heavy backfill in case it may be found necessary as a protection against frost. It is not anticipated, however, that such protection will be required, as the walls have been provided with double windows and doors, and all openings into the aqueduct are provided with movable covers, the building itself thus forming a closed air space between the aqueduct and the outside air. The exposed metal work in these structures as well as all metal work pertaining to the aqueduct subject to corrosion is of bronze. Boat entrances, separate from the overflow structures, have been provided at various points along the line. Concrete manholes carried up to the surface of the backfill, and provided with heavy cast-iron covers, specially locked, have been located at intervals of one mile along the aqueduct. An inner concrete slab cover has been placed in each manhole 18 ins. below the outside cover, and a bench mark has been set in the wall provided with a brass tag on which the station and elevation can be stamped.

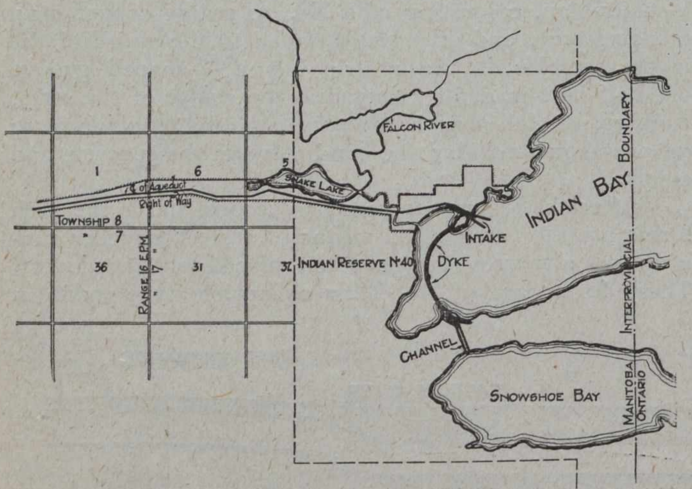

Fig. 5.—Plan Showing Falcon River Diversion.

Two Venturi meters have been laid out—one downstream from the intake, and forming part of the depressed section under the Falcon River, and one immediately adjacent to and east of the site of the future reservoir at Deacon. These meters will be formed generally of reinforced concrete, provided with bronze throat rings. Instead of using a continuous ring for the upstream piezometer casting, separate bronze plates spaced equi-distant about the periphery at the upper end of the entrance cone, have been designed, each plate being connected by a separate pipe to a central manifold or header located in the adjacent chamber erected for the recording and integrating apparatus. It is believed that several advantages are obtained by the use of the separate plates over the continuous ring, not the least of which is the less cost. In meters of similar description it has always been found difficult to maintain a large ring in a true circle, and when the necessary bracing has been erected it interferes greatly with the form construction, so that it has been difficult to get a smooth and unobstructed joint between the concrete and the face of the bronze ring. By the use of separate plates it is believed that this difficulty will be entirely obviated, since the forms can be first trued up to accurate shape and then the plates bolted to the form without danger of displacement. Another advantage in this arrangement lies in the fact that by having a separate pipe between the chamber and each piezometer, any one hole that becomes blocked up can be simply blown out. Fig. 4 shows the general arrangement of the Venturi meter which is being built at the Falcon River crossing.

Intake and Falcon River Diversion.—The most suitable location for the intake was found to be at the westerly end of Indian Bay, which is an arm of Shoal Lake, about six miles long and from one mile to three miles wide, with an average depth of water over the whole area of twenty-five feet.

Falcon River formerly emptied into Indian Bay at the extreme west end, and, being a muskeg stream, the water was naturally of a brown color, which discolored the water of Indian Bay. In order to overcome this objectionable feature the Falcon River was diverted into Snowshoe Bay, an arm of Shoal Lake parallel to Indian Bay, and separated therefrom by a peninsula five miles long. The diversion was made by constructing a dyke 7,500 feet long across Indian Bay, and excavating a channel from behind this dyke through to Snowshoe Bay as shown in Fig. 5. The Falcon River water is thus cut off from Indian Bay by the dyke and discharged into Snowshoe Bay by the channel.

The dyke was built in 1914 by means of the scow and bridge method. The scow was held in position beyond the end of the work by means of spuds and connected to the outer end of the completed portion of the dyke by a bridge on which a narrow-gauge track was erected and extended back along the dyke to the gravel pit located a short distance from the shore. Trains of 4-yard dump cars filled with sand and gravel by a steam shovel at the pit were run out and dumped from the connecting bridge, the empties being backed upon the scow. As the dyke was formed, the scow was gradually pushed out and the bridge dragged along with it. The face of the dyke towards the lake was rip-rapped with a layer of heavy stones obtained from a quarry of trap-rock opened up at the north end of the dyke. The top of the dyke was covered with top soil and seeded with Brome grass.

Tests made periodically of the water of Indian Bay east of the dyke from the time the dyke was built show a progressive reduction in color until at the present time the water of Indian Bay is as clear as that of Shoal Lake itself. With this layout even should the water from the Falcon River find its way through Snowshoe Bay into Indian Bay it will require several years for it to complete its course, and in that time the color will have entirely disappeared through the natural bleaching agencies.

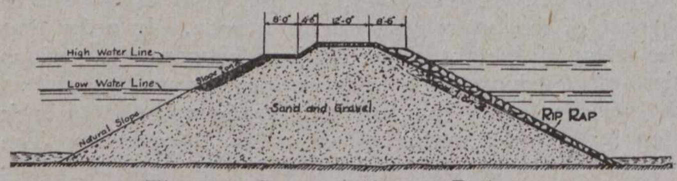

Fig. 6.—Cross-section of Dyke.

The intake will be located on the rock shore of the bay near the north end of the dyke, and it will be provided with fish screens, stoplogs and head gates. Two gathering walls will be carried out from the intake to the deep water of the bay.

Supply Line Between Reservoir Site and Winnipeg.—The construction of a reservoir of 250,000,000 Imperial gallons capacity, to be located at a point "southeast of Transcona," was recommended by the consulting engineers, not as a present requirement, but for some future date when warranted by the growth of the District. It was also alvised that the aqueduct at the present time be extended from this point known as "Deacon" to the present McPhillips reservoirs in Winnipeg as a 5-ft. 0-in. diameter steel pipe line capable of giving a discharge by gravity to the District of 25,000,000 Imperial gallons per