

is an almost unlimited supply of nitrogen in the atmosphere and man has been given the means of gathering this and incorporating it in the land. As a result the amount of this element in the soil, more than any other plant food constituent, is within the control of the farmer. Moreover, the addition of organic matter to a soil has a very much wider bearing than the simple addition of nitrogen; for in its decay the vegetable acids and the carbon dioxide formed tend to bring the insoluble potash and phosphoric acid into available form. Humus, which has such a wonderful effect on the mechanical condition of the soil, and which so increases its water-holding capacity, is also a product of the decay of organic matter. In fact, the presence of an abundance of decaying organic matter is practically indispensable. It is the source of nitrogen; the acids liberated in its decay make available the important ash materials which would otherwise be useless; it warms the soil; increases its capacity to hold water needed to dissolve the plant food; and improves its physical condition. Without the presence of organic matter and the associated germ life and the proper conditions for their action, a soil cannot produce its best results, no matter how rich it may be in all the essential constituents of plant growth. In one sense it may be correct to speak of a soil as a reservoir of plant food, to be drawn on for the growth of successive crops, but it is equally correct to regard it as a busy, complex manufacturing establishment in which all the various parts must work together under proper conditions to bring the store of plant food into a form available for plants. To bring this about is the object of cultivation.

But these combined agencies, while beneficial, are destructive unless means are taken to prevent loss by drainage. They tend to bring nitrogen, lime, magnesia, potash, etc., into a soluble form, which, unless taken up by plants, is lost in the drainage water. As proof of this, we have the familiar fact that water taken from underground drains or from wells is "hard" because of the lime which it holds in solution. Consequently, a surface soil is generally poorer in lime, and frequently in potash, than the subsoil. The complete impoverishment of the soil is prevented by the presence of certain constituents which combine chemically with the liberated plant food substances, and by the conservative action of vegetation. The plant is continually collecting from the soil and subsoil dissolved or easily soluble matter, storing these in its tissues, and at its death leaving them in the surface soil. But even with the best of management there is some plant food leached from the soil.

However, according to a well-known law, Nature allows nothing to be lost, and these leached out materials are through various agencies at least partially made to accumulate in great beds of limestone, phosphatic rock and potash salts. It is these accumulations of past ages that are to-day furnishing the main constituents of fertilizers. Who knows but what the plant food which is being annually leached from our fields will come into use in future ages.

But the leaching away of plant food is not the only way in which these materials are lost from the soil. The vegetable and animal produce of the land are frequently consumed off the land which reared them. A partial return of the plant food thus taken from the soil is made by the application of farm-yard manures, but the sale of vegetables, fruit, grain, animals, and animal products, the congregating of men in towns and cities, and the difficulty in employing sewage with profit, and the loss of fertilizing constituents from farm-yard manure before it is applied to the land, all tend to make the return of the manurial constituents to the soil incomplete.

Some soils are naturally so rich in the elements of plant food that when the crops are properly rotated and "catch" crops used to economize this natural wealth of fertilizing constituents, it may be a long time before the soil needs special manures; but, if the land be naturally poor, or injudiciously cultivated, or if special crops of like nature have to be grown year after year on the same ground, it may soon need some extra manure.

On naturally poor soils it may be necessary to make a complete return of all the elements of plant food removed by crops; but in most soils there is an abundance of some one or more of these elements, and a partial manuring will consequently suffice. With intensive farming, where thorough cultivation is practised, a good system of rotation followed, where little grain is sold and some

food is purchased in its place, and every care taken of the manure, the land may even gain in fertility. These, however, are not the conditions which exist with the gardener and fruit grower, and they must of necessity purchase manure of some kind.

R. HARCOURT.

Market Conveniences for Coarse Grains none too Satisfactory.

The complaints of farmers regarding the oat market and shipping facilities have been ventilated in these columns from time to time, and objections made, particularly at the grain growers' conventions to the inequality of the freight charges for oats as compared with wheat. This is a matter not hard to remedy, and such is in the power of the railroad companies. They also have it in their hands to foster the growing of another cereal, barley, so valuable to our stock growers, especially the bacon raisers, and an equally useful crop in the farm rotation, especially in the light of an aid to weed suppression. There is a considerable demand for barley for malting purposes at Winnipeg, but the grain needs to be thoroughly sampled by experts to determine its fitness for the purpose. Too close threshing, thus removing the germ, and exposure to the weather, lower the value of the malt producing cereal very materially.

Forty-three cents per bushel has been paid at Winnipeg for barley, but the trade in at a standstill unless Winnipeg is made an order point and sample market for barley. Generally the cars are billed through to Fort William. The Canada Malting Co. established a plant at Winnipeg two years ago and the development of the trade since that date has been marked, but further progress will be hindered unless buyers are given more time to select the cars they need at Winnipeg. This is a matter the grain growers can well afford to push through their executives.

The Wild Oat Plague

A correspondent asks us if it be only advisable to sow barley in place of summer fallowing to kill oats when it is desired to get a crop; and to outline the most effective method we know of to kill wild oats.

If a man has wild oats on his farm there are a lot of things to consider in adopting some scheme to get rid of them, and it is not probable that the plan that would be most likely to kill most would be feasible of operation on the whole farm. If the area infected did not amount to more than could be followed well we would advise fallowing and follow with a crop of barley, after which give a disking or light fall plowing, and surface cultivation the following spring again; but if it were not practicable to fallow all the infected area, or if it were considered too expensive to fallow, then a crop of barley could be grown with the probability of setting back the weeds. First, if the land has not been fall plowed, work very shallow early in the spring to get the oats started to grow; then, after wheat seeding plow and sow to barley. The barley being a faster growing crop than oats should ripen before the latter have had time to seed, and if any should have ripened and fallen to the ground a disking would start them growing and they can be killed before next crop is sown. If the land has been fall plowed, surface cultivation with the object of killing wild oats as they germinate should be practised in the spring.

Of course a person cannot expect to rid a field of wild oats by either of these methods in a year or two, for the reason that in a dry season not all the seeds will germinate, and in a wet season turning over the ground often means simply transplanting. Wild oats also are frequently buried too deeply to germinate and are not an infection until they are brought to the surface again by the plow or by frost or by some other agency. In killing wild oats try to keep the seeds that fall from the heads near the surface, and treat the land so as to get them to germinate between crops. Never try to plow them so deep as to put them beyond the seed bed of the soil, as this cannot be done, nor can they be killed by seeding to grass, unless grass grain and hoed crops alternate frequently. Become familiar with the nature of the weed and then try to set it back when it is least able to stand a check.

Iowa railroad rates on live stock have been lowered fifteen to eighteen per cent, by order of the Iowa Railroad Commission, after hearing the representatives of the Corn Belt Meat Producers.

Bluestoning Wheat.

The time for this operation is fast approaching, and it may be useful to some to know how it has been done in the Old Country for half a century. About that time I began the operation for my father (in England); he had confidence in me that I would obey his instructions to the letter; he was very particular. Now for my experience. At that time we put one pound of bluestone to four bus. wheat, and the wheat had it all, as you will see later.

Before we changed this proportion, I knew my father to grow fifty-six bushels to the acre on a thirty-six acre patch of beautiful white wheat. You see by this the strong dressing did not hurt wheat. Some years later we found out that a practical farmer only put one pound to eight bushels with success. Then we took the happy medium and put one pound to six bushels and so I have continued up to now—as father used to say, "Don't spoil a ship for a cent's worth of tar."

We put the bluestone on as follows: Put twenty-four bushels in the middle of a floor, about eight or ten inches deep. Dissolve four pounds of bluestone in hot water. When dissolved, which it will soon do if stirred, add sufficient cold water to make up one quart to each bushel wheat. You want two people to do it well and quickly with a shovel each. Dribble it over wheat quickly. Heap it up to a point; pop the broom round quickly. Quickly turn it, one on each side; begin the heap you are making close to, and keep it to a point all through, as the running down from point mixes it well. I always turn three times; some only once. I think if a thing wants doing it wants doing well, and if it wants doing well I would do it a little better. This done you may bag it up in two hours and it won't soil the bags. The wheat has practically all the bluestone it is intended to have. Do this at night and it will be ready to seed in the morning. We always did it at night for the morning's seeding. So much for English custom.

You may dip your bags of wheat in weak bluestoned water a week if you like, it can't take up but a certain quantity. If the solution is weak what the wheat takes up is weak. Done in the Old Country way the wheat has all it is intended to have. If done in my way I should back myself and son to do 500 bushels in a day, and you may put it in a heap and it would not hurt as bluestone would soon dry it. Smut should be little known if treated as I have stated. You may see field after field and not be able to find it.

Holland, Man.

JOHN C. WALKER

Corn in the Sub-Arid Country.

EDITOR FARMER'S ADVOCATE:

I want the ADVOCATE to take the top notch. I want to do you good. I have just read the article on corn and compared it with E. R. Parson's suggestions on corn for a sub-arid district. That preparation of the soil for corn won't do here. I will explain. I planted my corn last year after the old Ontario fashion, three inches deep with a corn planter, but found that on putting two and three ears to a hill my corn would fall over. You must remember corn has not so many brace roots as in more humid countries. Likewise in the fall we have hot dry winds. The soil of the sub-arid belt has a sandy top three inches or more in thickness. When hot, dry winds come that soil gets lifted away from the brace roots and over it goes. Potatoes also root differently in a sub-arid district to a humid one. The roots run along the top of the subsoil, pretty well over to the next row. The moisture rises by capillary attraction to the top of the subsoil in under the dust mulch. I have found it there on a hot day just the same as it has poured from my face when binding sheaves after a reaper.

I will give you E. R. Parson's way, the one I have decided to go by. He plows in the spring with three of the heaviest horses and a ten-inch walking plow. He gets down from eight to ten inches, harrowing right behind the plow. As soon as the land is plowed and harrowed the rows are marked out by plowing furrows six inches deep. A narrow listing plow is the one to use for this. Then the corn is dropped a grain at a time two feet apart. As soon as twelve or fifteen rows are planted the horses are changed over to the harrows and the rows partly covered by harrowing. This is repeated until the field is finished. One grain to a hill is the only way to raise a crop of corn. Prof. Shepherd in the *Dakota Farmer* says six