can be taken directly from the stalls to the field, the danger of loss is comparatively slight.

Mixing Manure. When manure is stored in yards or sheds it is very important that, as far as practicable, the manure from different kinds of stock should be mixed. Horse and sheep manure is comparatively dry and, consequently, ferments very rapidly. The manure from cattle and swine is much more moist and ferments more slowly. Mixing different kinds of manure, therefore, tends to prevent excessive fermentation of the dry manure, while the dry manure absorbs some of the excessive moisture of the wet manure, and thus helps to prevent loss by leaching. Moreover, the mixing of manures gives a product of more uniform quality, and more satisfactory to apply.

Fermentation. The widest difference of opinion exists among both practical and scientific men as to whether farmyard manure should be applied to the soil in its fresh state, or whether it should first undergo fermentation, or decomposition, in the heap. The question is a very difficult one, and it is also very important. The changes which take place in a pile of fermenting manure are extremely varied and are not, as yet, fully understood. Anything like a full discussion of these changes would be out of place here, but the advisability of allowing farmyard manure to ferment gives rise to so much discussion that it seems as though some attempt should be made to explain a few of the more important changes which may occur before the subject can be intelligently considered.

Before taking up the question of changes in manure, it may be well to make a few preliminary explanations, the importance of which will appear later. To begin with, an attempt will be made to explain the terms *free oxygen* and *combined oxygen*, *free nitrogen* and *combined nitrogen*. Oxygen and hydrogen are both colorless gases. If they are mixed in a suitable vessel and allowed to stand for an indefinite time, no change will be observed. There is in the vessel simply a mixture of oxygen and hydrogen, the same as there might be a mixture of sand and clay. But if a match could be applied to the mixture, or an electric spark sent through it, there would be an explosion, and after the explosion (if the gases were mixed in proper proportions) not a trace of either gas would be found. Instead of the gases there would be merely a few small drops of water. Before the explosion the vessel contained two *gases*; after the explosion it contained a small quantity of *liquid* called water. Now, water is made up of oxygen and hydrogen, but it is very different from either of them, or from the mixture of the two before the heat was applied. Heat brought about a union of the two gases, resulting in what is called a chemical compound. Before the explosion the gases were *free*, that is, each had a separate existence; but after the explosion the gases were no longer *free*, each gas lost its identity and the two *combined* to form water. In other words, before the explosion the vessel contained *free* oxygen and hydrogen, but after the explosion it contained *combined* oxygen and hydrogen.

Take another example. The atmosphere is largely made up of the gases oxygen and nitrogen, but they are not combined, and though they are mixed, they still exist as two distinct gases. The atmosphere, therefore, is largely made up of *free* oxygen and nitrogen. Now, hydrogen might be mixed with oxygen and nitrogen, and under ordinary conditions, no change would occur, but there would simply be a mixture of three distinct gases, each possessing its own peculiar properties. But, under certain conditions, these three gases do combine and