

It is true that fresh manure contains a large proportion of unavailable plant food, but if it has been properly cared for and contains all the liquid excrements of the animals, it will contain sufficient available plant food for the present requirements of the crop, while the remainder will gradually ferment in the soil and become available for succeeding crops. The conditions in the soil are entirely different from those in the manure heap. The manure is mixed with the soil, fermentation is gradual, air is freely admitted, and the mineral matter of the soil combines with the nitric acid as it forms. In a wet soil, however, where air is excluded by excessive water, or in cases where a very heavy dressing of manure has been applied, denitrification is very active, but the difficulty may be overcome by thorough drainage, or by light application of manure. In all soils there is always more or less loss of nitrates in the drainage water, but this loss will occur whether the manure has been fermented or not. As a result of investigations up to date the eminent authority, Prof. R. Warington, deduces the following conclusion: "The original voidings of the animal have a far greater manurial value than the final product of the manure heap which the farmer carries to his fields. In the whole progress from the stable to the field the loss of nitrogen is going on, this loss falling on the most valuable constituent of the manure, and resulting finally in a residue of comparatively inert matter." The subject of the preparation and preservation of farmyard manure is still under investigation, but up to the present time the bulk of evidence is in favor of applying manure in its fresh state so far as economy of plant food is concerned. Certain crops or conditions of soil may call for fermented manure, and sometimes the destruction of weed seeds may influence some farmers in their practice, but these are questions aside from the general issue.

Rotted or fermented manure is commonly believed to be more suitable for light, sandy or gravelly soils than fresh strawy manure. If the manure is very strawy no doubt some injury to the texture of such soils may result from its application, especially if applied and plowed under in the spring; but with manure of good quality applied judiciously, there is less need of rotting than is commonly believed, in fact, some excellent farmers prefer fresh manure for light soils. Just to what extent fermentation is effective in destroying weed seeds has never been clearly demonstrated. No doubt it has some influence, and may be justifiable under some conditions.

Fermentation of manure in the heap, therefore, is invariably accompanied by a loss of nitrogen, either as free nitrogen or as ammonia, but chiefly in the form of ammonia. Fermentation is accompanied by a rise in temperature, a high temperature indicating rapid fermentation, and the more rapid the fermentation the greater the loss of ammonia. If it is desired to ferment manure the temperature must be carefully watched, and some preservative should be used to retain the ammonia. Before deciding that fermented manure is necessary for any particular soil or crop, careful tests should be made with fresh manure applied in the most approved methods. But, in comparing the effects of rotted and fresh farmyard manure, great care is necessary. It will not do to apply equal weights of each to equal areas of land, and draw conclusions therefrom regarding their relative values. A ton of rotted manure represents a great deal more than a ton of fresh manure; consequently the rotted manure may have lost a large percentage of its original plant food and still contain more plant food per ton than the fresh manure. For example, at the Cornell Experi-