

has led to a spurious imitation, which is much less efficacious than the original. The parings of skins from the tan works are first boiled down by the glue makers, and the insoluble refuse sold as manure. Horns, horn sawdust, hoof parings, hair, and wool are all valuable and permanent manures.

Blood and flesh contain from 80 to 90 per cent. of their weight of water; but a ton of horn shavings, of hair, or of dry woollen rags, is as efficacious as 10 tons of blood; but, as they decompose more slowly, they appear to be less effectual than blood. Bones form a very valuable manure, 100 lb. of bone-dust convey to the soil as much organic matter as 33 lb. of horn, or 300 or 400 lb. of blood or flesh; they also add about two-thirds of their weight of inorganic matter, consisting of lime, magnesia, soda, common salt, and phosphoric acid, all of which must be present in a fertile soil. In order that bones may be the more readily available as food for plants, the bone-dust is mixed with dilute sulphuric acid, which completely dissolves it in two or three days. The solution or paste may be dried up with charcoal powder, dried peat, sawdust, or fine vegetable soil, and applied with the drill to the turnip crop, or diluted with fifty times its bulk of water, and applied with the water cart.

But it is in the solid and liquid excrements of an animal, that manure obtains its highest value especially for those plants which furnished food for the animal. The dung of pigs fed upon peas and potatoes is best adapted to manure a field growing peas and potatoes. In feeding a cow upon hay and turnips we get a manure containing all the mineral constituents of grass and of turnips. The dungs of pigeons contains the mineral ingredients of the cereal grains; that of the rabbit the constituents of culinary vegetables, the solid and liquid excrements of man contain in very great quantity the mineral substances of all seeds.

Cross-bred males.

As there is a large number of cross-bred cattle in this country I would recommend those who wish to improve them with either Ayrshire, Shorthorn, or other breeds that, in selecting a bull, preference should be given to an in-bred one, if good, and the young stock should be mated with animals of the same strain as their sire, and the cross blood would be worked out in a few generations. There is great judgement required in selecting a bull. The breeder should understand the defects of his cow, and endeavour to secure a bull exceedingly good in those particular points, to counter-balance the defect. Great mistakes are made by many breeders of the Ayrshire cattle in selecting bulls. They run away with the idea that the more the bull has the appearance of a cow the better. They prefer one small in the head, with a cwe neck and shelly appearance, and very likely mate him with cows of the same stamp. The consequence is that the progeny are more like half-bred goats than good Ayrshires. If a bull is like a cow, what may you expect the cows from that bull to be? A bull should always have a masculine appearance, with substance and quality combined.

FARMYARD MANURE.

[In the *Albany Cultivator*, Oct. 6, Sir John Lawes, of Rothamsted, writes on this subject, in answer to a question why, in certain reported experiments, Indian corn had responded so freely to the action of farm manure, as compared with "artificial" manure. We take here some passages from his letter, selecting what is more especially of Canadian interest.]

THE decomposition of barnyard manure is attended with the production of considerable heat, the land is rendered more porous, so that roots can penetrate more rapidly, the soil becomes more retentive of moisture, and its pores are filled with carbonic acid. In addition to a great variety of minerals,

barnyard manure also furnishes organic carbon, organic nitrogen, ammonia, and nitric acid.

No one is in any way competent to assign the proper value to each of these operations, and yet the sum of them represents the value of barnyard dung.

Leaving out of the question all the benefits which the corn⁽¹⁾ may derive from that which the artificial manures could not supply, and considering barnyard manures in the light of merely supplying so many pounds of ammonia, phosphate of lime or potash, let us see how the case would stand.

Of course I do not pretend to say what would be the composition of the barnyard manure applied on Mr. Valentine's farm; but having compared the analysis of different chemists with our own, and having found that they were tolerably well with calculation made as to the composition of barnyard manure, based upon the composition of the food consumed, and the litter used in ordinary farming, we have adopted the following figures:

<i>Contents of 100 parts of fresh manure.</i>			
Potash	.....	.....	0.50
Phosphoric acid, calculated as phosphate of lime	.....	.....	0.53
Nitrogen	.....	.....	0.64

Adopting these figures, there would be in the 40 loads of barnyard manure applied to some of the experiments on the Houghton farm:—

Potash	.....	.....	400 lbs.
Phosphate of lime	.....	.....	424 lbs.
Nitrogen	.....	.....	512 lbs.

This nitrogen is equal to that contained in 2580 lb. of sulphate of ammonia, or 3300 lb. of nitrate of soda. Sulphate of potash contains about one-half its weight of potash. The barnyard manure would, therefore, supply the potash of 800 lb. of this salt. So far, therefore, as merely contributing the constituents used in the artificial manures, even the smaller application of 20 loads of barnyard manure, mentioned by your correspondent, would furnish them in much larger quantities.

It is true that in barnyard manure the greater portion of the ingredients are liberated during its decay, and that this process may extend over a period of very many years. (2) In our experiments on the continuous growth of barley at Rothamsted, we have found that 275 lb. of nitrate of soda, with mineral manures, has produced as large a crop for thirty years in succession as 15 ton of barnyard manure which supplied about four times the amount of the nitrogen contained in the nitrate of soda. It is quite possible that corn, with its vigorous roots, and great powers of growth, may liberate from the barnyard manure much larger amounts of food than can be effected by other cereal grain crops.

* * * * *

It will, I think, be generally found that the beneficial influence of mineral manures, and more especially of phosphate of lime, bears some relation to the period when the seed is sown, and that when active growth commences, the nearer these periods are together, the greater will be the influence of the minerals.

It is the practice among English farmers to apply nitrate of soda alone, in March and April, to wheat sown in the previous autumn, during the autumn and winter the wheat has time to extend its roots sufficiently to obtain the requisite quantity of mineral food.

In growing barley, after a previous cereal crop, phosphates

(1) It is a pity the word *maïs* cannot be used universally, as, in England, *corn* generally means oats or all sorts of grain. A. R. J. F.

(2) Therefore, in England, half dung and half artificials are used, almost invariably, for roots. A. R. J. F.