

The Canadian Engineer

A weekly paper for Canadian civil engineers and contractors

WINNIPEG RIVER POWER AND STORAGE INVESTIGATIONS

A BRIEF REVIEW OF WATER RESOURCES PAPER No. 3, AN OFFICIAL PUBLICATION OF THE DOMINION WATER POWER BRANCH, COVERING THE DEPARTMENTAL INVESTIGATIONS INTO THE POWER RESOURCES OF THE WINNIPEG RIVER WATERSHED.

PART III.

AS typical of the detailed character of the investigations of the Dominion Water Power Branch into the proposed power concentrations on the Winnipeg River, and as indicating briefly the manner in which the data secured and compiled has been made available to the public in "Water Resources Paper No. 3," the following notes from the report on the proposed concentration at the Du Bonnet Falls have been prepared.

After full consideration of all aspects, the river reach in question was divided into three proposed concentrations—Pine, Du Bonnet and McArthur respectively. The Du Bonnet concentration includes the natural drop at Whitemud, at Little du Bonnet and at Grand du Bonnet Falls.

Head and Tailwater Elevations.—The headwater at the proposed Du Bonnet plant has been placed at elevation 808. This will result in a

4-foot rise in the present normal water level at the head of the falls, and will flood back to the foot of the second McArthur Falls.

Flooding.—Little flooding will result from raising the headwater to elevation 808. An embankment is necessary on the west side. This embankment is designed with a 10-foot top at elevation 815, and with $1\frac{1}{2}:1$ slopes. It is 800 feet in length, and at regulated level in the pond will withstand a head of from 5 to 7 feet at its heaviest sections.

Pondage.—A regulated level of 808 will create 1,700 acres of pondage. A draw of 1.7 feet on this pond will supply a four-hour peak load to the full installation considered, *i.e.*, 140,000 horse-power, assuming a continuous flow of 20,000 second-feet in the river. While this provides very fair pondage facilities, they are not as favorable

as the conditions at the majority of the sites proposed along the river.

Ice Conditions.—During the winter season the channel in the vicinity of island No. 2, below the Little du Bonnet Falls, becomes at times somewhat choked with a deposit of frazil and anchor ice. This is largely due to the long stretch of agitated water in the Grand and Little du Bonnet Falls, presenting ideal conditions for the formation of frazil and slush ice. The contracted river channel in the vicinity of the island, together with this formation of frazil,

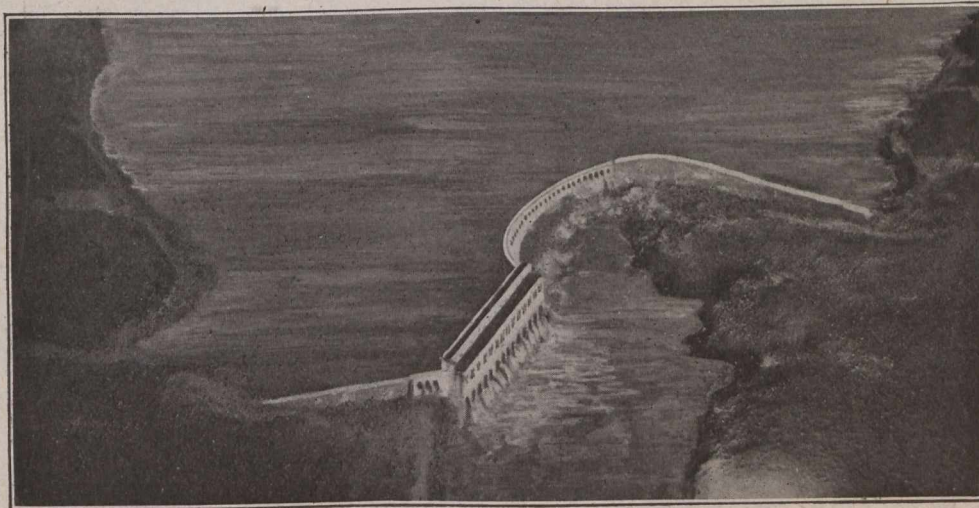
forms a combination favorable to the formation of an ice barrier, and is at times the cause of more or less choking and consequent raising of the water level above.

Layout.—The general layout (Fig. 1) connects with contour 815 on the right bank by means of a core-wall embankment, ice sluices, and power

station joined direct with a sluice and spillway dam of solid gravity section arched in plan so as to follow the high rock above the falls, and finally closes with the high land on the opposite bank by means of a second embankment.

East Embankment.—The east embankment has been estimated with a 15-foot top at elevation 815, and $1\frac{1}{2}:1$ slopes, constructed from the material most readily available. Impermeability is secured by a concrete corewall with a 1-foot crest at elevation 814; and a batter of $1:12$. This core will be bonded to the bedrock should the latter be within reasonable distance of the surface, and if not, a tight and safe bond can readily be obtained with the clay subsoil.

Ice Sluices.—Between the east embankment and the power house are located three 20-foot sluices with sills at



Model of Proposed Du Bonnet Layout.