Selecting the Seed.

The importance of selecting the proper varieties of seed grains has been fully treated in our two previous issues, and we will here only draw attention to the importance of obtaining these varieties free from injurious admixtures.

One of the most fruitful causes of weeds on a farm is that their seeds are sown together with the grain, and the greatest precaution is therefore necessary to sow only clean seeds. A sample of all the seed sown should be carefully examined by spreading it out on a piece of clean paper, and carefully comparing the form and color of all the grains. By this plan, any foreign seeds may be easily detected. If possible, the sample should be taken from the bottom of the bag or bin containing the seed, for the smaller foreign seeds are generally found there in the greatest number.

Another thing to be avoided is the sowing of seeds infested with injurious insects. Some of these, such as the "flaxseed" stage of the Hessian fly, sometimes seen in wheat, may be seen when examining the sample for foreign seeds. But others, especially if only the eggs are present, can not be detected by any simple plan of examination. The precaution should therefore be taken not to sow seeds grown in localities or fields visited by insect plagues the previous season.

By taking a little precaution in this matter, much loss and labor may be avoided.

Clover Sickness.

(Concluded.)

The analysis of the soil of these two plots shows that the land which had been highly manured contains far more organic matter and nitrogren than the other plot, while at the same time it contains very much less of these substances than the garden soil. The evidence points to a destruction of the clover plant by living organisms in the soil, a large increase in this life having been encouraged by the liberal supply of organic and nitrogenous matter. This does not, however, explain—supposing we had taken another leguminous crop, say beans, at the end of the fourth and the eighth year, followed by red clover in the twelfth year—why the crop would, in all probability, escape the attack of the living agencies, and be free from disease. It is at this point that the difficulty of finding a satisfactory solution is the greatest, and it can only be met by assuming that the clover plant requires, as part of its food, a special organic compound.

It must be understood that on our experimental land, whether 4, 8, or 12 years elapse before the clover is repeated, the same operations are completed every fourth year. Instead of one application of rape cake and ammonia, there will be two or three, two or three crops of roots will be plowed in, and more corn crops will be grown. The only distinction that I know of will be that the earlier applications of manure will have gone through longer periods of decay, and have formed compounds of which we know little or nothing. These compounds, however, when we arrive at further knowledge upon the subject, may explain much which is obscure at the present time. That such compounds are formed we have very strong evidence in another field, where we endeavored to grow beans for a long series of years upon unmanured land. The crop became very small, the growth being only a few inches high. Analysis of the soil showed that it had lost a large amount of organic nitrogen, and it was very poor in nitric acid. The experiment was therefore given up, and the field was sown with barley and clover. The barley was by no means a fine crop, but the clover was magnificent, and the color of the leaf remarkable for the beauty of its green.

I have selected this experiment out of a number of others where the clover was even more luxuriant, as in all the others manure of some description was used. Here we have the fact of a soil which became poorer in organic matter, nitrogen, phosphates, and potash, ceasing to furnish food for one leguminous plant, while it was accumulating food suitable for another plant of the same natural order. The soil of the garden where the clover has been grown for so long without disease differs in two remarkable respects from the soil of the highly manured rotation land, where disease occurred when the crop was repeated after an interval of four years. On the garden soil the accumulations from former manures were very large, and there was no fresh organic or nitrogenous manure to feed living bodies. It is quite possible that when organic matter has reached a certain stage of decay it may cease to be a food for much of the larger sorts of organic life in the soil, such as worms, &c.

Salts of ammonia appear always to have an unfavorable influence upon clover and to encourage disease. As far back as 1860 we published a map of a field, one-half of which had received salts of ammonia in addition to the various other manures applied, and it was quite evident, from the size of the various blank spots, that the disease was, in some direct way, encouraged by the application of ammonia. In a field which had received no dung or organic matter for a number of years, and had been growing barley manured with nitrate of soda and superphosphate of lime, with occasional crops of red clover, disease almost cleared off the plant when repeated after four years; but after eight years the crop was not attacked except where it joined the diseased portion, and it was evident that whatever was the cause of the disease, though it had passed over the border, it did not extend its ravages beyond a few feet. There are a few conclusions which may be drawn from these experiments:—

1. That clover disease does not occur even when the crop is grown continuously, provided that the soil contains in abundance the appropriate food of the plant.

2. That clover disease occurs in highly manured soils if the crop is repeated too frequently, and sufficient time is not allowed for the formation of the appropriate food of the clover.

3. That the fertility of a soil may be largely reduced by cropping and absence of manures, while at the same time the food specially required by the clover may be increasing in the soil. The crops grown during the process of exhaustion may be partly, or wholly, plants of the same natural order as the clover, provided that they differ from the clover in certain properties of their growth and the range of their roots.

4. That although clover does not appear to possess the same power of appropriating the mineral food of the soil as the cereal crops (for which reason mineral manures are often advantageously applied to this crop), still mineral manures cannot be depended upon to grow clover on clover sick land.

5. That all the evidence points to the soil as the chief source of the mineral and nitrogenous food of the clover; and if it should be ultimately proved that the nitrogen of the atmosphere played any important part in furnishing the nitrogen taken up by the plant, it is more probable that the nitrogen enters into combination with some ingredients of the soil than that it is directly assimilated by the plant itself.

Beet-Root Sugar in Quebec.

BY WILLIAM SCRIMGEOUR.

I have been asked to explain why this industry was not a success in the Province of Quebec. In order to do this briefly I will deal with the question in a general manner.

Some years ago this industry was brought prominently into public notice by a few local politicians and representatives of French capitalists, who went to work very energetically, getting the Quebec Government to promise a subsidy, and the Federal Government to concede the customs duties on the machinery imported, subject to the industry being carried on for a certain length of time. The interest taken in the affair was so great that no less than three companies were formed, and factories were erected at Coaticooke, Berthier and Farnham, costing altogether over five hundred thousand dollars ($500,000). The Quebec Government then offered a bonus of $10,000 to the company that first had sugar on the market, and every effort was made by each of the companies to secure the prize.

More time than was expected was spent in building and equipping the factories, and the first crop of beets grown had to be left in the farmers' hands.

This was a severe blow to the new industry, for compensation had to be made to the farmers, and a whole season's business was lost. Nor was this all, for the expenses consisting of salaries to directors, managers, chemists and skilled mechanics, besides interest on capital and incidentals, were running on all the time, and before another season came round they were obliged to mortgage their plant. This caused the public to lose all confidence in the undertaking, which now rapidly declined in its estimation. Many farmers would not deliver the second crop of beets until they were paid for, thus causing more trouble and delay in starting—so much so, that two of the factories had to give up without having worked one season. The other, at Farnham, which obtained the bonus of $10,000, was better managed, and in better credit, and continued to run for two seasons, making a very good quality of sugar. But there was no prospect of getting a sufficient supply of beets to make the industry profitable, and it too was discontinued.

Now as regards the beets themselves, owing to the delay in opening the factories, the first year's supply remained so long in the ground that they were in some cases touched by the frost, and this caused an impression to get abroad that they could not be successfully grown here. Although proved afterwards to be quite erroneous, this, nevertheless, had a retarding effect on the industry. Again, the factories were situated in the districts where the cultivation of roots is almost unknown, and mostly among a people who are proverbially conservative in their habits, and who do not take kindly to innovations. The only farmers who showed the least aptitude for