machinery, the local manufacturers being at present restricted to the smaller apparatus, such as low-power transformers. However, with the assistance of plant from abroad, continuous progress must be looked for in things electrical, especially in the districts most endowed with water-power.

HYDRO-ELECTRIC DEVELOPMENT AT FOUNTAIN FALLS, ONTARIO.

During the early part of May, 1914, the Fountain Falls station of the Northern Ontario Light & Power Co., Limited, was put in commission. This plant is located on the Montreal River, 1½ miles below Ragged Chutes. The following brief description of it may be of interest. For it we are indebted to the report for 1914 of Mr. A. A. Cole, mining engineer to the T. & N. O. Ry., on the mineral industry of Northern Ontario.

A concrete dam 400 ft. long diverts the water into a short canal, where it is passed through two 1,500 h.p. I. P. Morris Co., vertical water wheels, operating under a tentative head of 30 ft. These wheels are direct connected to two 3-phase, 60-cycle, 150 r.p.m., 11,000-volt, 1,250-k.v.a. Swedish General Electric Co.'s alternating current generators.

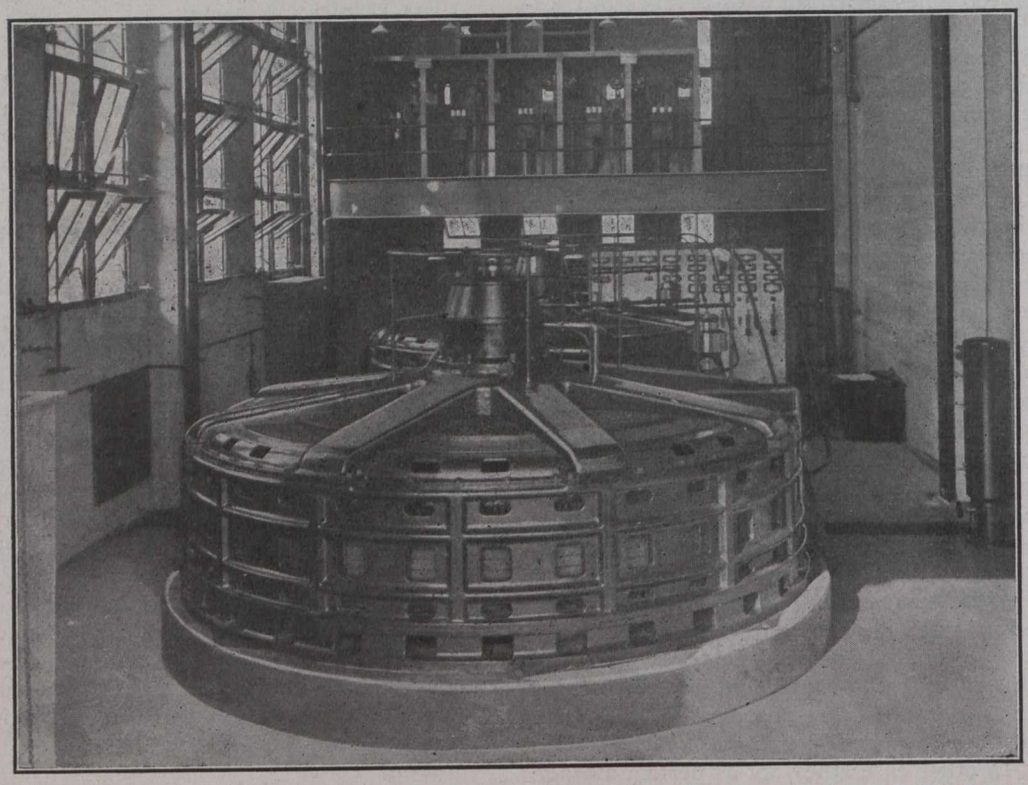

Fig. 1.—Interior of Fountain Falls Generating Station, Northern Ontario Light and Power Co., Ltd. (Switchboard and Galleries at Rear.)

Power for the excitation of these generators is supplied by two 52-kw., 220-volt, 1,200 r.p.m., motor-driven generators. Power for these exciter sets is being supplied through four 40-k.v.a. oil-insulated, self-cooled, single phase, 60-cycle transformers, which step the voltage down from 11,000 to 220 volts.

Speed control on the generators is obtained by Pelton, type "G," oil pressure governors, shaft driven from the generator shaft, and direct connected to the turbine gates. Each governor is equipped with a tachometer and a motor for switchboard control.

The dam is constructed of a combination of Cyclopean and reinforced concrete, and is of the Ogee type. It has an average and a maximum height of 12 ft. and 15 ft. respectively, to which are added 4 ft. of flash boards. It rests on solid rock foundation throughout its entire length.

The head gates, sheltered by an overhang from the power house as shown, are motor-driven. The gate house equipment comprises also stop-logs and racks. A concrete weir wall placed 10 ft. in front of the racks and extending 9 ft. below the operating water level prevents the entrance of ice and logs and damage to the racks. The gates themselves are 14 ft. 8 ins. by 9 ft. 8 ins. They are equipped with steel roller bearing surface. These gates close quickly and properly when the water wheel is operating with a full gate. They are the design of Viele Blackwell and Buck, consulting engineers, New York, who were in charge of the development.

The water wheels are of the Francis single-runner down-discharge type. They are installed in a scroll chamber of reinforced concrete with concrete draught tubes. They are each equipped with a lignum vitae guide bearing.

The sub-structure of the power house is a combination of Cyclopean and reinforced concrete. The superstructure, 26 by 66 ft. in plan and 78 ft. high, is a steel frame, with reinforced concrete walls and tile roofing, covered with tar and fine pebbles, and is equipped with a 20-ton travelling crane, with electrically operated hoist. Ninety steel frame windows, with wire reinforced glass, operated from the generator floor, together with a large ventilator on the roof, give the power house all necessary light and ventilation.