

VI. APPLICATION OF FARMYARD MANURE.

Rate of Application. A very common mistake in applying farmyard manure is to give a small part of the farm a very heavy coating and leave the remainder without any. There are several good reasons why such a practice should not be followed. If the manure has been properly cared for, there is no need of such heavy applications to supply sufficient plant food for the crops; and when heavy manuring is practised, a large part of the farm is neglected while a small part receives much more than it requires. The practice is similar to starving the greater number of a herd of cattle and giving the few remaining animals far more than they can eat. Very heavy manuring is wasteful. It is frequently claimed that if the first crop does not require the plant food applied, the next crop will be all the better off. It is true that the heavier the application, the greater the residue left over for succeeding crops; but it does not follow that there is no waste of plant food under heavy manuring. There are at least two important sources of loss of plant food in the soil under heavy manuring. In the first place, there is danger that some of the excessive plant food may be leached out of the soil and lost in the drainage water when the land is not under crop. In all fertile soils there is always a considerable loss of nitrates from the soil in the drainage water, and it is not difficult to understand that the greater the excess of soluble plant food in the soil, the greater the loss in the drainage water. Some loss is sure to occur, but an effort should be made to make the loss as small as possible; and moderation in applying manure is one step in this direction.

The other source of loss under heavy manuring is not so easy to understand, and may be best illustrated by reference to experiments conducted by Wagner and Maercker in Germany. After a long series of careful experiments in which farmyard manure was used with other fertilizers, notably with nitrate of soda, they were led to some remarkable conclusions, among which the following may be mentioned:

1. "The solid excrement of the horse and cow is practically without value as a manure for plants."
2. "When applied to the land, fresh horse or cow dung destroys the nitrates naturally contained in the soil, or added to it in the form of nitrate of sodium, and the crop which immediately follows is consequently less than if no dung had been applied."

The reason for these and other unfavorable conclusions is given in the second conclusion quoted above, viz., the farmyard manure brought about denitrification apparently of both the nitrates of the soil and the nitrate of sodium applied along with the farmyard manure; that is to say, it caused these valuable nitrates to be broken up, and the nitrogen which they contained to be liberated as free nitrogen which escaped into the atmosphere and was thus lost to the soil. Now, undoubtedly denitrification did occur in these experiments and very energetically too; and there is no room for doubt that in these experiments farmyard manure was a failure. But, as Warington points out, the experiments were conducted in zinc cylinders or pots from which there was probably no drainage. The amount of soil used in each pot was small, and the amount of manure used compared with the amount of soil was abnormally large, representing applications at the rate of from forty to one hundred tons per acre. In the field experiments at Rothamsted where moderate applications of manure were used along with nitrate of sodium, farmyard manure proved to be decidedly