

ject to the introduction of this mode on to their land, on the plea that it deteriorates soil more quickly than other kinds of farming. It is, of course, quite possible to conceive of a system of keeping cows which shall add nothing to the soil, but, on the contrary, take everything out of it, and it would, perhaps, not be difficult to find individual dairymen who follow this bad practice in every district. But that dairying properly carried out really enriches the soil is a fact not very difficult to prove. In a paper read by Mr. HOWMAN some years ago before the British Dairy Farmers' Association the matter was, so far as we are aware, first presented in its true bearing, and the subject came up for discussion again at the Ipswich meeting of last year's Conference. A few calculations will show us exactly how the matter stands. Ash or mineral matter exists in milk to the extent of about eight-tenths of a per cent. and if we allow that a cow yields 600 gallons per annum, she will extract some 50 lb. of manurial matter from the soil in the form of grass and fodder during that period. Out of this quantity only some 30 lb. represent the valuable substances, phosphoric acid and potash, and if we take a herd of say fifty cows, it follows that the total amount these materials removed from the farm, or such portions of it as grazes them in summer and grows fodder for the winter, is considerably under a ton, and would be replaced by about three tons of mineral superphosphate and two and a half tons of kainite. Besides these, however, there is the nitrogen which is removed in the albuminoids of the milk, and which is the most serious part. The fifty cows would remove about 2,000 pounds of it, or as much as is contained in five and a half tons of nitrate of soda. In round numbers, however, and at present market prices, these manures, to make up for all that is removed, would amount to thirty shillings per head.

These amounts of fertilising ingredients, however, never are really taken away, but, on the contrary, tend to accumulate in the soil. We have supposed the case where the animals are fed on home grown food only, but let us consider the circumstances where cake and other foods are used that are purchased-in, and the manure from such applied to the land. Suppose the animals to be receiving four pounds of cotton-cake (decorticated) daily per head, it will amount to over half a ton each per annum for the time in milk, or say, twenty five tons in all. Analysis shows this to contain about 3,000 pounds of nitrogen and 4,000 pounds of mineral matters, or, in other words, a half more nitrogen and twice as much mineral as is contained in the milk. Besides this, however, there is the residue left from the consumption of the grass, fodder, or other materials, while many people give far more than the equivalent of 4 lb. of decorticated cotton-cake per head daily—the writer, for instance, allowing 10 lb. of mixed meals.

It will thus be seen that, even after allowing a wide margin for waste, there is a large surplus of fertilising ingredients returned to the land in the manure of the animals, so that dairy farms, where there is even a very small quantity of purchased-in food allowed, must of necessity become more and more fertile, more especially as the fertility is added in the best of all forms—farmyard manure. For the sake of simplicity we have supposed the milk to be sold clean off the farm, but it is evident that where it is utilised in various ways at home there is some residue left, and therefore less to replace. Butter for instance, being a hydrocarbon, removes absolutely none of the valuable ingredients, though the skim-milk does.

It is to be regretted, however, that manuring on a dairy farm is often a very one-sided affair. The muck is generally spread on the arable fields, and the pasture lands are left to starve. This is not as it should be, and is, perhaps, the reason why a dressing of bones did so much good on the Cheshire pastures, a circumstance which no text-book on agricul-

ture must omit to notice if it is to be considered complete. It would be a better plan to give the pastures and meadows a dose each in its turn at regular intervals, and perhaps mow for hay the first year if the grass threatens to be too strong.

It is also to be regretted that cows' droppings lie all of a heap in the fields, and not nicely spread about, as is the case with sheep, this no doubt being one of the reasons why feeding with sheep improves land, and thus the summer's cow-dung is almost lost. We have heard of farmers who sent boys through the fields at interval to spread out the little heaps, and, considering the value of cake-fed manure, it almost seems worth while to do so, and could not fail to improve the grass. At present it is either killed out at the spot or grows so rank that the animals will not eat it.

It will thus be seen that a comparatively small amount of purchased in feeding stuffs or manure will replace the fertilising ingredients removed by a fairly large herd of cows, while a surplus is sure to accumulate for future crops if the business is conducted in the ordinary way. P. M'C.

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