

MANURIAL VALUE OF CLOVER.

Looking to the question of increasing the fertility of the soil, it is important that we understand the manurial value of clover. I do not know of any institution that has done the same amount of work in the laboratory and in the field with the legumes as the Experimental Farms, and all our work has been eminently satisfactory. Farmers must be made aware of the unique property of the legumes in that they are able to appropriate the atmospheric nitrogen. This they are not able to do of themselves but, through the agency of certain bacteria that live in tubercles on their roots. We have been able to show that in this way the legumes may furnish and add to the soil, when turned under, from 50 to 150 pounds of nitrogen per acre. This nitrogen is taken from the atmosphere and it is a most valuable addition to the store of plant food in the soil, vastly increasing its productiveness. Even when the crops of alfalfa are cut and used for fodder still the soils will be richer in nitrogen from growing these crops, because of the nitrogen in the root system which is left in the soil, and the larger the root system the larger the manurial value of the soil. Of all farm crops these leguminous crops alone enrich rather than impoverish the soil. All other crops leave the soil poorer in nitrogen. Some soils are without these nitrogen-fixing bacteria, and in these cases we must adopt the practice of inoculating the soil with cultures of these bacteria, which are necessary to the growth of alfalfa or clover or other leguminous crop. Soil from a field growing clover or alfalfa is an excellent inoculating medium and can be used instead of a culture. We have found, however, that in certain cases that failure in the growth of clover or alfalfa has not been due so much to the absence of the nitrogen-fixing bacteria in the soil as to the unfavourable conditions of the soil; that is to say, for instance, it has been acid instead of alkaline. In such cases the application of lime or ground limestone has given beneficial results. We have been able to show during the past ten or twenty years that we can enrich the soil to a very large extent not only in nitrogen but in humus by the growing of a legume crop systematically in the rotation. If a comparison can be made (the comparison may not be strictly accurate, very few comparisons are), we think that the growth of clover in a rotation is practically equal to a good dressing of manure of say ten tons per acre of ordinary farmyard manure. I do not wish to be considered as laying that down as a definite and absolute fact, but nevertheless by the introduction of a rotation which includes clover or other legumes in districts in which legumes can be grown luxuriously, we find there is invariably a marked increase in the fertility of the soil; and we have repeatedly found an increase in crop yield therefrom equal to that which can be obtained by the use of 5 to 10 tons of barnyard manure per acre.

FERTILIZERS.

There are many inquiries in regard to fertilizers, their value and function. In Canada up to the present time our knowledge respecting the value of fertilizers is largely fragmentary—incomplete, if we may so term it. The whole subject is comparatively new in Canada. We have not had the length of time to ascertain what their values may be, in any absolute sense, nor have we had the number of acres on various types of soils, with different crops, under experiment with fertilizers to afford the necessary data to arrive at final conclusions. Consequently our deductions in this matter are to be regarded as tentative and provisional. Years of careful, systematic experimentation are necessary before we can hope to speak with authority on the subject. However, we are preparing for it, and we now have experiments going on with fertilizers in widely distant points in the Dominion. These experiments are being conducted, in so far as we are able to make them, in a scientific and rational way. There have been experiments in Canada in the use of fertilizers which have been irregular and unsatisfactory. From these it is impossible to say in many instances what profit, if any profit, has resulted from their use.