. lbs.		Calorifiant. lbs.
Carbon	11.90	...	5.10	...	6.80	...	.828	...	5.972
Hydrogen ...	1.61	...	.62	...	.99	...	.109	...	.881
Nitrogen ...	.45	...	.20	...	.25	...	.250	...	—
Oxygen.....	10.74	...	4.12	...	6.62	...	.373	...	6.247
Ash	1.71	...	1.09	...	.62	...	—	...	—
	26.41		11.13		15.28		1.560		13.100

In this case the food used was grass.

By multiplying the quantity of nitrogen consumed by 6.25, we get 1.56lbs, which is the quantity destined for nutrition.

A regular system of diet would therefore require such tables for every condition of animals, so that there may be a relation between the wants of the system and the food. If this method of reasoning be correct, the relation between the nutritive and the calorifiant constituents of the food is nearly as 1 to 8½. By comparing this fact, which is independent of all supposition, with the difference in the food of mankind, it is probable that some light may be obtained upon the difference in the relative number of these constituents. Milk, for

* Op. cit., p. 67.

† The "quadrate pyramidal" crystals in the Malpighian vessels of the caterpillar of the sphinx convolvuli are, according to Müller's description and figures, (*Archiv.*, 1846, p. 44, fig. 31,) evidently oxalate of lime. They occur in the cavity of the follicles, exterior to the glandular cells, and must therefore have been separated in a fluid state from the cells, and originally concentrated or crystallized in the efferent ducts. The same observer detected amorphous molecules of uric salts, along with the octahedrons, in the Malpighian vessels of insects. The pathological secretion of vertebrate animals appears to be a constant normal excretion in insects, but possibly only in the larva state. The subject, however, requires further investigation.

The occurrence of uric salts within the glandular cells, as the cell content of finer molecules, is very interesting. The urine would seem to be secreted through shedding and bursting of a whole series of glandular cells, in the mode above assumed for the oxalate of lime on the mucous membrane of the urinary conduits in mammals. Should not the same thing apply to birds, in the kidneys of which the uric saline deposits have been found to inject the most delicate uriniferous tubules?

example, the food of the infant mammalia, contains two parts of calorifiant constituents for every one of nutritive; but as long as an animal continues to grow, the nutritive part of the food not only compensates for the consumption of solid matter, but more is required to increase the bulk of the animal; and as it has been showed that animal heat is generated by the change of the fibrinous tissues, it is plain that in the nourishment of the infant animal, the casein must contribute greatly to the supply of heat much more than that afforded by fibrin to full-grown animals, because the amount taken in proportion to the calorifiant matter is much greater. If we refer to the food which is usually employed by the inhabitants of England—viz., wheat and barley, we find, by taking the mean of a number of experiments, that the quantity of albuminous matter in them amounts to about eleven per cent., whilst the quantity of starch and sugar varies from seventy to eighty per cent. From this the conclusion may be drawn that the nutritive food is to the calorifiant in the proportion of one to seven and upwards.

It may be assumed that this food is adapted for the consumption of an animal from which no important exercise of the muscular system is required, and may be considered as the limit of the excess of the calorifiant over the nutritive constituents of the food. If greater exertion of the muscular system is necessary, the proportion of nutritive substances should be increased, and this may be extended to the point where the nutritive constituents are equivalent to the half of the calorifiant, which is, probably, in a perfectly normal nourishment, the greatest admissible number of nutritive substances.

This relation of the constituents of the food should, therefore, vary according as the animal is in a state of rest or exertion. For calculations of this kind tables are necessary, showing the quantity of albuminous matter in the different kinds of food. The constituents of those flours used for human food are chiefly albuminous matter, calorifiant matter, water, and salts; so that, after the determination of the albuminous constituents in the dried flour, the remainder may be taken as calorifiant matter without occasioning any perceptible error. In the following table, the water has not been removed from the flour.

	Albuminous matter				
	per cent.				
Bean meal	...	...	...	...	25.36
Linseed meal	...	...	...	...	23.62
Oatmeal, (Scotch)	...	...	...	...	15.61
Semolina	...	...	...	...	12.81
Canadian meal	...	...	...	...	11.62
Barley	...	...	...	...	11.31
Maize	...	...	...	...	10.93
American flour	...	...	...	...	10.87
Essex flour	...	...	...	...	10.55
Flour, (East Lothian)	...	...	...	...	9.74
Hay	...	...	...	...	9.71
Malt	...	...	...	...	8.71
Rice	...	...	...	...	8.37
Sago	...	...	...	...	3.33
Arrowroot	...	...	...	...	3.21
Tapioca	...	...	...	...	3.13
Potatoes	...	...	...	...	2.23
Starch, (wheat)	...	...	...	...	2.18
Swedish turnips	...	...	...	...	1.32

All these numbers are calculated from the nitrogen, which was determined in the Glasgow laboratory.

As all the substances contain, however, from five to fourteen per cent. of water, some deductions are necessary, in order to determine the true amount of calorifiant matter. It may be stated, that, in general, wheat flour, maize, barley, and beans, contain from ten to fourteen per cent. of water; oatmeal, six per cent.; and tapioca, arrowroot, and sago, from ten to thirteen per cent.

If we take the water into consideration, we then obtain the following numbers, which show the relation of the nutritive to the calorifiant constituents:—

Milk	...	...	...	...	{ 1 to 2
Beans	...	...	...	...	{ 1 to 6
Oatmeal	...	...	...	...	1 to 2½
Semolina, barley	...	...	...	...	1 to 5
English wheat flour	...	...	...	...	1 to 7
Potatoes	...	...	...	...	1 to 8
Rice	...	...	...	...	1 to 9
Turnips	...	...	...	...	1 to 10
Arrowroot, tapioca, and sago	...	...	...	...	1 to 11
Starch	...	...	...	...	1 to 26
	...	...	...	...	1 to 40

From this table we must conclude that the food of an

animal in a state of exercise should lie between milk and wheat flour, and it is to be hoped that more light will be thrown on this subject by careful researches. It is thus we explain how beans, oatmeal, oats, and barleymeal, should be so much used in the feeding of horses. As milk is the food of children, the use of arrowroot, or any other starchy food which is deficient in nitrogenous matter and salts, is opposed to the principles of the preceding table. In the table on the amount of the albuminous matter in the different kinds of food, another column might have been added, showing 100 parts of bean meal to be equal to 1160 parts of starch; but if the foregoing views are correct, it shows that this estimation of the nutritive power does not rest upon scientific principles. In a proper system of dieting, an equilibrium must be maintained between the wants of the body and the constitution of the food.

The truth of this is shown by the following table, from which it can be easily seen that the food which contains most starch or sugar does not yield the greatest quantity of butter; although it is from these substances that the butter is supplied; but the greatest quantity of milk and butter is produced by that food which seems most effectually to restore the equilibrium in the animal. The first column of the following table, shows the mean quantity of milk of two cows in five days; the second, the butter in the same time; and the third contains the amount of nitrogen in the food of both cows for the same period:—

	Milk in five days. lbs.		Butter in five days. lbs.		Amount of Ni- trogen in food, lbs.
1. Grass	114	...	3.50	...	2.32
2. Barley and hay	107	...	3.43	...	3.89
3. Malt and hay	102	...	3.20	...	3.31
4. Barley, molasses, & hay	106	...	3.44	...	3.82
5. Barley, linseed, and hay	108	...	3.48	...	4.14
6. Beans and hay	108	...	3.72	...	5.27

From this table, we must conclude that grass gives the richest products, because in this food the nutritive and calorifiant constituents are in the most advantageous relation.

If the foregoing principles are properly understood, little difficulty will be found in forming proper systems of dieting, adapted to the different circumstances in which the animal may be placed. By different mixtures of one kind of flour which contains a small quantity of nutritive constituents, with another which is richer in that material, the equilibrium of the food which may have been disturbed in a country from meteorological causes, is again restored. The English wheat, for instance, is inferior to that of the continent of Europe and America, as the table shows. It is improved, however, by admixture with foreign flour; or oatmeal, barley, beans, and very good bread, can be formed in this manner. All these kinds of grain owe their nutritive properties to the presence of fibrin, casein, gluten, and albumen. Wheat owes its property of retaining the carbonic acid, formed by fermentation, to the excess of gluten which it contains, and thus it receives its vesicular, spongy structure.

By mixing one-third of Canadian flour with two-thirds of maize, we form a very good bread, and if we mix equal parts of flour and oatmeal, or barley, or peasemeal, a very palatable bread is obtained by this mixture.

July, 1847.

Original Contributions to The Lancet in Abstract.

MEDICINE; SURGERY.

Albuminuria, or Bright's Disease.

MR. SANDFORD, of Wigston Magna, Leicestershire, has forwarded the details of a case of albuminuria, which has been recently under his care, and that of the gentleman to whom he is assistant. The patient—a gentleman, fifty-six years of age, of moderate and temperate habits—suffered, some years ago, from pains which he considered to be lumbago. They did not prevent his attending to his business, and finally left him in the possession of comparatively good health. About a year ago he complained of difficulty of breathing, especially when hurried, or waking suddenly from sleep; and also of a dragging sensation in the right breast, just under the fourth rib: this part was dull on percussion. He had also a cough, and the pulse was intermittent, tongue foul, bowels torpid, and urine scanty, thick, muddy, and apparently containing a great deal of the phosphates, its specific gravity from 0.15 to 0.20. The application of the tests detected the presence of albumen. He was treated with diuretics, alteratives, and expectorants, and directed to live moderately; and after some