

food for cattle, horses, colts, pigs, and sheep. It injures neither the cow nor the butter she produces. But if the hired-man gets himself saturated with the odour of silage before he begins milking, the odour will get into the milk-pail.

There is a loss in ensiling corn, as above, but the loss in stooking fodder corn is greater. Very careful managemont is necessary in stooking corn not to lose 30% of feeding value, and, as it is usually done, the loss is nearer 50%.

Less labour required to put the corn into the silo and deal it out to the cattle, than to stook it and deal it out from the stook. In a winter dairy, silage is far better than corn fodder. Eighteen tons of silage are equal to five tons of hay.

Ensiling economises wild grasses. The station has never ensiled clover, as it is believed there that the losses in the drying of hay-crops are less than in ensiling them; and the same holds good with barley, rye, green-oats, and Hungarian grass.

The only other profitable silage crop is pease and oats, as that crop can be got off by the 1st July, and ensiled. Other crops, to be fed green to follow.

Professor Hills, after speaking of the Experiment-stations of the United States in general, adverted to the subject of the Vermont laws as to the adulteration of milk. No milk to be considered pure, unless it contains 3 $\frac{1}{2}$ % of butter fat; but at hardly one of the 30 creameries he had visited had all the patrons brought in pure milk. The Babcock-test is, in itself, a policeman, and the patrons of a factory in which that instrument is used, never know when the test is to be applied to their milk.

Whether milk comes from the blood or from the udder, nobody yet knows. A test was made as to the effect of temperature on cows, and it was found that, when the temperature rose, the quality of the milk fell, and when the temperature fell, the quality of the milk was improved.

Manures.

HOW TO USE CHEMICAL MANURES. (I.)

We are now acquainted with the different matters that constitute chemical, or rather commercial manures, for chemistry is not concerned at all with several of these matters.

How shall we employ them? The question is how to manure a piece of land with them.

Let us suppose that the land is of ordinary quality and stands in need of manure, that is, that it is in want of a complete manure capable of replacing advantageously farmyard dung.

It must therefore get a dose of nitrogen, phosphoric acid, potash, lime, and even of iron, all in rational quantities.

Here is a formula that, in the majority of cases, whatever be the soil and whatever the crop to be grown, will answer the purpose. For an acre—

- 300 lbs. of nitrate of soda.
- 500 " of superphosphate.
- 100 " of muriate of potash.
- 100 " of sulphate of iron.
- 200 " of plaster.

The cost of this dressing will come to about \$20.00, besides freight, and it will be found pretty effective.

Note by the Editor. The recipe is good enough, but we doubt the need of the sulphate of iron. Potash, too, may be omitted on most heavy soils, especially where the dung-cart is not absolutely unknown. Practically we have never found potash pay in this

country, though of course the phosphoric acid in wood ashes does pay.

MIXING AND SPREADING.

As these different matters are manure in a concentrated form, that is, they contain the elements of fertility in very small compass, it is of the utmost importance that they be all equally spread over the surface of the land. There must not be too much here, not enough there:—*Too much* would very likely burn the plant, *Not enough* would give it insufficient food.—In all cases inequality of distribution will cause inequality in the appearance and in the yield of the crop.

Therefore, 1. mix the different matters composing the manure thoroughly; 2. Spread them over the land with the greatest care.

Mixing.—This should be done on an even, dry floor of some kind.

Let us mix the above formula. Manures are generally sent out in bags containing 200 lbs.

On the floor, empty the bags of nitrate, potash, and iron sulphate. These three will contain more or less lumps, nitrate especially, those should be sifted, and the lumps that will not pass through the sieve be broken fine.

Then turn out the plaster and the superphosphate; turn the whole over with the shovel at least three times, mixing the heap thoroughly, and bag the lot again.

Note by the Editor.—Here again, as in the States, the term *superphosphate* is used absolutely, without stating whether the quality is of 10%, 12% or 16% of phosphoric acid.

The mixing should not be done a long time before the spreading, lest certain injurious action take place between the different elements. It should be done as wanted for use.

Spreading.—This is done by means of the manure-drill, or by hand. The drill does its work perfectly—if the driver knows his business.

By hand, broad cast.

There must be no wind, just before rain is the best time; the sower must be very careful, just as careful as if he were sowing grain. To make sure of equal distribution, sow the manure along the ridges first and then across them.

Next, bury the manure. This is almost always done with the common harrows. On meadows, the chain harrow works better than the old-fashioned bush harrow.

Note by the Editor.—Nitrate of soda is generally used on the young brard, and if the lumps be properly broken, no harrowing is necessary. Sulphate of ammonia, bone dust, and superphosphate should be harrowed well into the land before sowing the crop. Potash, if used, ought to be applied in the fall and not harrowed at all, as it can take care of itself, and the furrow should always lie unbroken all the winter.

The above rules are of general application, practically, many exceptions will occur, and we proceed to examine some of them.

The formula given above may and even must be modified according to the variation of land and crop.

MANURES FOR VARIETIES OF SOILS.

In rich soils, already full of manure, I should leave out a great part of the nitrogenous manure, if not the whole of it, and add more phosphoric acid and potash to prevent the crop of grain being laid or getting scalded.

Where there is plenty of lime already in the land, I should omit the plaster. Granitic and clay soils need no potash.

Were my land full of acids, as are newly cleared soils woodlands, and bogs,

I should try to cure the acidity by the use of lime and mineral or metallic phosphates, and use farmyard dung. Drainage of moist, marshy land must not be neglected.

Heavy dressings of commercial manures are only really useful when the soil is in a good state of cultivation.

In poor land, the expenditure of twenty dollars an acre for artificials will probably not pay. But, on land already yields from 10 to 20 bushels an acre, the same expenditure will very likely double the crop of wheat.

As a general rule, a dressing of from 30 to 40 tons of dung and from 1 to 2 tons of raw phosphate, either mineral or metallic, should be given to every acre of land every fourth year. This is the slowly acting, fundamental manuring.

Note by the Editor.—The metallic phosphate is the, now, well known basic slag, which is coming more and more into favour daily in England. Our English plan of dividing the dung, $\frac{2}{3}$ to the hoed or green crop, $\frac{1}{3}$ to the young clovers or grass seeds, is better than the plan recommended by the author, particularly on some land, where frequently repeated small dressings are much more effective than large dressings at wider intervals.

And every year, each crop should receive a dressing of artificials: this is the active and most productive manuring.

PHOSPHATISING DUNO.

The best plan of combining phosphates and dung, is to mix the phosphate with the dung as fast as it is made by the cattle. From 3 $\frac{1}{2}$ to 5 lbs. of phosphate should be scattered over the dung yielded by each head of horned stock or horses every day.

This would have the double effect of enriching the dung with phosphoric acid, and, according to some, of preventing the loss of ammonia by preventing the formation of ammonia: now ammonia contains nitrogen.

This latter position is contested by many agriculturists, who contend that phosphatizing dung favours the disengagement of the nitrogen instead of of hindering it.

Note by the Editor.—If the word *phosphate* here means plain undissolved mineral phosphate, we conceive that its effects in a dung heap would amount to nothing at all, unless the heap were kept for a considerable time. If *superphosphate* be meant, the superfluous sulphuric acid would certainly tend to 'fix the ammonia.' In a dung heap kept, as it should be, moderately moist, but sheltered from rain or drip from the eaves, but little loss of nitrogen takes place. (See Warrington's 'Chemistry of the Farm,' p. 26, ed. 1881.)

After due consideration, MM. Muntz and Girard recommend this mixture of phosphates and dung, but with the following precautions:

Make the dung-heap carefully and cover it with a little earth: this earth will absorb the ammoniacal vapours and become an excellent manure.

Never use, in this process, the *basic slag*, it will aid the escape of ammonia.

Do not forget the advice to supply every four years, a good dressing of phosphatic manure in some form or another.

On account of not paying attention to this, of having used chemical manures alone (i. e., we suppose, nitrogenous manures alone. Ed.), many farmers have ruined their land.

Having got so far, let us study the formula in accordance to the wants of the plants to which they are to be applied. They are calculated for land that has not received a full dressing of

farmyard manure. If the advice just given be followed, the dressings can be diminished in practice by one-third or one-half.

A question of the greatest importance. Why, on so many farms, is the urine allowed to escape into the yards and road—a pure loss—where it becomes the cause of most insalubrious exhalations? It is the best part of the manure, one of the most elementary lessons in cleanliness and economy should be the preservation of it. It should be collected in a tank near the mixon, and, in summer, pumped over it. Dung so treated constantly will never get "fire fanged." If any remain, it may be mixed with $\frac{2}{3}$ or $\frac{3}{4}$ its bulk of water, and carted over the meadows, &c.: the hotter the weather, the more diluted it should be. Chemical manures, as active agents, are never so effective as well employed liquid manure.—(To be continued.)

Waste of manure.—In talking of this badly used but invaluable article, the American agricultural papers seem to advise carting it out fresh to the land all the winter, and spreading it at once but not on the snow, surely? Very good advice, too, if it is certain there are no weed-seeds in it, an unusual occurrence, indeed. Also, this would hardly answer on hill sides, where the wash of melting snow would carry its most useful constituent, i. e. the most soluble parts, down the slope into the nearest stream. As a talented writer in an English paper puts it: The ghastly appearance of too many farmyards, even in 1892, is a disgrace to the country. The spirit of the dung having departed, nothing is left but a corpse; this is carted to the field in a "crazy hearse," and then the farmer wonders at the slight effect it has on his crops!

And the treatment dung meets with here, in the province of Quebec, is, if possible, worse. The fathers and grandfathers of the present generation of Canadian farmers seem to have found dung considerably in their way, if we are to trust to the accounts we have of their carting it out on to the ice that the spring-freshets might rid them of the rubbish! In those days, the farmers of the province had no difficulty, it is said, in growing from 30 to 40 bushels of wheat an acre, which yield seems to have fallen to $\frac{1}{2}$ bushels by 1879, and in the Saguenay district as little as 4 to 5 bushels—see Mr. Barnard's prize-essay on "The Farming of the Province, Journal vol. 1, (1879), p. 34, first series.

Since 1879, no doubt a vast change has taken place in many districts, but the old contempt for farmyard manure is not wholly eradicated. Still, here and there, dung-pits may be met with, and we have actually seen, at Sorel and its neighbourhood, neatly shaped dunghills, with well trimmed up sides, turned over just ten days or so before the manure was to be applied to the land.

The worst of all practices in the treatment of dung we observed during one of our tours—1886—in the neighbourhood of St-Césaire. In every other point the land and cattle seem to be treated in the most approved fashion. But the manure had been carted out during the winter on to the meadows; discharged from the carts in heaps—about two to the load—; frozen up hard, it could not be spread, and, when I saw it, in July, the destructive effects of its long repose in the same spot were but too clearly visible.

If those who "vilipend" farmyard dung would only try the effects—the marvellous effects, I may say—of feeding off a piece of rape, clover, tares of