

large amounts of the mineral constituents, potash, phosphoric acid, and lime. These being present in sufficient quantities, the clover plant, with the aid of the germs I have referred to, will obtain its own nitrogen. This points to the economy where the soil is poor in these elements, of supplying a certain amount of them, either as wood-ashes—our own special product, and one that we are parting with to farmers in the United States at a price much below their true value—or some form of German potash salts supplemented by superphosphate or basic slag, to encourage the growth of clover.

In conclusion, I propose to present some of our field results, showing the beneficial effects upon grain and other crops by this system of manuring by clover. They are of an exceedingly striking character and furnish ample corroboration of the claims I have made for the clover crop as a means for increasing the soil's productiveness. These field experiments, I should add, were conducted by Dr. Saunders, Director of the Experimental Farms.

Grain after clover.

In 1897, 8 plots were sown with grain, 4 with the addition of clover seed at the rate of 10 lbs. to the acre, 4 without the addition of clover. In October of the same year the crop of clover was turned under, the adjoining "no clover" plots being ploughed at the same time. The grains sown on these plots were: Preston wheat, Banner oats, Bolton barley, and Odessa barley. This land without any application of manure was sown in 1898 with Banner oats. Regarding the appearance of the growing crops on these plots, Dr. Saunders speaks as follows:—"The difference in the growth of the grain on these plots was very noticeable, and as the season advanced, especially just before the heads appeared, the difference in height and vigour of growth in favour of the plots where the clover had been grown was very remarkable. So clearly was this manifest that the difference could be distinctly seen at a considerable distance, and the outline of those plots on which no clover had been sown could be readily traced by the manifestly shorter and less vigorous growth. After the grain was fully headed, the difference in appearance was not so clearly seen at a distance, but by careful examination it could be easily traced." The plots were cut and threshed separately, and weighings made of the grain and straw from each plot obtained. The results showed an

average increase in the yield of grain from the four clover plots of more than 11 bushels per acre over that on the plots on which there had been no clover sown.

To ascertain what manurial value there might be from the clover the second year after ploughing under, these same plots, without the addition of any manure or fertilizer, were sown in 1899 with Mensury barley. Again a great difference on the plots that had been grown with clover in 1897 was noticed, and the harvesting results showed that the average yield on the four clover plots over that of the four "no clover" plots amounted to almost 9 bushels per acre.

The weight of grain and straw harvested from these plots in 1898 and 1899 are given in the subjoined table:

Another experiment in which equally striking and important results were obtained may be described as follows:—In 1897 two plots adjoining each other and uniform as regards size and character of soil, were selected: No. 1. was sown with barley and a grass mixture containing clover seed: No. 2. was similarly sown, with the exception that there was no clover seed in the grass mixture. In the spring of 1899 they were ploughed under and sown with Bavarian oats. The yield per acre on No. 1. was 46 bushels 4 lbs: that on No. 2. 36 bush. 6 lbs. on increase of 9 bushels 22 lbs. of grain to the acre on the plot which had grown clover over that on the plot sown with grass seed only. This increase was practically due to the fertilizing constituents set free by the decay of the clover roots only, for in 1898 two crops of hay had been taken off. (1)

Indian Corn after Clover.

In 1897 a number of plots were sown with grain and clover, check plots being left throughout the series upon which grain only was grown. The clover was allowed to remain through the winter, and on May 23rd, 1898. (at which date there was a heavy mat of growth) ploughed under. It was planted with Indian corn. The yields in detail are to be found in the Report of the Experimental Farms for 1898. I will now merely state that the average yield from three plots that had previously grown clover was 16 tons 240 lbs. of fodder corn, while that from the plots on which there had been no clover was 13 tons 380 lbs.

(1) Very striking. Ed.