

land overturned after the hay has been cut. Such fallows are only plowed once. They are then worked on the surface. Sometimes they are sown with winter wheat, and sometimes the land remains bare until spring. The obstacles in the way are, in some instances, the stiffness of the soil, and, in others, the busy season at which the work would have to be done.

The practice of allowing the land to remain bare all the summer is wasteful of fertility, and it is seriously so in wet summers. When rains wash down through the soil, they wash out fertility in the form of nitrates to a much greater extent than if crops were growing upon the land. If the fallow is bare during the whole of one of those seasons, and if manure has been applied to it early in the spring or summer, there will be a serious loss of fertility, and the lighter the soil the greater will be the loss.

But it would be much better to have the bare fallow and the loss of a crop than to have a dirty farm. A dirty farm is an undesirable possession. Of the two evils, if one must be chosen, take the bare fallow.

The Dwarf Essex Rape.

This plant is growing more and more in favor all the while. At one time its growth was confined to two or three counties in Ontario; now it is being grown in many counties of this province. It is rapidly coming into favor in the Province of Quebec. It is also being favorably tried in the Maritime Provinces. Some of the farmers in Manitoba grow a large acreage from year to year, and it is now grown to some extent in the territories. Much of the attention that is now being given to rape is doubtless the outcome of experiments conducted by the experiment station at Guelph, while Professor Shaw had the management of the farm.

This plant, as is now known to many, furnishes an excellent forage plant for sheep. It also furnishes fine food for cattle and swine as well, but it is, *par excellence*, a sheep food. The stockmasters of this country can ill afford to do without more or less of it to furnish autumn pastures. But on some soils, as hard clays, for instance, it may not be prudent to attempt to grow it. On these soils, clover may, to some extent, be made to answer the uses of rape. The rape crop, as is now generally known, is usually eaten off in the field, but it furnishes an excellent soiling food for animals of all classes that have to be kept more or less confined, and when fed thus to milch cows, after the time of milking, the results are very beneficial.

The Dwarf Essex rape may be grown in many different ways. It may be grown along with spring grain. When thus grown some seed may be put in along with the crop, say, about one pound of seed to an acre of land. The results from this method of sowing will vary much with the season. If the season is good, that is, if it is growthy, the rape will furnish considerable pasture after the crop of grain has been harvested. If the season is adverse, the benefit will be very slight, but the loss of seed in that case is not a very serious matter.

Sometimes the rape is sown broadcast, about the end of June, on land well prepared and in a good condition as to productiveness. From three to five pounds of seed are used per acre. This mode of sowing is coming into favor in Manitoba on fallow lands to be sown with wheat the next year. Rape should not be sown thus on poor land, for the growth will in

such instances be inadequate to the labor bestowed.

One of the best methods of sowing rape is to put it in rows on raised drills, about two feet apart, and to cultivate it much after the same fashion as a crop of turnips. It may then be sown about the end of June, and the cultivation may be made eminently helpful in cleaning the land. The cultivation is also very favorable to the growth of the rape. This mode of growing rape is one of the most satisfactory, and it may be practised where rye has been grown and pastured off. Thus two crops may be grown upon the land in a year. From one to two pounds of seed per acre is required.

Rape may also be grown after the harvesting of an early grain crop. It may be made to follow winter rye, winter wheat, barley, or, indeed, any crop that is cut early. If the season is a wet one, a large amount of food may be thus grown. It may also be grown amid standing corn. It may be sown before the last cultivation given to the corn, and, after the crop has been harvested, it may furnish much food.

Rape, of course, is only one of the fodder plants that should claim our attention. There are others of much importance. But rape is certainly a valuable plant for those who are interested in sheep husbandry. It has been a stand-by for autumn pastures for many years past with some of the best stockmasters in Ontario—practical men, whenever put in much time in trying to grow a crop which will not pay them.

Try a little. The seed is not dear. If you try nothing more than a small patch not far distant for soiling, try that much, and convince yourself of its value. The fever of rape growing is rapidly extending in the United States. Many of the New York State stockmasters now grow it as regularly as the season comes around, and the same is true of some stockmasters in Michigan.

The Value of Marls.

Sometimes the question is asked as to the value of marls in agriculture. That they are oftentimes of real value has been demonstrated over and over again. And yet in many instances their use has proved disappointing. This is just what we should look for when we know something of their value, and of the way in which they should be applied.

The chief items of manurial value in marls are phosphoric acid, potash, and lime. The relative quantities of these which they contain vary much, and the condition also in which these constituents are found varies. It is apparent, therefore, that for these reasons the results from the application of marls will vary greatly. And they vary because of other influences which will be given below.

The phosphoric acid is oftentimes found in combination with iron and alumina. This is less available than that found in superphosphates. Hence, though we know the relative amount of it in the marl, we should be careful not to put too high a valuation on it. The potash in marls is oftentimes not more available than that found in good soils. Much of it, therefore, is in a form that is inaccessible to plants; it may be for years to come. The lime is usually as good as lime obtained from other sources; but, oftentimes, it is no better. A large proportion of the plant food in marl is, therefore, not available for some time after it has been applied. Because of this the farmer oftentimes gets more benefit from the

application of marl than he is aware of, or than he is disposed to give it credit for.

But, in addition to the plant food which marl brings to land, it exerts a favorable influence on the physical properties of the soil, and it aids it mechanically. These influences, too, are sometimes more beneficial than the direct influences from the plant food in the marl. When it is applied to stiff soils it tends to improve their physical texture. When applied on lands containing an excess of organic matter the lime in the marl aids in reducing the same. And it improves soils in other ways.

It is evident, therefore, that the effect of marl upon soils, physically and mechanically, will vary much with the character of the soil, as well as with the character of the marl. When soils are nearly tight in texture they may receive but little help from the application of marl, either physically or mechanically. On the other hand, when the physical or mechanical condition is very faulty, they may be greatly benefited.

The wisdom of applying marl to land will depend very much upon the distance from which it has to be drawn, and the opportunity for drawing it. If the farmer can apply it without drawing it far, it may be eminently wise for him to do so, and more especially at those seasons of the year when he is not over busy. A time may come, in the autumn, when both men and teams may draw marl, and to very good advantage, when they would not be otherwise so profitably employed.

Because of the inert condition in which much of the plant food in marl is found, it is a good plan to get it strewn over the surface of the ground in the autumn. The influences of sun, rain, frost, and snow act upon it, and, in consequence, more of it is available than would otherwise be by the time the plants come to be sown, where the marl has been applied. And when it has thus been applied, and it is incorporated in the surface soil by the harrow, the mechanical influence on the texture of the same is usually very favorable.

In some counties in Ontario there are immense beds of marl. These may be of great service where the adjacent lands need such applications. But it is very doubtful if it will pay to transport marl to any great distance, or to go to any considerable expense in carrying it. Sometimes it is found outcropping on the surface of the soil, and is, therefore, easily accessible. At other times it is down in deep beds. In some instances it is found in a dry and almost pulverized state, and at other times it is found with much water in proximity to it. As agriculture progresses, and the necessity becomes more and more felt for the application of fertilizers, marl will receive more attention than it gets at the present time.

Thorough Cultivation.

In Ontario, and, in fact, in all the provinces to the eastward, thorough and careful cultivation is of prime importance; and the heavier the soil the more careful does the cultivation require to be. In the soils to the west, that is, in the prairie soils, deep cultivation is not nearly so important relatively, although it may be well to have these plowed deeply now and then.

The following are among the advantages that result from the careful preparation of a good seed bed: (1) The seed can easily be deposited to a good depth. (2) The ground presses more closely around the seed, and a quicker germination will result. (3) The

roots of the plants penetrate the soil more easily, and, in consequence, they gather food more readily. (4) The soil retains more moisture.

The seed can be planted more deeply. This is a question of no little importance, especially with some kinds of grains, as peas. In some parts of the province the clay is stiff, so much so that when plowed in the fall it hardens in certain seasons. When heavy rains fall on it they impact it in the winter and early spring. To use the farmer's term, it "runs together." When sowing time comes it is very hard, and in the hurry and rush of work at the time the farmer is tempted sometimes to sow without having expended sufficient labor in preparing the seed bed. He, as it were, skims over the work, in the hope that the season may prove propitious, and that, as a result, he may still hope for a fair crop. But why run any risk? The season may prove just the reverse, and then the crop will be an utter failure. Its roots cannot penetrate the hard soil below. It is, of course, different on the prairie. The soil there is spongy, and if stirred too deeply in the spring it will lie too loose, and will suffer through surface evaporation, or it may blow away.

The germination will be quicker. When seed is put in the soil the particles of earth must lie close to it, if it is to germinate quickly. If they do not, light and air will be too easily accessible, and will, in consequence, retard the growth of the young plant. If the ground is left cloddy it will dry out readily through surface evaporation, and it will very readily admit of the escape of ground moisture. But in Manitoba soils, for instance, the question of fine pulverization would scarcely need to be raised. There it would be a question rather of keeping the land firm than of making it loose. And even in Ontario we may sometimes find the soil so fine and porous near the surface that but little attention needs to be given to the preparation of a seed bed. In some seasons one harrowing over the surface will leave the ground in a better condition than half a dozen harrowings would under different conditions of weather.

The roots of the plants will, of course, penetrate the soil more easily where the ground is friable. In crop growing this question is one of much importance. It is a grand thing to have the grain get a good start. When tender rootlets come against clods as they push out into the soil, they are turned aside in their course, and in this way time is lost; and when they cannot push out roots readily in all directions, they, of course, cannot grow nearly so vigorously. To note how rapidly the rootlets of young plants push through a congenial soil, one has only to dig up a few plants and examine them. Before a blade of corn, for instance, reaches the surface of the earth, although it has only to come through about two inches of earth, its roots will have penetrated horizontally through several inches of soil. The more easily the roots of plants can penetrate the soil the further can they push in search of food, and they also multiply their rootlets more quickly, and are, in consequence, better able to gather much food for the sustenance of the plants.

The soil also retains more moisture. When the soil is only stirred a short distance from the surface, and heavy rains fall, they run away over the surface. The water cannot penetrate into the subsoil. And when the subsoil is hard, capillarity is hindered; hence less moisture comes up from below. And when the surface is rough and cloddy, as