

price of these quantities and kinds of food is so considerable, that the animals do not yield a profit to their owner.

The amount of straw consumed by stock, and its nutritive properties, have for some time engaged the attention of the Council of the Royal Agricultural Society. In the twenty-first volume of its Journal, p. 34, is given the prize essay of Mr. H. Evershed, on the uses of straw on a farm. Its author is of opinion that, although it is a common plan in grazing districts, where roots are scarce, to feed store cattle on about 20 lbs. of straw and 3 lbs. of bean meal, yet that they do better on straw, with roots instead of meal, even when the supply of roots did not exceed $\frac{1}{2}$ cwt. per head per day. Cattle wintered on straw and meal only become "hide bound," with staring coats. In a note upon this paper Mr. Frere calculates the average production of straw per acre to be $2\frac{1}{2}$ tons, or 250 tons from 200 acres of corn. He reckons that not more than 4 cwt. of straw enters into the composition of a ton of farm-yard manure; the remainder being excrements 6 cwt., rain-water 10 cwt. The composition of straw chaff by a cart-horse he places as at least one ton per annum; cattle, 1 ton 1 cwt.; per annum; for sheep on a farm of 400 acres he assigns 8 tons of straw-chaff yearly. On an arable farm of 400 acres, therefore, Mr. Evershed calculates that there is required for the fodder of 50 head of large stock, whether horses or beasts, at least 50 tons; for sheep, 8 tons; for storing roots, when wheat is reaped, waste from thatching, making foundation of stacks, &c., say 5 tons; total 63 tons of straw.

As regards the quantity eaten by the stock, Mr. Evershed adds: "It is an interesting fact that well-fed cattle, kept in open yards, will eat more straw during the winter months than other cattle kept under the warm shelter of a roof. The careful manager saves his stock of bean straw until the cold weather sets in, knowing that at that season its bitter flavour will be disregarded. During the winter of 1859-60 I compared the quantity of mixed hay and straw chaff eaten by six oxen, fattened in a warm cattle-house, with that consumed by cattle of the same age and breed in an adjoining yard. Each lot was fed alike in respect of corn and roots, and as much chaff was given as they would eat. Those in the house ate 14 lbs., and the others 18 lbs. daily, showing a difference of nearly a fourth less carbonaceous food required by cattle when kept in a condition of artificial warmth." In the experiments on fattening cattle at Woburn (*Jour. Roy. Ag. Soc.*, vol. xxii., p. 216), in six experiments, during eight weeks, on 44 oxen, fed in boxes, of an average weight of 1,470 lbs., there was consumed per head weekly about 43 $\frac{1}{2}$ lbs. of cake or corn, 110 $\frac{1}{2}$ lbs. of clover hay chaff, 377 lbs. of roots; in all 531 lbs. of food. There was used besides 133 lbs. of litter. Total feed and litter, 664 lbs. The amount of fresh

dung produced, 575 lbs. The dry substance of the dung was 156 lbs., that of the litter only 106 $\frac{1}{2}$ lbs.: there was therefore a gain of about 50 lbs., or nearly one-half, upon the litter used. The dry substance of the food and litter together was, however, 276 lbs., yielding in dung 156 lbs., or only 56 $\frac{1}{2}$ per cent. of the total; 43 $\frac{1}{2}$ per cent. of the dry substance of the food and litter were therefore either stored up as increase, expended by the animal in respiration, &c., or lost by the decomposition of the manure. To produce 1 ton of fresh box dung, there were consumed 168 lbs. of cake or corn, 431 lbs. of clover-hay chaff, and 1,496 lbs. of Swedes; in all 2,068 lbs. of food, besides 518 lbs. of litter, making a total of 2,586 lbs. of food and litter; this contained 1,075 lbs. of dry substance, and the ton of dung 608 lbs., but we must not fall into the common error of confounding together a good the straw of all kinds of cereals. Neither must we fail to consider the very material difference in value between the straw of the same grass, harvested at different stages of its growth, or in varying degrees of ripeness. These points Professor Voelcker, in his recent valuable paper on the composition and nutritive value of straw, has elaborately examined; as he observes (*Jour. Roy. Ag. Soc.*, vol. xxii., p. 382), "Many farmers form much too low an estimate of the feeding value of every kind of straw, except pea haulm. On the other hand, the views of others respecting the nutriment contained in straw are so unmistakably exaggerated that, with some degree of justice, they are made a laughing stock at the market-table. The main anxiety of the first-named class seemed to be how to tread into manure all the straw grown on the farm; that of the second how to stuff stock with all the straw at their disposal: the creed of the former being that neither little nor much will do their cattle any good, whilst the latter hold that any appropriation of it for litter is an intolerable waste."

"The intelligent agriculturist, however, knows full well that whilst wheat, oat, and barley straw when cut fine into chaff possess a certain feeding value, particularly when this bulky material is combined with some concentrated or more readily digestible food, they are not the less essential on the generality of farms to the production of good farm-yard manure. On most farms, indeed, the want of straw is felt much more on account of the difficulty of preserving the most valuable constituents of the liquid and solid excrements which arises from an insufficient supply of litter, than because an economical substitute of this kind of bulky food cannot be found."

But the professor feels evidently that there is much yet to be learnt with regard to the condition of the straw, the way in which it is produced, and its varying nutritive quality; for he adds, in his opening observations of its chemical com-