The top dressing of impoverished meadows early in the season has also been found a profitable practice.

These then constitute some of the more important features respecting manure in our propaganda.

CLOVER, ALFALFA AND THE LEGUMES GENERALLY.

Though the fact that the growth of clover increased the yields of succeeding crops has been known since the days of the Ancients, the explanation of the fact awaited the discovery of Hellriegel and Wilfarth in 1886. These scientists showed that the leguminosae have the power to appropriate the free nitrogen of the air that is in the interstices of the soil, through the activity of certain bacteria that reside in nodules or tubercles on their roots. Their presence is an example of useful symbiosis. These bacteria pass on the elaborated nitrogen to their host for the development of root and stem and leaf. The immense value of a leguminous crop in the rotation must be at once obvious. The legumes alone of all our crops, leave the soil richer rather than poorer for their growth. Even when the crops are cut and used as fodder—and very rich fodder they make by reason of their high nitrogen content—the soil will be richer for their growth, because of the nitrogen in their root system. Experiments have shown that by the growth and turning under of clover, alfalfa and other legumes from 50 to 150 lbs. of nitrogen can be added to the soil per acre. And this enrichment is not in nitrogen only; it is in humus-forming material and in the mineral plant food therein held and which is set free for crop use as the organic matter further decomposes. Alfalfa with its heavy and deep root system stands first among the legumes in this nitrogen appropriation; red clover comes next. The manurial value of these leguminous crops is easily observable for three or four years, that is, throughout the whole rotation and, at a conservative estimate may be said to be equal to that of an application of five to ten tons of farm manure per acre. This fact has been established by repeated experiments. All grain crops in the rotation should be sown with clover or a mixture of grass seed with clover or alfalfa, for this method not only furnishes an abundant yield in the following season of highly nutritious fodder but manures and improves the land in a way and at a cost not possible by any other means.

It sometimes happens that the soil does not possess the nitrogen-fixing bacteria. In such cases, made known by the absence of nodules on the roots of the crop, inoculation must be resorted to. This is more especially necessary with alfalfa. Cultures for this inoculation may be obtained from the botanical laboratories of the Experimental Farm, or