

prosecuted into detail, many subjects of great interest and importance offer themselves for consideration, and of these not the least worthy of notice is the best method of making the food consumed fully available to the animal. It has been clearly established that only a very small proportion of the nutritive matters of the food is stored up within the body in the form of flesh and fat, and that even under the most favorable circumstances by far the larger proportion is practically wasted, or at least reduced to the less valuable form of manure. It is known also that the quantity stored differs greatly in different animals; thus, the pig makes a much better use of its food than the ox, for it will increase in weight nearly twice as much with the same consumption of food. The same is true, though to a more limited extent, with regard to individuals of the same species, and every one knows that some cattle fatten more quickly than others. These differences are, no doubt, often due to constitutional peculiarities which cannot be overcome in practice; but it cannot be questioned that it is a matter of the greatest possible moment to determine the circumstances under which the waste can be reduced to a minimum, and the animal be made to assimilate the largest possible proportion of the food which enters its stomach. It is very obvious that the complete solution of this problem involves many nice physiological questions, and in the present state of our knowledge is scarcely possible: but there are individual departments of the subject which may be considered, and to one of these I propose directing your attention on the present occasion.

The particular question I intend to discuss is how far the nutritive value of a food may be increased by adding to it certain accessory substances which are not themselves *foods*, in the proper sense of the term, but which, either by maintaining the general functions in a state of health, or by promoting digestion, facilitate the assimilation of the true food. My attention has recently been directed to the subject in the course of some experiments, to which reference will afterwards be made, but which I shall here discuss only in a general point of view. Substances added to the food in this way are commonly known by the name of "condiments," and are understood to operate by promoting the healthy exercise of the digestive organs. The mode in which they do this, however, is not well defined, and cannot in all cases be identical. We ourselves use a vast variety of these substances, but we do so without any definite object, and most of them have probably no other effect but that of pleasing the palate, and are, therefore, very far from acting favorably, but rather induce the ingestion of a larger quantity of food than the stomach can properly dispose of, and, consequently, check, instead of promote the progress of digestion. On the other hand, if we are to argue from our natural instincts and the universality of their use, there are substances which must be beneficial. Experience has led us to the use of

certain mixtures of food, which are often considered to be mere manifestations of popular fancy, but which are really founded on natural laws, thus, for example, we eat beans and bacon, and thus conjoin a very fat feed with the most highly nitrogenous vegetable. In the same way, the Irish laborer who consumes a large quantity of the starchy potato uses along with it a great deal of milk, so as to supply the nitrogenous and fatty substances the system requires. It is reasonable, therefore to assume that the use of condiments is dictated by the necessity for them. If, then, the subject is important in regard to human beings, it is still more so in relation to the feeding of cattle, which, in their artificial state, cannot select for themselves, but must take what the feeder supplies.

The most important of all condiments to animals is unquestionably salt, and if we are to assume that their natural instincts lead them to take what is beneficial, we can have no doubt as to its utility. The desire for it is shown by the avidity with which cattle consume it when hungry, and it is placed in their feeding troughs, and that this is not the effect of the artificial state in which they are kept is proved by the fact that any spot where it exists is sure to become the resort of wild cattle. Such spots are not uncommon in the back woods of America, where they are known by the name of "salt licks," and the ground around them is constantly covered with the footprints of innumerable herds of wild cattle. So familiar is the desire of cattle for salt that in our colonies it is well known that the most effectual method of preventing them from straying is to place abundance of salt at their disposal in the neighborhood of the stations at which they are kept. Beyond all question, then, salt must be in some way advantageous to animals. Let us see whether it is possible to find any reason for this. If the different parts of the animal body be examined, the quantity of salt contained in it is found to be far from inconsiderable. Thus—

Human blood contains	0.42 per cent.
Milk	0.02 "
Horses' blood	0.51 "
" chyle	0.53 "
" urine	0.29 "
Ox urine	0.01 "
Pig urine	0.52 "
Sheep urine	0.63 "

It is clear, therefore, that a considerable quantity of salt is indispensable for maintaining the supply required by the system. Thus, a horse excretes daily about 20 lbs. of urine, containing nearly 400 gis. of salt. If, now, we look to the food as the source of this supply, we are struck by the small proportion of common salt which many of them contain. This quantity is exceedingly variable, and depends to no small extent on the nature of the soil on which the crop was raised, proximity to the sea, &c.; but the following tables give in grains the average quantity