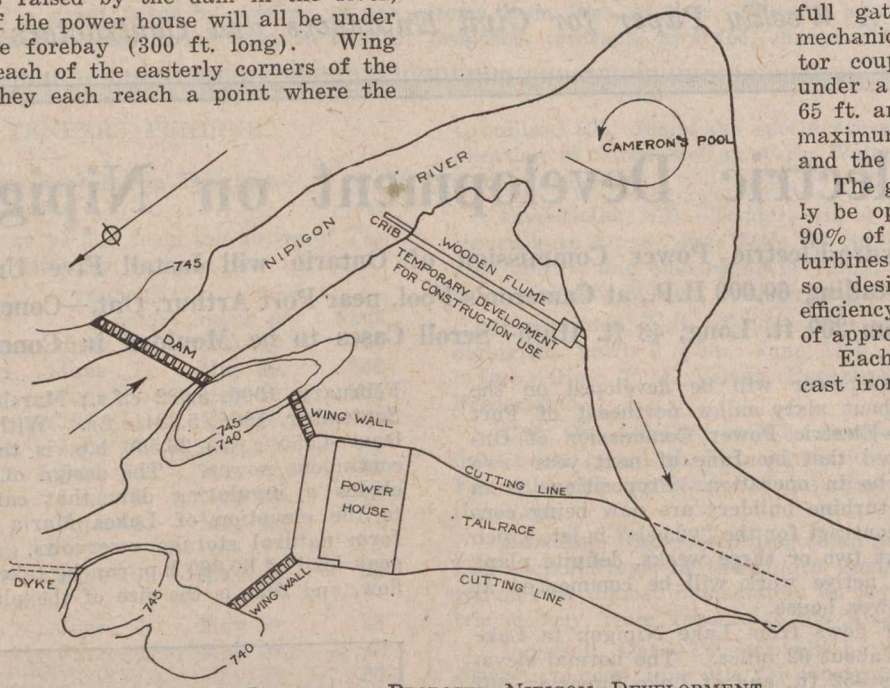
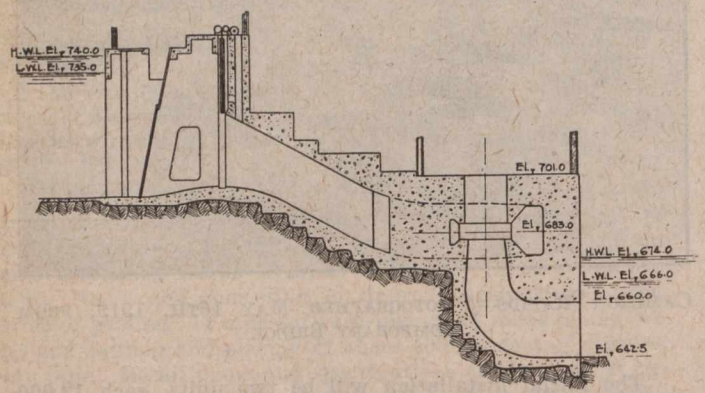
of the top of this dam will be 745 and the elevation of the river bottom is 702, so that the dam will be 43 ft. high. The river bed is rock, so no foundation troubles or construction difficulties of any kind are anticipated. The power house will be constructed in the dry, but when the water level is raised by the dam in the river, the ground to the east of the power house will all be under water and will form the forebay (300 ft. long). Wing dams will extend from each of the easterly corners of the the power house until they each reach a point where the natural elevation is 745. The natural basin that exists at this site greatly facilitates the development, as these wing walls can be constructed entirely in the dry and then, together with the power house itself, enclose an admirable forebay. Ice will be carried through the southern wing dam. No serious ice trouble is anticipated.

The penstocks will be square, tapering from 21 ft. section at the intake to approximately 18 ft. at the scroll case. They will be about 80 ft. long, and will be built of reinforced concrete, box section. As can be seen from the general plan of the power house, two penstocks will serve each turbine.



General Layout of Proposed Nipigon Development

The trash racks will be about 12 ft. behind the stop logs, and the gates about 18 ft. beyond the racks, The distance from the gates to the centre line of turbine shafts will be 80 ft. The velocity of the water will be increased from about 2 ft. per sec. at the intake to approximately 8 ft. per sec. at the scroll case. The turbine casings will be of



Section Through Power-House Showing Stop Logs, Trash Racks, Gates, Penstock, Turbine Setting and Draft Tube

the spiral, or volute, type and will be moulded in reinforced concrete. This is an innovation in design for the "Hydro" Commission, as none of its other plants have concrete scroll cases. Each draft tube will also be built in concrete, and also the power house itself and the dams, so that the construction will be reinforced concrete throughout.

For construction purposes a temporary development is being built near the pool, in order to supply light, heat and power for the job. A wooden crib will be built as shown in the general plan of the development, and a wooden flume will supply water at 22 ft. head to two turbines which will develop about 2,200 h.p. and which will drive generators and air compressors.

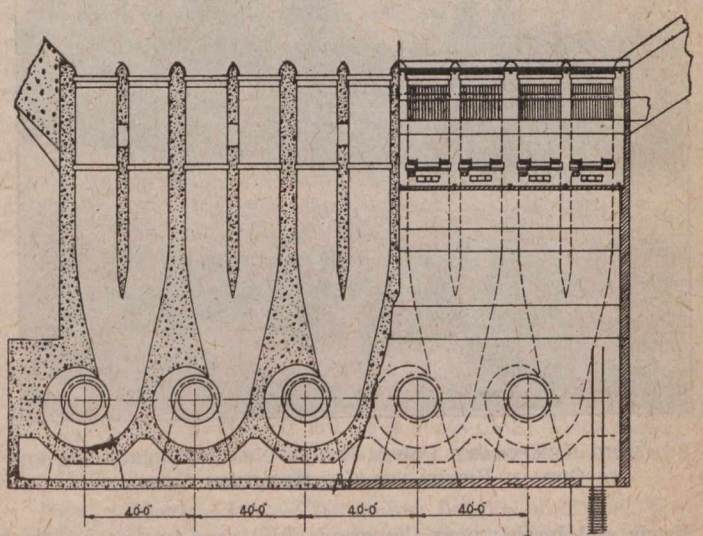
Specifications for the 12,000 h.p. water turbines were submitted several weeks ago to a number of prominent manufacturers. Among the firms from whom bids have been received are Canadian Allis-Chalmers, Ltd., Toronto; S. Morgan Smith Co., York, Pa.; Escher-Wyss Co., Switzerland; and Boving Hydraulic & Engineering Co., Lindsay, Ont.

Each turbine must have a full gate capacity of 12,000 mechanical h.p. at the generator coupling when operating under a net effective head of 65 ft. and at 120 r.p.m (The maximum gross head is 69 ft. and the minimum is 61 ft.)

The generators will normally be operated at from 60 to 90% of full rated load. The turbines, therefore, have been so designed that the best efficiency obtains with a load of approximately 10,000 h.p.

Each turbine runner will be cast iron, the vanes being cast integrally with the crowns and bands. In deciding the award of the contract for the turbines, special attention is being given to the method for providing seal and for overcoming the unbalanced thrust of the runners due to wear.

The speed ring will be made of cast iron in two sections and will consist of upper and lower flanges or crowns, connected by approximately ten stationary vanes, cast integrally with the flanges. The vanes will direct the water efficiently from casing to the guide vanes and in addition will act as stays to the upper and lower flanges, to resist the hydrostatic pressure acting upon the casing, and to support all superimposed weight. One of the vanes will provide a steel nose for the concrete at the junction between the end and inlet of the casing. The speed ring will be of such shape as to protect the concrete casing effectively from excessive wear from high velocities of the water, and also such that thin or taper sections of concrete will be avoided at the junction of the speed ring and the spiral casing.



Plan of Power-House Showing Concrete Penstocks and Turbine Settings

The movable guide vanes will be of cast steel of the balanced wicket type, planed and machined all over, with the shafts highly polished. These vanes are designed to guide all water, with the least possible eddying, from the speed ring to the turbine runner. They will be pivoted and pro-