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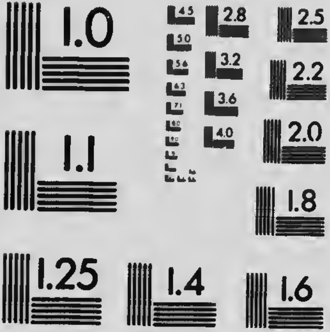

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DOMINION OF CANADA
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EXPERIMENTAL FARMS

CORN GROWING

IN

MANITOBA

BY

W. C. McKILLICAN, B.S.A.
Superintendent Experimental Farm, Brandon, Man.

BULLETIN No. 14
Second Series

Bulletins of the Second Series of the Bulletins of the Experimental Farms treat of such subjects as are of interest to a limited class of readers, and are mailed only to those to whom the information is likely to be useful.

Published by direction of the Hon. MARTIN BURRELL, Minister of Agriculture, Ottawa, O.

OTTAWA
GOVERNMENT PRINTING BUREAU
1913

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1913

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The Honourable
The Minister of Agriculture,
Ottawa.

SIR,—I have the honour to submit herewith Bulletin No. 11 of the Second Series, on Corn-growing in Manitoba, prepared by Mr. W. C. McKillican, Superintendent of the Experimental Farm at Brandon, Manitoba.

In this publication is presented a strong argument for the introduction of corn as a more general forage crop in Manitoban agriculture, as well as a concise and clear exposition of the best methods of growing, handling and utilizing the same.

Corn-growing, until a very few years ago, was supposed to be quite impossible under Manitoban conditions. Twenty-odd years' experience in growing this crop on the Experimental Farms at Brandon, Man., and Indian Head, Sask., has shown it to be one of the most certain and most profitable forage crops possible of production on the prairies.

It is hoped that the information included in this publication will be effective in inducing many of our farmers to introduce gradually corn for forage into their list of crops, and so greatly increase the crop-producing possibilities of their farms and render the profits of their farming operations less subject to wheat market influences.

I have the honour to be, sir,

Your obedient servant,

J. H. GRISDALE,

Director, Dominion Experimental Farms.

OTTAWA, March 25, 1913.

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CORN-GROWING IN MANITOBA

The question may be asked: Why should corn be grown in Manitoba? Since Manitoba is the very centre of the hard wheat belt and many hundreds of miles north of the centre of the corn belt, why not stick to our wheat and let the people of the south grow the corn?

The first answer to this question is that we can grow a considerable quantity of corn on the land now in use in Manitoba without decreasing the output of wheat by a bushel. Corn-growing does not of necessity mean the displacing of wheat but may, rather, help us to continue to grow that cereal. While an attempt to grow nothing but wheat will eventually make profitable wheat-growing impossible, a balanced system of agriculture, with corn as an important crop, will keep the yield of wheat up to virgin-prairie standard. There is no reason why wheat should not continue to be the principal money-making crop in Manitoba for many years, but the amount of income from it will be increased rather than decreased if cattle are kept as a profitable side line, if corn is grown for them on land that would otherwise be summerfallow or stubble crop, and if the fertility and physical condition of the soil are kept up by the use of the manure.

CORN GROWN SUCCESSFULLY.

While it is true that Manitoba is north of the district usually considered as the corn belt, nevertheless corn for fodder may be grown here with success. This has been demonstrated in a practical manner by farmers in all parts of the province as well as by the Experimental Farm. While it has been ripened occasionally, the production of ripe grain cannot be considered as being on a profitable basis. But with the right varieties and proper cultivation, the production of a satisfactory yield of fodder corn is as certain as that of any other successful crop, and the amount of fodder produced is greater than can be obtained from any other crop at present known.

CORN AS A SUBSTITUTE FOR SUMMERFALLOW.

The system of summerfallowing, which has given such good results in western Canada, is not without its faults. So long as land is cheap and abundantly fertile, it is a very satisfactory means of keeping up the yield of grain. But with land becoming more expensive and at the same time its virgin fertility being depleted, some system needs to be adopted that is less extravagant of soil fertility than straight grain-growing and summer fallow. While it is possible to adopt a rotation that provides for the use of barnyard manure without including corn, still, the addition of corn makes it more practicable and better balanced. The principal advantage that corn has over summerfallow is in making possible the profitable use of the land every year. Summerfallowing may insure an excellent crop of grain the following year, but it does so at the loss of a year's use of the land. Corn will give as good results as the fallow and it pays for the use of the land and for the work expended on it by giving a large crop of excellent forage.

It may seem strange that corn will give practically as good a following crop as summerfallow but it nevertheless is true, as has been demonstrated in practice. The yield in bushels will probably be slightly less, but the crop ripens from ten days to two weeks earlier, and is much easier to handle on account of having shorter, stiffer straw that is less apt to lodge and requires less twine. From the experience of a number of seasons on the Experimental Farm, it is apparent that wheat after corn is equally as profitable a crop to harvest as wheat after summerfallow even when only the one season's work i counted.

CHEAP GRAIN AFTER CORN.

But when the costs of the two seasons are considered together, the wheat grown after corn is by far the more cheaply grown and therefore the more profitable. Results that throw light on this subject have been obtained in the rotation experiments at the Brandon Experimental Farm. In these tests, eight different rotations are being compared. Records are being kept of the total cost of farming each field, including rent, use of machinery, manure, etc., as well as labour. Then the value of the products is ascertained, and the profit arrived at. We find that grain following a crop of corn is always the most cheaply-grown grain on the Farm. The following results in 1912 illustrated this: Wheat grown in field G 4, which grew corn the previous year, cost 29 cents per bushel to grow and thresh; wheat on fields D 4 and E 4, following summerfallow, cost 43 cents per bushel; wheat on field G 3, fall-ploughing, cost 37 cents per bushel, and on field E 3, spring ploughing, cost 49 cents per bushel. Similarly, in 1911, wheat on field G 3, following corn, cost only 23 cents per bushel, while on other fields, on summerfallow or stubble land, the cost ran from 41 to 49 cents per bushel. The reason for this is plain; we have a field in as good condition as a summerfallow, without having a back debt against it of an idle year. It must be remembered, however, that, in order to get these results, the corn field must be as clean as a good summerfallow.

CORN IN THE ROTATION.

Rotation of crops is one of the most needed improvements in Manitoban agriculture, and corn is a crop that lends itself most readily to use in a rotation. When corn is grown so as to get the best possible results from the corn itself, it also gives the best conditions for the crops that follow. It serves well as a cleaning crop, and, as has been shown, may act as a substitute for summerfallow. Being a gross feeder it can make excellent use of manure, rotting sod or other humifying material. A heavy application of manure may cause too great a growth of leaf and stem in grain, causing lodging and lateness, but there is no such danger with corn, as the more leaves it produces the better. It helps to decay the manure, which is also mixed through the soil by the cultivation, so that the grain that follows corn gets as much benefit from the manure as though it had received it directly and, in many instances, the effect on the grain is much better.

Just what rotation should be used will depend on circumstances, such as location, and the system of farming to be followed. For the man who wishes to grow a considerable amount of wheat, something different is required than for the out-and-out dairyman or stock raiser. The following is a good rotation which gives two-fifths of the land to wheat:—

1st year—Wheat.
2nd year—Wheat.
3rd year—Corn.
4th year—Oats or barley (seeded down).
5th year—Hay.

This is the old Norfolk rotation with corn instead of turnips and an extra crop of wheat added. For the dairyman who wants less wheat, it would be an improvement to drop the extra year of wheat. This rotation makes no provision for pasture, and is therefore suitable only for a farm where there is enough permanent pasture. The addition of another year, i.e., 6th year, Pasture, would make provision for pasture where it was needed.

Another arrangement which has some advantages and some disadvantages is the following:—

1st year—Wheat.
2nd year—Wheat.
3rd year—Oats or barley (seeded down).
4th year—Hay.
5th year—Pasture.
6th year—Corn.

The advantage is that it brings the corn on the sod land, which is a good arrangement. The disadvantage is that there are three years of grain crop in succession and the seeding down is with the third, so that the land is in danger of being rather dirty for a good catch of grass.

The following is a good rotation for a stock raiser or dairyman, using alfalfa as the hay crop:—

1st year—Wheat.
2nd year—Wheat.
3rd year—Corn.
4th year—Oats or barley.
5th year—Oats or barley.
6th year—Alfalfa, seeded alone.
7th year—Alfalta.
8th year—Alfalfa.
9th year—Alfalfa.
10th year—Alfalfa.

This gives only one-fifth of the farm in wheat as compared with one-half in alfalfa, and consequently would not be acceptable to a wheat grower. To get alfalfa into a rotation it is necessary to have a long rotation and a large proportion of alfalfa. Alfalfa may be used separately from the rotation as thus:—

1st year—Wheat.
2nd year—Wheat.
3rd year—Oats or barley.
4th year—Corn.

The farm could be divided into five equal fields, four to be in the above rotation and the fifth in alfalfa. Once every five years the alfalfa could be changed to a different field. The whole farm would then have had the alfalfa in twenty years' time.

In these rotations, summerfallow or roots may be used instead of corn, but as this bulletin is written especially to show how corn may be grown in rotations, the latter has been used in each case.

There are numerous other rotations in which corn may be successfully grown, but these serve as an illustration.

CHOICE OF VARIETIES.

Success in corn-growing depends to a great degree on the selection of proper varieties. Varieties that are best suited to conditions in the corn belt states or in Ontario do not suit for Manitoba. Corn of the large varieties is a semi-tropical plant, its growing season is very long, *and its normal growing temperature is high both day and night.* In Manitoba we have a season much too short for the *larger varieties of corn*, and our nights are too cool. It was only by continued selection of specially adapted types that the northern boundary of successful corn-growing was pushed northward for hundreds of miles. A type has been developed that does with less heat than the southern corn requires and reaches maturity in a much shorter season. To do this it has been necessary to sacrifice size, so that the northern varieties do not produce the bulk of corn that is obtained in the south. It is advisable for Manitoban farmers to use varieties of this specialized northern type. Sometimes a greater bulk of fodder can be obtained by the use of larger varieties, but the quality is quite inferior on account of the necessity of cutting the crop in a very immature condition. The following are some of the varieties that may be used successfully in Manitoba for fodder or ensilage growing: Northwestern Dent, Quebec Yellow, North Dakota White, Longfellow, Early Eight-Rowed Canada, Compton's Early. For grain production, Squaw corn is about the only variety that can be depended on to ripen, but the yield from it is very small. In good seasons or specially favoured locations, the variety known as Free Press will ripen; it is probably the best suited for grain production of any we have at present.

SEED TESTING.

As the production of the seed corn which the Manitoban farmer uses is quite beyond his control, it is very important that the seed should be tested for germination before being used. Seed corn is very often badly lacking in vitality owing to bad weather, bad storage, immaturity or other causes. It is always advisable, then, to procure a small sample before purchasing and have it tested. The Laboratories of the Dominion Seed Branch at Ottawa and Calgary and of the Manitoba Agricultural College at Winnipeg are always available for the free testing of any seeds sent to them, or it is an easy matter to test for oneself. Count out 100 or 200 seeds of average appearance, roll them up in a wet cloth, or put them between blotting papers, and then keep moist and at a uniformly warm temperature for about ten days.

PREPARATION OF LAND.

Corn is a crop that requires a large amount of available plant food in the form of rotting vegetable matter. This can best be obtained by ploughing under sod and by applying liberal quantities of barnyard manure. In soils that are deficient in humus it is necessary to do one or both of these. In most Manitoban soils, where there is abundance of humus, good crops of corn can be obtained without either sod or manure. However, manure is always a great benefit, and will produce not only a heavier, but also an earlier, crop. There is not only the fertilizing effect of the manure, but the fermentation which takes place develops heat which is very helpful to the heat-loving corn.

When sod is ploughed under for corn, the ploughing should be done the year before, and the earlier in the fall it can be done the better. This provides a better opportunity for killing the grass and commencing the rotting of the sod before the corn is planted. With sod of cultivated grasses and clovers, the best results will be obtained with moderately deep ploughing. The furrow slice should not be thicker than can be properly packed so that there will be no air spaces left under it. It should be thick enough to bury the turf and give enough soil to form a seed bed. With native prairie sod or brome grass, best results will be obtained by breaking shallow early in the preceding summer and backsetting deeper in the fall.

The best time to plough stubble land for corn will depend on the soil, some soils being more suited to spring ploughing and some to fall ploughing. In most Manitoban soils, fall ploughing will give the better results. In ploughing under manure, the ploughing should be deep enough to cover the manure properly, but not enough to bury it out of reach of the corn.

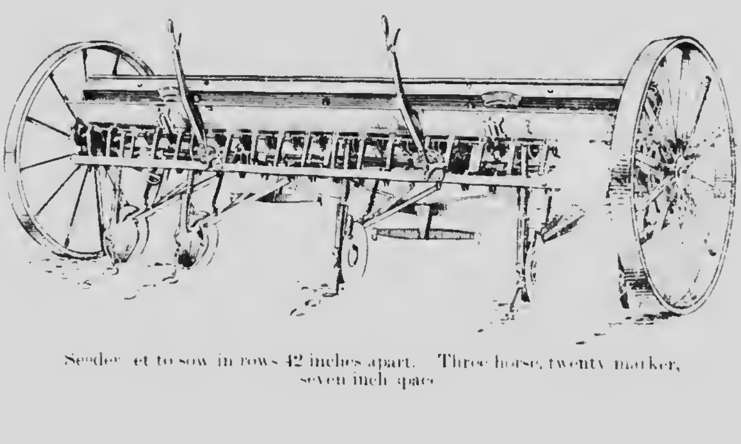
Land for corn should always be thoroughly worked before planting, as corn requires a finely-worked, firm seed bed and it is almost impossible to work a corn field too much. Cultivation can be performed in a more wholesale and inexpensive way before the corn is planted than after it is up. It therefore pays to kill as many weeds as possible and have the land in as near ideal condition as possible before planting. The amount of cultivation required will depend on the condition of the land. The disc harrow is usually the best implement for working up corn land; it should be followed by the packer and the drag harrow. When a marker or a corn drill is to be used for planting, a smooth roller is the best implement to use just before planting, as it leaves a smooth surface where the marks are easily followed. As soon as planting is done, the harrow should be used again to renew the surface mulch that the smooth roller has destroyed.

Marker for sowing in hill by hand.

METHODS OF SEEDING.

Corn may be planted with a hand planter, a grain drill or a corn drill.

In order to use a hand planter, it is necessary to mark the field with a home-made marker made of a 16-foot 4-inch x 4-inch scantling with legs, handles and shafts as shown in the illustration. By dragging this implement across the field in each direction, and planting at the intersections of the lines it makes, one can plant the corn in rows each way. This is a very cheap and easily-operated piece of equipment, and cannot be called very slow either. With one horse and a 16-foot marker, one man can get over the ground very quickly; a man with a hand planter can plant four or five acres in a day. The advantage of planting in this way rather than with the grain drill is that it permits cultivation between the rows of corn both lengthwise and crosswise of the field; this makes it much easier to keep down the weeds, and lessens the amount of hand-hoeing.



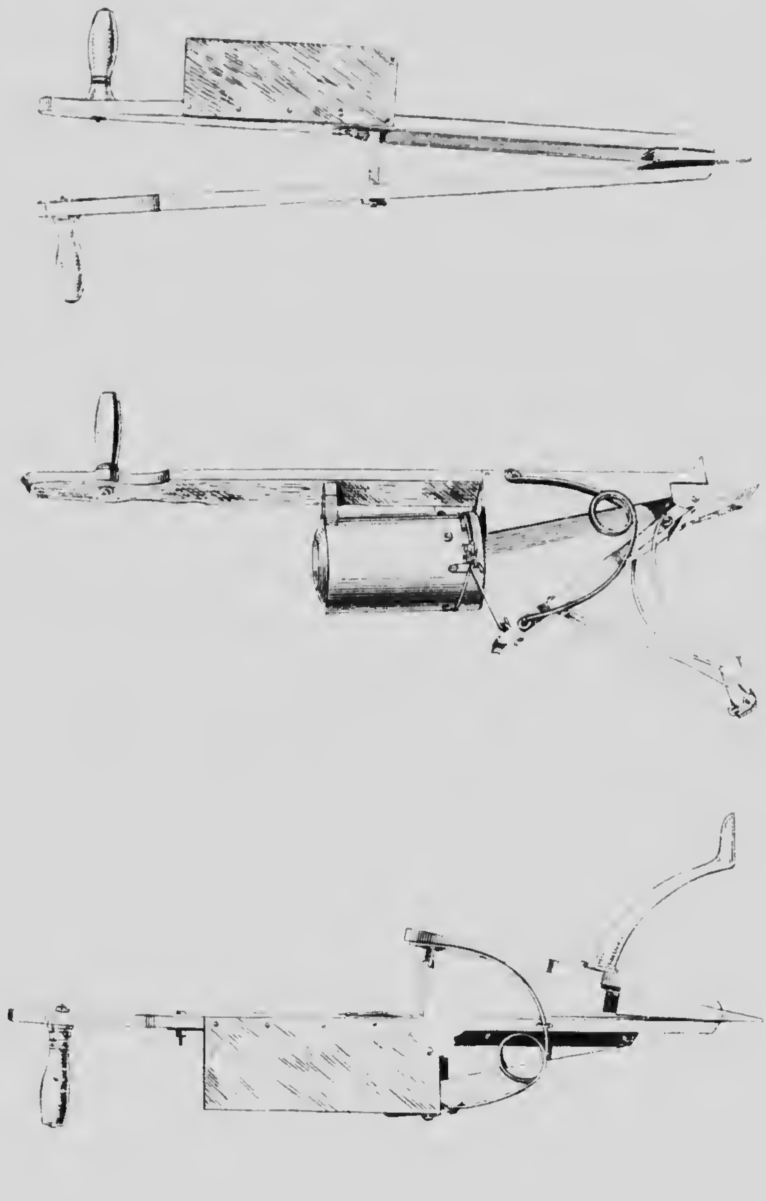
Seeder set to sow in rows 42 inches apart. Three horse, twenty marker, seven inch space.

Most of the corn planted in Manitoba is put in with the ordinary grain drill. So long as the land is not very foul with weeds, this is a perfectly satisfactory method of planting. It is the quickest method that can be used. Enough of the spouts of the drill should be stopped up so that the corn will be planted in rows 42 inches apart. If it is desired to cultivate the field afterwards with a four-horse duck-foot cultivator with some of the feet off, the two machines should be got together before seeding and compared. It will sometimes be found possible to sow with the drill spouts so spaced that, afterwards, the cultivator can follow without either horses or wheels going on the rows of corn, and with some feet removed to allow for the rows. The drill should be set to drop the grains of corn about six inches apart. It should be tested on a hard road or yard before being used in the field.

Planting with Corn drill. Brandon Experimental Farm.

The corn drill is made specially for planting corn either in rows or in hills. For planting in rows, it has little advantage over the grain drill, and would hardly justify its cost. Where corn is to be used on a large scale as a cleaning crop instead of summerfallow, it will pay to have a corn drill, and to plant in hills so as to be able to cultivate in both directions. In planting in hills, either with corn drill or hand planter, from three to six grains should be dropped in each hill.

Experiments have been conducted at this Experimental Farm for a considerable number of years, in which planting in hills has been compared with planting in rows. The average results show that the larger yields are obtained from the rows. However, this is offset by the fact that it is easier to keep the land clean when the corn is in hills, and more of the cultivation can be done with horses. As it is our object to have the corn field as clean as a summerfallow, we believe the hill system is preferable even though the yield be slightly less. The same conditions prevail in comparing distances between the rows. Rows only 30 inches apart have averaged a slightly heavier yield than when 36 or 42 inches apart. The greater opportunities for cultivation offered by the wider bare strips lead us to prefer 42 inches as the distance between the rows even though the crop be slightly smaller. We believe the difference is more than made up in the cleanness and vigour of the following grain crop, and in the superior quality of the corn forage produced.

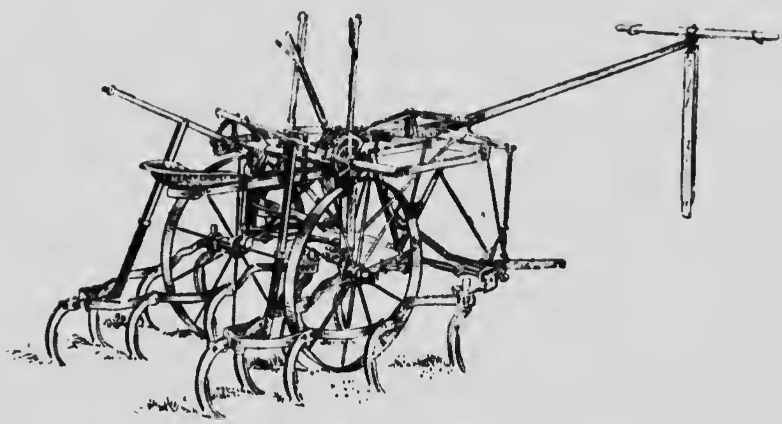


Hand Corn Planters.

Corn should be planted during the last half of the month of May. Earlier than this gives too great risk of injury from frost, later seeding does not give a long enough season for the corn to properly develop.

INTER-TILLAGE.

Corn can be used as a cleaning crop because it permits of inter-tillage or cultivation between the rows. Corn in itself is not a cleaning crop; there is no crop that will leave a field any dirtier than corn if it is left uncultivated. In order, therefore, that corn should serve its purpose as a cleaning crop in a rotation, it is absolutely necessary that it be kept clean by repeated cultivation. The crop itself is thereby greatly improved and responds very quickly to its benefits.



Two-horse riding cultivator.

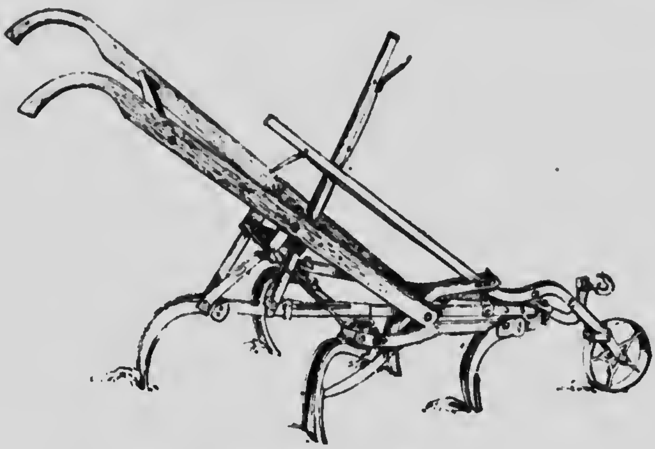
As soon as the seed is in the ground, the harrow should be started to help cover the seed and to renew the soil mulch which has been spoiled by the smooth roller, if it has been used. The harrow should be used two or three times while the corn is getting started and reaching the height of about six inches. If there are showers during this time, many weed seeds will be started and if these are killed with the harrow it will save more expensive work later on.

As soon as the rows of corn can be distinctly seen, the work of inter-tillage should commence. Wherever there is an area of, say, eight or ten acres of corn grown, it will pay to have a two-horse cultivator. It is not a very expensive implement and is a great time-saver as compared to using a one-horse cultivator, and is much more satisfactory than trying to adapt an ordinary big cultivator. The latter method is used by some corn growers in southern Manitoba and is reported as practicable. The spouts in the drill are stopped and the feet of the cultivator are taken off so as to match each other. The big four-horse cultivator is then used on the corn. This method will help a grain-grower to start in corn-growing by using the implements already on hand. But it is only a makeshift compared to the convenience and good work of the two-horse corn cultivator.

The two-horse cultivator should be used often enough to keep the land clean, with a loose mulch on the surface. When the corn gets too high for this implement, then the one-horse scuffler should be brought out. On the Experimental Farm, the cultivation of the corn is continued until the man and the horse cannot be seen in the tall corn. This is the way to get big crops; the miserable corn so often seen in Manitoba is due almost always to cultivation being stopped too soon. This method.

together with some hand-hoeing, gives land which can be used the following year for growing clean seed grain.

In order for corn to be a success as a cleaning crop, it is necessary that a certain amount of hand-hoeing be done. In no other way can the weeds that grow between the stalks of corn be reached. The work of hand-hoeing can be reduced greatly by



Single, walking cultivator.

plenty of work with the disc harrow before seeding, and with the drag harrow until the corn is seven or eight inches high. After that, a thorough cleaning can only be obtained by going over the field once or, in a wet season, twice with the hoe.

CUTTING.

As corn would make use of a much longer season than there is here, it is well to let it have as much of the season as possible. Therefore, the later the harvesting can be left without damage by frost the better. But the crop should not be allowed to be frozen and should always be cut before the usual date of killing frosts. A light frost that burns the tips of the leaves will not do serious harm, but a general freezing is injurious to the quality of the fodder. In actual practice, from September 5 to 10 is found to be about the right time for cutting corn at Brandon. In case a heavy frost comes unusually early, before the corn has been cut, it is advisable to rush cutting and get all the corn knocked down before it dries out.

Three methods of cutting corn are practised, viz., cutting by hand with sickle or hoe, cutting with a grain binder, and cutting with a corn binder. For small or medium areas, the first is the cheapest method, but the scarcity and independence of farm labour in Manitoba, particularly in the fall, make it rather impracticable.

The grain binder is the implement generally used for cutting corn in Manitoba. So long as the crop of corn grown is poor and light, the grain binder will handle it satisfactorily, but a good crop of well-developed stalks of corn is much too hard on this machine. When a man claims success in cutting corn with a grain binder, it is usually a good indication that his crop of corn is not what it should be.

Wherever corn-growing is taken up in a thorough manner, it is practically a necessity to have a corn binder. Of all the special corn machinery, the corn binder is the one which it is most difficult to dispense with. As it is an expensive implement and is only used for a few days in the year, it will pay three or four farmers to co-operate and buy one among them. Provided they are men of the spirit that makes for co-operation and are willing to work together, one machine can serve their needs quite satisfactorily.

The field at cutting time.

Harvesting the crop.

STOOKING

There are two distinct methods of curing and storing fodder corn. The one almost universally practised in Manitoba is to dry it in stooks. This system has the merit of being inexpensive, and is the best for a man who cannot afford to build a silo and buy or hire silo-filling machinery.

In stooking corn, a home-made contrivance called a stooking-jack is a great help. It is made by putting two legs about four feet long on one end of a 16-foot scantling. Two or more holes are bored horizontally through the scantling at from three to six feet back from the end that has the legs. An old broom handle is fitted loosely through one of these holes. The stook of corn is built by standing the sheaves around the junction of the broom handle and the scantling. When the stook is completed, the jack is removed by taking out the broom handle and then pulling away the scantling by the end that has the legs on; the other end slips easily through the stook. If this implement is used and the stooks made large and straight, they will stand up all the winter. A good size of stook is one that is about six feet across on the ground and about three feet across at the band. All stooks should be tightly tied with a band of binder twine about three-quarters of the way up.

Curing corn in stook.

About as satisfactory a method of handling stooked corn as any is to leave it standing in the stook until it is needed, and then draw it into the stable either by the sleighload or by dragging each stook with a chain.

If it is desired to have the corn stored nearer the buildings, it may be piled against trestles in long rows. These rows should run east and west so that the snow will be carried through by the prevailing winds and not piled up in banks against the corn.

Fodder corn cannot be stored by piling it up in mows or stacks unless it is put in layers with about four times its bulk of dry straw. If piled up by itself it will heat and mould. The method of stacking it with straw has been tried at the Experimental Farm with satisfactory results. The corn kept well and the straw [illegible] out so flavoured by the corn that the cattle ate it greedily, but it takes much extra work to stack it this way.

Fodder may be stood up against a wall or partition or on top of a mow in a barn, and will keep in this way if it is dry when brought in and is not in too great bulk.

STORING IN SILO.

The ideal way of storing fodder corn is in a silo. It is very much to be preferred to stooking. Some of the advantages may be briefly stated as follows: Ensilage is a much more valuable food on account of its succulence; it takes the place of the green grass of summer. It is more economical, as it is all eaten up clean, while the coarse stalks of the dry fodder are often left. It makes straw more useful as it softens and flavours it so that it is assimilated better. It is much more convenient to use and eliminates going out in the snow for fodder. It is more palatable, and stock thrive better on food they like.

The old prejudice against ensilage is largely dying out. However, one occasionally comes across some remnants of it among people who have never seen ensilage fed. In case it still exists in the minds of some of our readers, the following definite statements are made: Cattle like ensilage very much; sometimes, cows that have never seen it refuse it at first as they might any new food, but they soon get very fond of it. It has no ill effects on the milk either in flavour or richness. It has no ill effects on the health or longevity of cattle, but rather, when fed wisely, it improves their general condition.

While silos are as yet quite few in number in Manitoba, they are increasing, and with the spread of mixed farming they are sure to become more common. No up-to-date dairy farm is complete without a silo, and for other types of animal husbandry they are almost as needful.

The round silo is much to be preferred to the four-sided one. The corners of the latter cause uneven settling and are more subject to mould and freezing. A great many of the first silos made were of this latter type and were made by boarding up a corner of a mow in a barn. They are largely being replaced by cylindrical silos of cement or wooden stave construction. These two latter are the best types of silo. The cement silo has the advantage of solidity and durability. There is no danger of its being blown over by summer winds, and if well made it will last several lifetimes. The wooden stave silo has the advantage of cheapness and of being less subject to freezing than is the cement. We believe that it is the more desirable silo for use in Manitoba, where low winter temperatures make the freezing of the ensilage a consideration that lessens the desirability of cement. With a stave silo, there is very little of this difficulty if the ensilage be used out uniformly and not too slowly. A stave silo, if made of good material, will last fifteen or twenty years, so that lack of durability is not at all a serious objection against it. The method of constructing a stave silo will not be discussed in this bulletin, as it has been well described by J. H. Grisdale, B.Agr., Director of Experimental Farms, in Bulletin No. 35, 'The Stave Silo,' which may be obtained by applying to the Publications Branch, Department of Agriculture, Ottawa.

The nearer to full development that corn can be brought, the better the grade of ensilage it will make. With the best efforts that can be made in Manitoba both in selecting varieties and in cultivating for the hastening of maturity, corn for the silo is likely to be rather on the green side. The quality of the ensilage made from this corn can be considerably improved if the corn be allowed to lie on the ground for about five days or a week after it is cut by the binder before it is cut up and stored in the silo. This dries out a little of the superfluous moisture and brings on a maturing process in the stalks that makes an ensilage of less acidity than is obtained from green corn taken directly to the silo.

One of the principal difficulties in the way of the *greater adoption* of silos is the cost of silo-filling equipment. It is necessary to have a machine to cut up the corn

Stave Silo, Experimental Farm, Brandon.

and elevate it to the top of the silo and power to drive such a machine. There are two types of cutting box in use, and it will depend on the power available which is the better to use. The cutting box with endless chain elevator is the cheaper kind and can be run with a two-horse tread power or a small gasoline engine. It works much more slowly than a blower and therefore can be kept going with fewer men and horses. This kind of cutting box is best for a man who is farming in a small way and has no powerful engine. The blower type of cutting box is much faster and more satisfactory where there is work enough to justify it. It requires a large engine (15 h.p. or more) to drive it, and a good strong force of teams drawing in corn to keep it busy. Wherever a farmer has an engine for ploughing or threshing it will pay him to get a blower on account of the saving of time it permits. When silos become more common it will be possible for threshing machine owners to run a silo-filling outfit as well. It would prevent much lost time, as silo-filling can be done when it is too wet to thresh from stooks.

The corn should be well mixed as it falls in the silo. The draft from the blower carries the heavy stalks to one corner and the leaves to another. The leaves will mould if left by themselves and should be mixed among the heavy parts. There is not much advantage in tramping the bulk of the corn in a silo. So great a weight comes on it that the tramping makes little difference. It is better, however, to tramp around the edge as the friction of the sides of the silo hinders settling and tramping helps to make the settling more uniform. It is also advisable to tramp the last few feet at the top. A silo cannot be filled completely all at once. To get the greatest quantity in, it should be filled once, then allowed to settle for a few days, then filled again, and even the third or fourth time there will be room for a lot more. Different coverings for the ensilage are recommended, such as wet cut straw, etc. Anything that is solid and airtight is satisfactory. There is nothing better or more convenient than the corn itself. If the top is tramped and left alone, about six inches will rot and provide an airtight protection for the balance.

USING ENSILAGE.

The silo is emptied from the top downwards. The surface of the ensilage should be kept as nearly level as possible except that it should be a little lower around the edge. This will lessen the danger of freezing in cold weather. It should be lowered uniformly, and feeding from it cannot be discontinued once it is begun or the top will spoil. If any ensilage freezes to the walls it is not injured and can be fed as soon as it thaws out.

Ensilage may be fed directly to cattle just as it comes from the silo. It is better, however, to mix it with cut straw or hay in the proportion of about six pounds of ensilage to one pound of hay or straw. A full-grown cow will eat from 30 to 50 pounds of this mixture per day. The meal to be fed may be thrown on top of this mixture after it is in the manger. As both ensilage and straw are rich in carbohydrates, the fat and meat-forming constituents and deficient in proteids, the muscle and milk-forming constituents, they do not constitute a properly balanced ration for any class of stock, and particularly so for growing young stock and milking cows. To give best results, they should be fed in conjunction with clover and alfalfa hay and bran or oat chop. These latter feeds are higher in proteids and help to balance the highly carbonaceous corn and straw.

COST OF CORN EQUIPMENT.

The cost of suitable equipment for corn-growing and ensiloing in Manitoba on a moderately large scale (15 to 25 acres annually), assuming that seeding is done with a grain drill and that an engine is available, is as follows:—

Filling the silo.

Feeding the ensilage.

Two-horse cultivator	$ 49
One-horse cultivator	10
Corn binder	165
Cutting box (blower)	149
Stave silo, 200 ton capacity, about	400
	$773

Of the specially-devised means of planting, the cost is: Hand planter and home-made marker, $5 or less; corn drill (two-horse), $50. The other kind of cutting box (chain elevator) costs $104.

The average life of these implements should be from eight to fifteen years, and of the silo from fifteen to twenty years. Taking twelve years as the average life of the whole equipment, the yearly cost would be about $65.