

ing the summer to find him enthusiastic in this movement. In fact, before we parted he had procured a catalogue that listed subsoil plows, and by this time, I believe, he has one on his own farm which he intends to use this fall. As he put it, if he gains nothing he is only out \$12, the cost of the plow!

Prof. King in his work on subsoiling has proven that more moisture is made available by subsoiling than with ordinary plowing. The following are the results given:

	Subsoiled ground.	Not subsoiled.	Difference.
1st foot	17.07	18.91	-1.84
2nd foot	23.29	19.42	+3.87
3rd foot	22.76	17.78	+4.98
4th foot	16.35	14.19	+2.16
5th foot	18.14	19.20	-1.06

Which show that at the expense of the first and fifth foot the second, third and fourth feet where the roots will be found in greatest abundance have gained considerable in quantity.

There are, however, dangers to be avoided when subsoiling. One of the most serious difficulties, aside from the expense, is the danger of puddling (or packing when wet). Of course, this is particularly noticeable in rainy climates, where the subsoil in the spring is liable to be too wet; but with the exception of low-lying lands and clay or heavy loam soil this would scarcely apply to our soils in the West. The danger may also be intensified on account of the fact that the surface soil may be in good condition for plowing when that below is much too wet. If this work is attempted when the ground is not in good condition very great harm may be done, so it is generally much safer to subsoil in the fall (in moist soils especially) and also dry ones, with the exception of summerfallow, and in wet climates, when the ground is generally driest.

There is also another great danger which must be carefully guarded against, that is: In case there should be an exceptionally dry season, such as 1910, and the soil had not been firmed in some manner (packing preferably), the water supply from below may fail to make connection with the young rootlets in time to produce any material crop growth. However, if the land is properly packed, the danger from this would be very small. Possibly when commencing to subsoil it would be better to deepen the soil gradually than to disturb any great amount at once. The plow with the narrowest point, say two to three inches, would be better, and easier on the horses than one with four inches or more.

The point in use on the C. P. R. farm has been drawn by the blacksmith to three inches—formerly it was four. Although it is impossible as yet to give results, ten acres have already been subsoiled, and it is expected that thirty acres will be finished this fall.

Man.

T. H. TWELTRIDGE.

Using a Subsoiler

EDITOR FARMER'S ADVOCATE:

The practice of subsoiling has never been introduced into this country, and it is only occasionally that one hears any reference to it. I cannot speak from experience in Western Canada in the matter of using a subsoil plow, but have used it successfully in Eastern America and cannot see why it could not be used to advantage here. Subsoiling has two chief objects: the opening of a larger soil area for the retention of moisture and the enlarging of the zone in which the plant feeds. It is most useful in sections where the rainfall is just about sufficient to produce crops, and where every effort has to be made to retain as much as possible of the moisture.

Stirring up the subsoil has this effect, providing the surface is kept in condition to prevent evaporation, that is, in a mulch. A crop of grain grown on subsoiled land, if it gets rightly started, will withstand drought better than on ordinary plowing, for the moisture that is in the soil is further below the surface, and if the roots of the crop have got down well into the subsoil grain will produce much better on a deeply stirred soil than it will under ordinary methods of cultivation. Of course, the kind of soil has to be con-

sidered. Sandy soil doesn't need subsoiling. Neither should heavy land with the hard, shaly subsoil common in some sections. But the average soil can be subsoiled, and, I believe, to advantage.

In using a subsoiler it is not advisable to stir up the lower soil too violently the first time. The first instrument sent into the soil below the plow line should be a sort of sharp-pointed spike that simply pierced the soil and jars it up a bit. The lower soil should never be brought to the surface. Subsequently the subsoiler may be used with a flatter point and a larger area stirred. It should be used carefully at first.

Man.

R. M. G.

Level Cultivation Saves Moisture

Level cultivation saves moisture. When the land is ridged it is put in a condition for getting rid of moisture, as there is more surface exposed and the furrows make a splendid place for the rain to run off. Where there is too much moisture it is an advantage to throw the soil up around the plant and to leave the furrows in which the surplus rain runs off.

In North Dakota and the northwestern states we need to put forth every effort to save the moisture and the more level we can leave the surface the less there will be of it exposed to the air, wind and sunshine, and then when it does rain it will have to soak in, as there will be no channel for it to run off. Then again the ridges and furrows are objectionable, in that the soil in the ridge dries out, so that the plant roots do not have as much surface soil to grow in as under level cultivation, and it is out of the surface soil that the plant gets nearly all of its food. Deep plowing and level cultivation is the best way to save moisture, to give the plant roots feeding surface, and to keep the soil in fine tilth. This applies equally to corn, potatoes, vegetables or trees.—W. C. PALMER, N.D.A.C.

The Need of a Hoe Crop in the West

The value of a hoe crop to the farmer has been demonstrated over and over again. It has many points of advantage. Besides furnishing a very remunerative crop it cleans the land of weeds and takes the place of a summerfallow in improving the conditions of the soil.

The need of a fodder crop has not been much felt in this country as yet. In Alberta prairie hay can be readily obtained; slough grass is comparatively plentiful in parts of Saskatchewan. But in Manitoba, where the land is becoming more thickly settled, the fodder question is becoming an important one. The time is not far distant when the sloughs will be drained and the prairie broken up. Then some provision must be made for the production of winter feed for the stock. Alfalfa and clovers are grown to good advantage in many parts; grasses grow well.

But one of the great needs of the country is a crop, such as corn, where cultivation can be followed during the season and a good crop be procured in the fall. And why not corn? It is only a few years since the most hopeful thought wheat could only be grown in the warmer parts

of the West. Look at its present range; and its limits have not yet been reached. I venture to say that within ten years corn will be successfully grown in Southern Alberta and that inside of twenty years the stock will be eating ensilage.

Perhaps the larger varieties will not be grown; and perhaps not fully matured at first. In Ontario some of the larger varieties of corn sown in July have reached a growth of eleven feet by October. It was not fully matured, but it made excellent feed. There is no trouble in getting a season as long as this in some of the parts of the West, and why should we not try some varieties. The plant soon becomes acclimatized; and by selecting the first ripe, while the crop is growing, the variety may be made much earlier. Experiments conducted with corn in Alberta are encouraging. The prairie soil is well adapted for corn, and when successfully grown it will be one of the most profitable crops the farmer can raise.

What potatoes have done to clean the soil corn will do much better. In many places stink weed, and many other weeds, have been cleaned from the soil by potato culture. The great difficulty is that where this crop is grown on a large scale there is not sufficient market.

Some hoe crop is necessary. By hoe crop it is not meant that the crop must be kept clean by hoeing. This is not the best method; even if it were as easy and cheap. If the crop is put in well, there is little difficulty in keeping it clean. The rows should be straight; and if put in hills the marking and planting should be carefully done. Then the cultivator can be run so close to the hills that there is need for little hoeing. Thus we have the soil summerfallowed while the crop grows. Weed seeds are germinated, started to grow and killed, and as the corn shades the ground there is little chance for growth of weeds. Besides the land is left in an excellent shape for sowing the following spring.

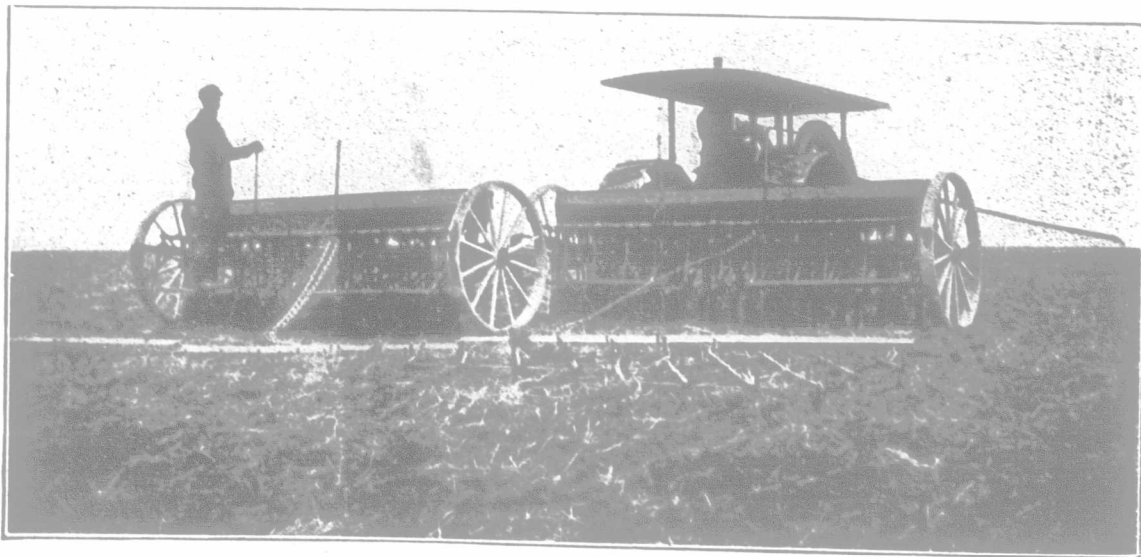
The weed proposition is one that must be looked after or it will be a very costly one. It appears that the hoe crop is the best and cheapest solution of the problem. And when corn can be grown it will prove to be the most profitable of crops. It will clean the soil, put the land in a good state of fertility and tilth, and give a remunerative crop.

J. P. JOHNSTON.

Seeding a Permanent Pasture

A reader in Saskatchewan states that he has a piece of new breaking which he wishes to seed down for permanent pasture. He wants to know what he should seed it with and the quantity of seed required per acre.

Answering the inquiry, Angus McKay, superintendent of the experimental farm at Indian Head, says: Brome grass is the best variety for a permanent pasture, but as objection is taken to the difficulty of eradicating it, I think Meadow Fescue, or English blue grass, 10 pounds, and timothy, 5 pounds, will be found suitable. This quantity will seed an acre. Unless the land in question has been plowed deeper than ordinary breaking it will not give satisfactory results as a pasture, especially in seasons like the present.



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