carefully used. They are always too costly to throw away. They are too valuable to be allowed to percolate through the earth and pass on in our rivers until they reach the sea. They should only be used when wanted, and they should always be applied with intelligence; that is to say, they should always be applied at the right time, in the right way, and on the right crops.

Mangels or Sugar Beets.

There can be no doubt but that mangels can be much more easily grown than sugar beets, but that of itself does not by any means prove that sugar beets should not be grown for live stock. Mangels are more easily grown, since they push on more quickly when young, and, therefore, give opportunity for sooner cleaning out weeds, both between the rows and also in the line of the row. They also want to be thinned to a greater distance between the plants in the line of the row, and in consequence the work can be more quickly done. When the season comes for taking up the plants, moreover, the mangels are more easily taken up than the beets, they are more quickly topped, and the roots do not require so much trimming.

And yet it may be the proper thing sometimes to grow sugar beets. When we say this, we do not refer to sugar beets of the varieties grown for making sugar, nor to growing them exactly on the same lines, but to beets that will render good service in feeding live stock. Of course, beets grown for sugar-making will render such service, but it is more trouble to grow them for sugar-making uses than as a food for live stock. But for some uses in feeding, without any doubt, sugar beets are a better food for live stock, under certain conditions, than mangels. They are undoubtedly better, pound for pound, for fattening uses than mangels. They, therefore, make a superior food in feeding for beef, for mutton, or for pork. But how much superior does not appear to have been made clear as yet. This is one of the things that we shall expect the experiment stations to tell us. And we trust we may not have very long to wait.

Sugar beets grown for feeding may be grown with much less labor than those grown for sugar-making. In the first place, they are larger. In the second place, in consequence of this, they may be grown further apart. And in the third place, as a further consequence, they are much more easily handled when being harvested. But they require quite a little labor to harvest them, as they grow chiefly under the ground, whereas much of the mangel grows above the ground.

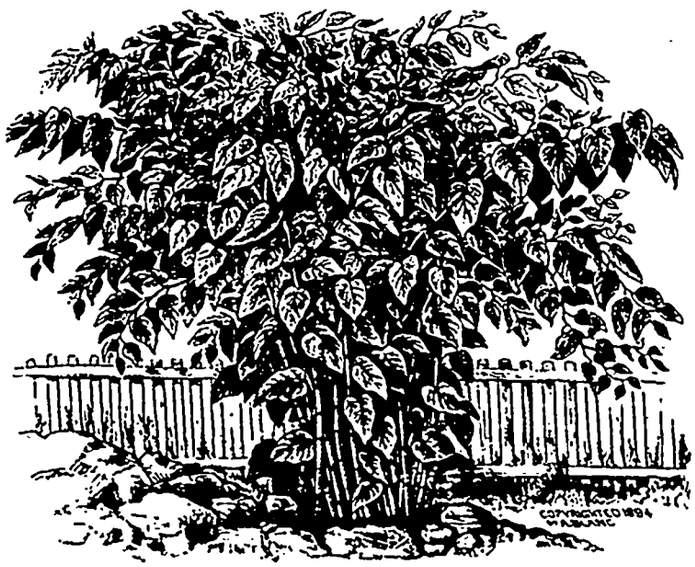
The varieties of mangels will vary with soil conditions. The Globe varieties are best adapted to soils not possessed of very much depth. In other words, they will do better on such soils than the longer varieties. The long varieties should have deep soils. A large proportion of the root grows out of the ground, and in consequence they are very easily taken out of the ground. Some of the intermediate varieties are very good and rich in quality, but they are not as large as the long kinds.

As to the time of planting, there is virtually no difference between mangels and sugar beets. Both should be put in as soon as the ground is ready in the spring in Ontario. But in Manitoba it would be possible to sow the seeds so early that the crop would be cut off by the frost after it had appeared above ground.

As to the time of taking up the plants, there is virtually no difference. Both are tender of *frost, and easily injured by the same; hence* they should be harvested before the frosts get severe. More of the mangel being above ground, it takes injury the more readily of the two. And when the roots are raised they should not be exposed to hard frosts, or they will be so injured that they will not keep.

Mangels and sugar beets may both be fed as soon as they are raised, but they are not in the best condition for being fed then, as the process of ripening goes on with the advance of the season. The feeding value of sugar beets, therefore, is somewhat greater in *the spring than in the autumn, and the same* is true in regard to mangels.

Probably no better way can be adopted by the average farmer than to grow both mangels and sugar beets. The former could be used for feeding in a general way, and the latter when more specific results were wanted. Sugar beets are excellent for young pigs and lambs, and even for fowls. Owing to their fleshing properties, they do not require to be as lavishly fed as mangels, and, therefore, a given amount will go further than an equal amount of the mangels.



THE NEW FODDER PLANT, SACALINE.

The Rotation of Crops.

The rotation of crops is a broad subject. It is a deep subject. It is so broad that it has never yet been fully compassed. It is so deep that it has never yet been sounded. And yet there are principles which appertain to the question that a child can comprehend, and it is greatly important that they shall be observed. The aim in this article will be to refer to some of these principles, and more especially to some of them that may be considered of primary importance.

Whatever the rotation adopted, it is important that the soil be well supplied with vegetable matter. Several advantages will thereby be secured, and more especially in moist climates. First, the vegetable matter is rich in plant food; hence the crops sown can get plant food without difficulty. Second, the vegetable matter in the soil improves its texture. In heavy soils it keeps the particles further apart, and, in consequence, promotes the filtration of water through the soil, and yet it retains more water than could be held by the same if the vegetable matter were not present. In light, leachy soils it has the opposite effect. It binds them together. It will be apparent, therefore, that whether the *soils are light or heavy, vegetable matter in* them promotes the retention of soil moisture. In almost any kind of a season this is an important matter, but in a dry season it is doubly so.

There are various ways of bringing vegetable matter to the soil, but of these two may be singled out as eminently practical. These are, first, to turn under sod of a meadow or pasture, and, second, to apply farmyard manure. The amount of vegetable matter in any sod field where the plants have grown closely is very large. It usually amounts to *many tons per acre. It is well, therefore, to* sow to grass and clover frequently, in order to get an ample supply of vegetable matter to turn under. When manure is applied, it should be in the fresh state where practicable, if it is to retain moisture to the greatest possible extent.

In the rotation it is important that the crops should be changed frequently. If the same kind of crop is grown for years in succession upon the same field, it not only saps the fertility of a certain kind from the same, but gives encouragement to the growth of some particular kind of weeds, such as may be able to ripen in that particular kind of crop. It is greatly important, therefore, that cereal crops should be changed frequently. They should alternate with grasses and clovers in a succession more or less close, and the more frequent the succession the better the crops of grain and of grass that will be secured.

The more frequently cultivated crops are introduced into the rotation, the more satisfactory will the results be. Cultivated crops, as corn or field roots, are cleaning crops, and, if the work is well done, the land is in an excellent condition for the crops that follow, because it is clean, because the soil has been so stirred that the inert plant food in the same is more or less liberated to feed the crop which follows, and because the condition as to pulverization is usually good, though this may not always be so, at least in heavy soils.

In the rotation, grain should always follow cultivated crops the first season, in order that grass seeds may be sown upon the same. The order, then, after cultivated crops, is grass. The grain is only sown that it may act as a nurse crop to the grasses. A carefully cultivated hoed crop, then, means a *clean hay or a clean pasture, and measurably* clean grain crops coming after the grass.

To grow two cultivated crops in succession would be a mistake. It would be an unnecessary tax upon the land. It would be growing a cleaning crop after a cleaning crop, which would be a waste of labor. It would certainly be better practice to grow two fields of corn, for instance, of ten acres each, on different fields, and in successive years, than to grow ten acres in cultivated crops for two years in succession, on the same piece of land. In the first instance, the benefits of *the cleaning process could be conveyed* to twenty acres of grain sown to grass, whereas in the other instance they would only be conveyed to ten acres of the same

It is, too, excellent practice to keep the land at work, more especially in a climate where there is plenty of rainfall. When the ground is bare the rain runs down through the soil, and it carries out much plant food with it. But when the ground is filled with grass roots, or the roots of other crops, these take up the principal portion of the plant food as it works its way down through the *soil.* In any case much attention should be given to the rotation. Where a judicious rotation is not adopted, the soil of a country, howsoever fertile, soon gives way. On the other hand, where a judicious rotation is adopted, it may be worked down to the end of the world.

The New Fodder Plant, Sacaline.

Some of our readers have written enquiring what the new fodder plant, sacaline (a description of which we gave in our January number), is like. In response, we give an illustration of a hill of it growing. If any of our readers are thinking of trying it, they should experiment with it on a small scale first, to see if it will grow properly in this country, and also to see how far it deserves the high encomiums given to it. If it possesses only half the good qualities that have been ascribed to it, it should prove a very valuable fodder plant.

Ontario Agricultural and Experimental Union.

At the annual meeting of the above association, held at Guelph, the following were present. Hon. John Dryden, Minister of Agriculture; Messrs. T. B. Terry, Hudson, Ohio; William Mulock, M.P., Toronto; Dr. Mills, president of the O.A.C., Allen Shantz, Waterloo, president of the union; C. A. Kyle, vice-president; R. F. Holtermann, secretary; G. F. Marsh, treasurer; John S. Pearce, London, L. Wolverton and A. M. Smith, Grimsby, John Kenny, James Anderson, and Captain McCrae, Guelph, James Hunter and F. J. Sleightholm, Humber, E. M. Ensign, Holbrook; Prof. J. Hoyes Panton, Prof. Shuttleworth, C. A. Zavitz, Prof. Dean, and very many others. The president, Mr. Allan Shantz, occupied the chair.

The report of the agricultural committee was presented by M. R. F. Holtermann. It reported favorably on the self hiver for bee keepers, where a number of colonies were kept. The union has secured the co operation of some of the best beekeepers in the province in testing five banded Italian bees.

The president, in his address, urged greater interest being taken in the union. There was