

districts where sod is to be plowed for corn, fall plowing is preferred. On our own farm, Weldwood, spring plowing has proved to be much more advantageous. Sod to be worked up for spring crop of cereals should be plowed fairly late in the fall and to a fair depth, being careful to turn it well, and if possible use a skimmer to help get over the difficulty of grass growing up in the seams before the land can be worked in the spring. We would advise fall plowing of all sod intended for oats or barley next spring. For peas, spring plowing is generally good practice where the time can be had to do it in the spring, or where the field is so situated that a few days' plowing may be done before the other land is ready to seed. In plowing sod the main thing is to be sure that all grass and other growth is well turned under. It is sometimes considered good practice to disk and work down a fall-plowed sod field in the fall to get the top fine, which aids in rotting the sod and preventing grass growth. Sod has not the same tendency to run together as stubble or other land worked according to this system.

Water Furrow.

Most of the land would be benefited by running a system of water furrows throughout the field. The more quickly the water can be pumped away from the surface of the field in the spring, the earlier seeding will be completed, and water furrows help. This is a job which should be attended to just before freezing up. A day or so will water-furrow a whole farm and in many cases it would pay well.

Five Things to Remember.

There are five things to remember. First, if the corn and root ground is clean and in good condition, leave it as the crop left it; if poor and dirty, plow. Second, replace the single plow with the two-furrowed gang and rush the stubble plowing to completion, being careful to turn the land well. Third, sod for cereal crops will be the better of plowing and cultivating this fall, and the work can be done after the stubble land is completed. For corn and peas spring plowing would be better in some localities. Fourth, where the land is heavy and has been plowed and time remains, ridging up would put it in better condition for winter and for an early seeding. Fifth, water-furrow wherever necessary.

Selecting, Curing and Storing Seed Corn.

What is known as the corn producing area of the Dominion lies in the South-western portion of Ontario, and to a limited extent along the lake shores where the temperature is tempered by the water. However, certain varieties mature satisfactorily in a more northern latitude, especially where the soil is inclined to be warm, so that seeding can be done fairly early in order to give a long growing season. On many farms, choice seed corn for the next season's planting can be secured in the home field. In making the selection, attention should be given to the quality of the ear, and the kind of stalk which produced it, consequently the proper time to select seed corn is while the crop is standing. It is too late for that now, and, in fact, many have difficulty in finding time to do it even when the crop is standing. The next best thing is to pick out ears conforming to your ideal at the time of husking. Corn allowed to mature and then cut and shocked gets a fairly good chance to dry, but it is advisable to husk it and take it in from the field before severe frosts occur. It does not take a very heavy frost to injure the germination of the kernel if it contains much moisture. Freezing causes the water in the kernel to expand, breaking the cells. When mature, and still standing, corn contains about twenty-five per cent. of moisture and this should be allowed to dry out in a place that permits a good circulation of air. It soon evaporates if the corn is standing in shock, or if the ears are lying on racks exposed to the breeze. If not dry by the time frost comes the seed corn should be placed in a building and artificial heat applied in order to drive out the moisture, after which severe freezing will have little effect on the corn. To have thoroughly mature corn is not sufficient to guarantee a high percentage of germination next spring. It must be cured properly and kept dry until seeding time. In seed corn belts special drying kilns, or cribs, are erected but where only a few bushels of seed are saved, less expensive, but nevertheless effective means of curing and storing the corn are employed.

There is a lot of corn to be husked yet and while the frost came earlier this year than usual there are fields where the corn was matured before growth was stopped by the frost, and it may yet be possible to select good seed corn. There are certain types of ears that it is found advisable to gather. No matter what variety, the rows on an ear should be straight, with the same number at the tip as at the butt. Regular rows produce more corn, and kernels from a straight ear are likely to produce ears with straight rows of kernels. Like tends to produce like, and that is one argument in favor of seeing the corn on the ear. The ideal ear is strong in the centre, tapers slightly towards the tip, with a full, well filled tip and butt. In endeavoring to secure ears having the tips and butts well covered, due regard must be given to the proper length of the ear, which varies with the variety. For a dent corn the best length is from seven and one-half to nine and one-half inches, and the circumference, measured at one-third of the distance from butt to tip, five and one-half to seven and one-half inches. Of course, the length of an ear of flint corn is greater than this, and the circum-

ference less. With the dents there is a certain ratio between circumference and length which it is advisable to aim at. It is claimed that the circumference should measure about three-quarters that of the length. Attention must also be paid to the shape of the kernel, the best being broadly rounding, wedge-shaped kernels. The shoe-peg type is undesirable. The sides of the kernels should be slightly rounded, with the width carried right up to a square shoulder; the point should be plump, as that is where the germ is found, and it is also the part of the kernel richest in oil. The germ should run well up towards the upper end of the kernel and should be thick through. Those which appear pointed when looked at from the side also appear pointed when viewed edgewise. Such grain is low in feeding value and weak in the germ. It is possible to increase the yield considerably by careful selection of the seed. For this reason it is advisable to know the kind of stalk that produces the corn. This cannot always be done, but it is possible to know the kind of ear from which the seed corn is taken. If the grain is left on the ear over winter there is less danger of the germ being injured than if it is shelled.

The Origin and History of Mangels.

By L. H. Newman.

An interesting article on the origin and history of mangels by L. Helweg, Director of Root Seed Production in Denmark, is published in a recent number of the Danish Crop Production Journal (Tidsskrift for Planteavl, 23 Binds, 2 Hæfte, 1916). For the benefit of Canadian readers the writer is taking the liberty of translating and making a brief summary of this article which follows:

Cultivated forms of field roots are among the oldest of cultivated plants. In an Egyptian tomb, about 2,000 years B. C., there was found a picture showing a workman making a large mangel pit. Theophrast (about 320 B. C.) cites that red and white beets were commonly cultivated in Asia under the name of Teulion melon and Teulion levkon. Pliny and Columella, in the first century after the birth of Christ, speak of these beets and also mention the bluish-red beet, cultivated in Italy. The latter is called Teulion kokkinogoulia.

Yellow forms were not mentioned and it may therefore be assumed that these were not known in ancient times. Helweg expresses the opinion that violet-red and bluish-red forms were cultivated in ancient times as dye-producing plants.

Our cultivated forms of mangels, as well as sugar beets and red beets are believed to have originated from the so-called Shore or Strand beet, (Beta maritima L.) which is found growing wild by the Caspian Sea as well as in Spain, France, Holland, Denmark and Great Britain. In order to show the relationship between Strand beet, the sugar beet and mangel, Helweg makes comparisons between certain characteristics. Thus Strand beets are perennials, but often produce seed stalks the first year. Our cultivated beets as a rule, are biennials, but according to many investigations it would seem that one may obtain roots which produce seed during successive years, as does the Strand beet.

The seed stalk in the case of the Strand beet is procumbent, while that in the case of our common cultivated beets is upright. The color of the leaf of the Strand beet is a darkish green, while in that of the cultivated beet it is more of a light green. Sugar beets, on the other hand range intermediate between the cultivated beet and the Strand beet in color and position of leaf. The Sludstrup Barres Yellow Intermediate mangel is regarded as representing the acme of man's efforts in improving upon this ancient type. As intermediate between these two extremes, many inferior and degenerate forms are to be found.

The influence of cultural conditions in changing the type of beets and producing a certain form of degeneration has long been recognized. One of the most striking illustrations of this effect was found in connection with certain work conducted in Denmark. In 1905 a German seed grower in one of the Rhine Provinces bought 100 kilograms of common commercial seed of Sludstrup Barres from a seed merchant in Denmark. This grower produced his own seed and after growing this particular type for four years he sent back a quantity of seed to Denmark. The roots produced from this seed proved to be quite degenerate. The German grower reported that during the first two or three years the roots were grown on volcanic soil and Helweg thinks this is probably an explanation of the degeneracy. He does not believe that in this case cross-fertilization with wild forms, which very commonly produces a form of degeneration, played an important part. In supporting this view he marked a number of careful comparisons and observations, the details of which need not be repeated here.

The root of the Strand beet is small and spindly, but when taken from its natural habitat and cultivated on well-manured land, it develops a thicker main root and decreases in dry matter. This discovery of this behaviour of the Strand beet is probably accountable for its being brought under cultivation.

Many experiments have been conducted with a view to proving whether the Strand beet was actually the original form of our cultivated beets. Many noted workers, such as Rimpau, Timbal, E. von Proskewetz and others have devoted much time to this work, and

After the ears are thoroughly dry, care must be taken to store them in a dry place. One method used in drying the corn is placing it on racks where no two ears touch, and where there is a free circulation of air. It does not take long to tie a number of ears together and hang them in a furnace room, the attic, granary or barn to cure. Some drive nails into boards and stick the cobs on the nails, and find it a very satisfactory way of curing a small quantity. As soon as the corn is husked it should be spread out where it will get the circulation of air. Cases are known of where it was left in a bag for a day, heating started and the germination was destroyed. It does not require a great deal of space to store sufficient corn to plant the usual acreage on the average farm. About one hundred ears make a bushel of shelled corn, which will give some idea of the amount required. An extra quantity should be collected, as it may be necessary to cull out a number of ears in the spring, and there is always the possibility of rats or mice destroying some of the corn. Care must be taken to store in a dry, well-ventilated place.

their investigations seem to show that the great variety of types is to a large degree a result of cultural conditions. Helweg summarizes the points which seem to indicate that strand beet is the original form from which our present cultivated beets have come as follows:

1. Strand beet's botanical characteristics in the main compare closely with those of our cultivated forms.
 2. Morphological examinations and chemical analyses show definite relationship between the Strand beet and the cultivated beet.
 3. When an improved Sludstrup degenerates it happens that outer as well as inner characteristics approach more or less closely those of the Strand beet.
- During the past thirty years a great many different types of mangels have been tried out in Denmark, but to-day, 88.4 per cent. of all seed handled on the market consists of the so-called Barres type, a Yellow Intermediate form. The history of this type is interesting, in view of the fact that both in Denmark and Canada this type has come to displace all other types of mangel grown.

History of Barres Mangel.

The Barres forms of roots are first spoken of in the literature of the French Horticulturist, André LeVeque de Vilmorin who died in 1862. His son, belonging to the firm of Vilmorin, Andrieux and Co., in Paris, reported, in 1899, that through the continued selection for many years of the beet called *Disette jaune* by his father on one of the seed firm's estates called Les Barres, he produced a sort to which he gave the name *Jaune ovoïde des Barres*. (Barres Yellow Intermediate). This came on the market for the first time in 1853 and appears first in Danish literature in a report published in 1861 on experiments conducted at agricultural high schools.

Professor Jrgensen in this report writes: "The new type of mangel called Barres is an attractive, thick, medium-sized yellow root, the seed of which was obtained in France from Vilmorin of Paris last year."

The area devoted to root growing in Denmark has increased very much during the last thirty years. In 1878, according to statistics, there were 12,330 acres of roots, while in 1915, 307,307 acres were under cultivation. No other kinds of cultural plants and no other variety has made such rapid progress in Denmark during this period.

In many countries root growers believe that a certain kind of soil requires a certain sort. This same belief prevailed in Denmark for many years, but as a result of experiments conducted by the State between 1893 and 1899, this idea has come to be abandoned. These experiments showed that the Barres stocks were practically always superior to any other, irrespective of the kind or quality of soil. During the past few years the problem which the Danish root growers have been considering most is that of improving upon the Barres type. This type has been defined by the Danes as follows: "Barres is an intermediate, orange-yellow mangel, the root being, as a rule, somewhat more than twice as long as it is broad, the greatest thickness being found usually just below the middle although in some cases it is thickest at the middle. The flesh is white but with a weak yellowish tinge."

From 1900 to 1913 there were tested out at the Danish Experimental Stations many different lots and strains of this type. The strain which has produced the best results was given the name of Sludstrup, having been procured in 1887 by a teacher, J. H. Michelsen, of Sludstrup, Denmark. Sludstrup Barres has been tested out in Canada for a number of years and is now looked upon as one of the very best types of Yellow Intermediate or of any other type of mangel, and steps are being taken by the various agricultural colleges and some of our experimental stations to produce pure seed of this sort. This year stock seed of this variety was obtained from MacDonald College, P. Q. by a number of farmers who intend, as members of the Canadian Seed Growers' Association, to propagate it and offer it for sale in sealed packages.

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