

the urine increased in just the same proportion, the quantities being:—

|                      |              |
|----------------------|--------------|
| No salt, .....       | 828 grammes. |
| 5 Grammes daily..... | 898 "        |
| 10 " .....           | 987 "        |
| 20 " .....           | 1124 "       |

The urine was not only increased, but it contained more of the peculiar principle of the urine called *urea*, the numbers being, in the course of the whole experiment:—

|                 |       |
|-----------------|-------|
| No salt .....   | 107.4 |
| 5 Grammes ..... | 109.5 |
| 10 " .....      | 110.9 |
| 20 " .....      | 112.8 |

The importance of this observation will be understood when it is borne in mind that the urea affords a measure of the quantity of the tissues disintegrated and excreted, and that the presence of a larger quantity than usual in the urine is a proof that an increase of food is necessary to maintain the true weight of the animal. Such was, in fact, found to be the case, and the dog fell off in weight when it got the salt with its food. These experiments, therefore, tend to confirm those of Boussingault, and show that salt does not cause the animal to make a better use of its food; on the contrary, the effect is in the opposite direction, so that in economical feeding more salt should not be used than is just sufficient for the requirements of the animal. On the other hand, it must not fall short of this quantity; and to secure a proportion, the nature of the food should be taken into account, so that if much straw, and more especially straw grown at a distance from the sea, is used, a small addition should be made to the food, but it should always be small, and it should not be given *ad libitum*, but in the smallest quantity consistent with fulfilling its object. On exactly the same principle as the addition of salt has been recommended, it has been proposed to employ phosphate of lime. That substance, as we all know, is an indispensable constituent of the animal body, and, besides, forming the larger part of the bones, is met with in almost all the other organs. It is a substance, also, in which the food is sometimes deficient, and it has been maintained that in most cases an additional quantity should be beneficial. There is no doubt that when it and other mineral constituents of the food are in too small quantity, the health suffers, and a remarkable instance of this is found among the experiments of Messrs. Lawes and Gilbert. They fed these swine for eight weeks on maize, a substance containing a very small quantity of mineral matters, and more especially of phosphates, and they began to suffer from swelling of the glands and other bad symptoms. They were then supplied with a mixture of 5lbs. wood ashes, 1lb salt, and 4lb. of superphosphate, every fourteen days, and this nauseous mixture they greedily devoured and soon regained their health, while others

which did not get it died. Several series of experiments have been made in which phosphate of lime, in the form of extremely fine powder, has been added to the food of animals, and the results, as in the case of salt, have been exceedingly conflicting. Lehmann made one series, in which he obtained a favourable result. He gave exactly the same food to three young pigs, two of which got daily half an ounce of finely ground bone earth, and these, at the end of 259 days, weighed respectively 23, and 11 lbs. more than the third, which got none. In another experiment, made in Silesia, and also on swine, no perceptible difference existed between the two lots. In a third series, made by Von Barratta on lambs, bone meal was employed to the extent of half an ounce daily, and here the results were most unfavourable, for the lambs which got it weighed, at the end of 40 days, 31 lbs. less than those which got none. In this case, however, the effect may be due to the animal matter of the bone meal, which may not be suited to the herbivorous animal. A more minute and careful series of experiments on the influence of phosphate of lime on lambs has recently been made by Von Goehren, which lead to the conclusion that it does not affect their growth in any way, the weight of those receiving 120 grains daily being sensibly the same as that of those which had none. By comparative analysis, however, of the food and excretions, he has ascertained that a portion of the phosphate of lime was actually absorbed and employed within the system. Where no phosphate of lime was used, the excretions contained 3.5 grains of phosphoric acid less than the food, so that this was the quantity daily stored up in the system. But when bone earth was added to the food, 28.10 grains were retained daily. It thus appears that the phosphate of lime, like salt, has no effect in increasing the live weight of the animals to which it is given, or in causing them to make a better use of their food; but it is quite possible that where there is a deficiency in the phosphoric acid it may exert an important influence on the health of the animal during the early period of life, when the bone is chiefly formed, and hence its use may occasionally be advantageous.

The general conclusion to be drawn from all the experiments and observations now detailed is that whatever benefits may accrue to the health of the animal by the use of condiments, of which common salt may be taken as the type they are without effect on the quantity of nutritious matters assimilated; and salt, when used in considerable quantity, actually causes the expenditure of an extra quantity of food to produce the same increase in live weight. These facts are not unimportant in relation to a class of substances now commonly called "condimental foods," which are very actively pressed upon the attention of the farmer, and are alleged to produce so great an economy of the ordinary