

aware that some speculative farmers suppose that, by pursuing a certain course of management, the growth of weeds may be checked, if not entirely overcome. This they propose doing by drilling the grain crops, and by the use of the horse and hand hoes during the earlier stages of the growth of the plant; but whilst we admit that such treatment will check the progress of certain weeds, we must deny its capability of superseding a system of alternating plants of different natures. Such is a brief view of causes which render a rotation of crops necessary to secure the fertility of the soil; and we would wish to impress the importance of the subject upon our readers, because there are, comparatively speaking, very few farmers in Ireland who understand the importance of successional cropping.

FEEDING OF SHEEP.

It appears from experiments of the Leipsic Society, that sheep cannot be fed to their full extent on hay alone, and that those of a particular breed, which, when fed on hay, reach a weight of 90 lb., acquire an additional 10 lb. by the use of concentrated food. Further, that hay is not favourable to the production of fat, but that the grains, especially rye and linseed cake, greatly surpass it. Experiments on cows, have also shown that 1 lb. of rape-cake given in the food produces an increase of $\frac{3}{4}$ lb. of milk, and that with cows of high milk-producing powers it may produce double that quantity; or, on the average, rape-cake will produce its own weight of milk.—The highest effect is produced by 2 lb. daily; but this quantity is too high, if butter is the object, as it acquires a disagreeable flavour; but when the milk is to be sold, this quantity may with safety be employed. In the production of milk, rape-cake cannot be replaced by double its weight of hay; and under favourable circumstances, when combined with food poor in nitrogen—such as straw, potatoes, or turnips—it will produce three times the nutritive effect of hay. Rape-cake is equally favourable to the production of flesh, and it appears that 1 lb. daily will increase the live weight of a cow by 15 lb., and sustain it at the higher point.—In one particular experiment the live weight of two cows was increased, in the course of fourteen days, by 62 lb., and with the consumption, in addition to their former food, of 66 lb. rape cake. This effect, however, was only produced under favourable circumstances; for when three or four lb. rape-cake *per diem* were used, the animal only reaches a weight proportionate to this increase after the lapse of a very

considerable time; and it appears that the more nearly the animals approach the fully fed condition, the more slowly do they increase in weight especially under the influence of the same food.

With sheep, 1 lb. rape-cake added to the daily food will gradually produce an increase of 20 lb in their live weight, provided the composition of the total food be properly attended to. This, however, it will only do in the early part of the feeding, its effect being somewhat diminished in the latter part of the process. The poorer the other nutritive matters supplied to the animal are in nitrogen, the larger is the quantity of rape-cake which may be advantageously employed. It is not found advantageous to give to each sheep a larger quantity of rape-cake than $\frac{3}{4}$ lb. daily. If the daily food of a sheep of medium weight consist of 4 lb. turnips, $1\frac{1}{2}$ lb. hay, and a quantity of rape-cake be supplied in addition, commencing with a small quantity, and gradually increasing it to $\frac{3}{4}$ lb., the weight of the animal will increase in the course of six or eight weeks by about 13 lb., and with the expenditure in all of from 28 to 30 lb. of rape-cake. It thus appears that the effect of rape-cake on the sheep though favourable, is not so striking on the cow. These experiments have been followed by an inquiry into the quality of the dung produced. To connect together the whole inquiry, it may be well to mention the principal points established. It appears that when rape cake is given to sheep, not for the purpose of fattening, but in small quantity, and a part of their winter food, not more than 1-6th of the original quantity of nitrogen disappears during the nutritive process and by decomposition, and the other 5-6th remain in the dung. The quality of the cow dung is similarly increased; for, as 1 lb. of rape-cake produces 1 lb. of milk, containing only $\frac{1}{4}$ of the nitrogen of the cake, the other $\frac{3}{4}$ must manifestly appear in the dung. When, however, a rapid increase is taking place in the weight of the animal, a smaller proportion of the nitrogen will pass into the dung, and a larger quantity be retained within the body of the animal. What proportion is thus retained for each 100 lb. increase in the live weight cannot be accurately deduced from the experiments; at all events, it is clear that Boussingault's estimate of 3.66 lb of nitrogen is too high—a result which is also brought out by Mr. Lawes' experiments. It may happen that, when a rapid increase in the weight of the animal occurs, the whole of the