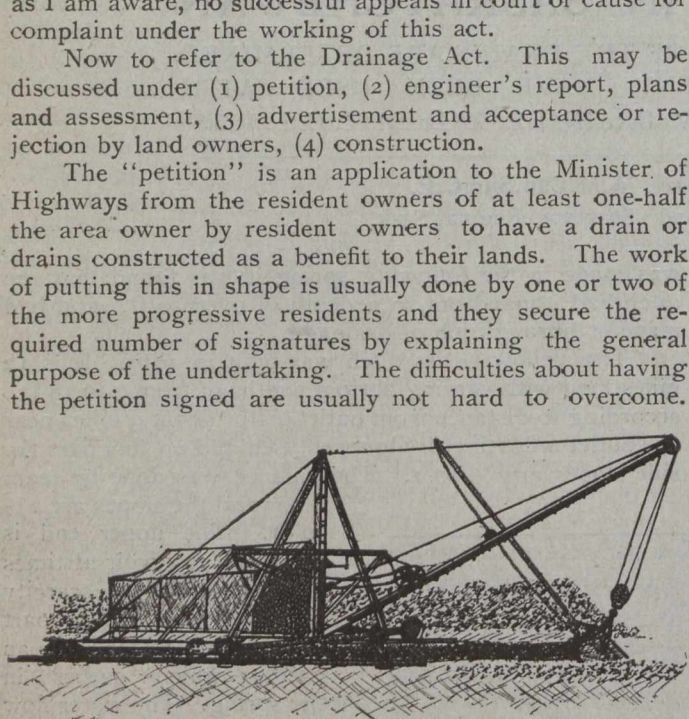
these ditches is, of course, to get the owners to do their proper share, or in the case of a contractor, he is usually a local man and frequently attempts to use his neighborly influences with the council in order that something "just as good" may be replaced for the real article in the contract. This is ordinary experience and the remedy is in the hands of the engineer. There have not been many private ditches constructed in Saskatchewan, and insofar as I am aware, no successful appeals in court or cause for complaint under the working of this act.

Now to refer to the Drainage Act. This may be discussed under (1) petition, (2) engineer's report, plans and assessment, (3) advertisement and acceptance or rejection by land owners, (4) construction.

The "petition" is an application to the Minister of Highways from the resident owners of at least one-half the area owner by resident owners to have a drain or drains constructed as a benefit to their lands. The work of putting this in shape is usually done by one or two of the more progressive residents and they secure the required number of signatures by explaining the general purpose of the undertaking. The difficulties about having the petition signed are usually not hard to overcome.



Bay City Land Dredger at Lewvan, Saskatchewan.

New settlers from countries where taxation is heavy sometimes hesitate to sign until they understand the method of assessment and collection. A few look upon this class of work as a government undertaking and think that cost should be borne by the province at large, but when it is pointed out that the fair method of apportioning this cost is for the people benefited to pay for the improvement and the province is giving assistance by financing and carrying out the work, their objection is nearly always withdrawn.

On receipt of this petition regularly signed and properly verified, the Minister appoints an engineer to prepare a report, plans, specification and estimate of cost, together with an assessment (or apportionment of cost) to be borne by each parcel of land affected.

The engineer usually arranges to make this survey in the fall or early winter immediately after freeze-up, when he will be able to go over any part of the wet land with the least difficulty and before there is snowfall to any extent to prevent inspection. At this time the location of line through sloughs can be made more accurately as the topography of the lake or slough bottoms can then be easily determined by test holes through the ice.

When on the ground, he first makes an inspection of the wet land, estimating the acreage which might be benefited and securing a rough valuation of the improvement if drainage were effected. A preliminary estimate of cost is obtained by level and stadia survey and this information can usually be secured in three or four days' time on an ordinary survey. In connection with collecting this data, it is not at all wise to depend upon the knowledge of residents as to flow of water as it is quite a common occurrence to hear arguments between neighbors regarding which way the run-off occurs in water courses within a mile or two of their homes and usually each person is quite emphatic in his views and convinced that he is correct, whilst his neighbor may be equally certain that the flow is in an opposite direction. However, when the engineer is satisfied with the main points a comparison is made to determine whether the cost of the proposed work will exceed the benefit to be received and if this is the case it is his duty to discontinue the survey and report adversely regarding the scheme. In the event of the work appearing to be feasible and of advantage a detailed survey is made.

From the information already obtained the main route in general is determined. It is usually best in this province to select the deep points in the lakes or sloughs and establish the route by connecting these points and carrying the drain to an outlet by a line which will make the least yardage excavation and be the most efficient from a standpoint of maintenance. It is of advantage to have this main drain as direct as possible but if this entails a yardage figure very much in excess of following another line on which the ground levels are lower but which is more circuitous, it may be doubtful as to which is best to adopt. The latter route may be objectionable in cutting of land into parts which are awkward to farm but the engineer must consider the valuation of the land, which is, on an average, about 35 per cent. in Saskatchewan of the price in the older provinces, and also excavation cost, which is about double the cost of work in Minnesota or Ontario. These factors, along with any differences in maintenance estimate, have largely to do with the main direction of the drain. Before finally disposing of this, however, he should consider whether the drainage can be done with good effect by ditching along the road allowances because it may be practicable to build a grade for public travel at the same time as the drain work is done by using the excavated material for road purposes. Therefore, the difference between the cost of drainage with and without improvements to roads should be figured on to find if the extra road work is warranted by the extra benefit which might be received. In drains constructed under the Act so far, it appears to be good practice to build the drains along the road allowances only where the district is very level and the roads on low-lying ground. In many cases where fairly deep cuts have been made along the road allowances, it has been found necessary to go to considerable expense in cleaning; and the presence of large open ditches along travelled roads are undesirable from a standpoint of safety.

The main direction having been decided, the engineer proceeds with an exact location; that is, where best to commence and the extent of the work, also how much outlet work is to be done. The outlet may be a lake, river or watercourse of any kind. Levels should be taken for a considerable distance beyond the point necessary to discharge the water in order to make certain that damage should not be done through flooding, or if any is done, to ascertain the extent of this. Notes should be made as to whether banks of outlet streams or lakes are well confined, also if there are any flats or low-lying ground below the outlet and this information may be conveniently shown on a contour sketch plan and retained as a reference in event of any later action for damages through flooding, or the information may be used in case it is decided in later years to extend the drain. In Saskatchewan it has been considered the better plan on the engineer's part to carry the drain to an outlet sufficiently safe to avoid any probability of damage resulting, rather than attempt to