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PETERBOROUGH WATERWORKS

DETAILS OF MODERN WATERWORKS PLANT—DESCRIPTION OF PUMPING EQUIPMENT

By R. O. WYNNE-ROBERTS, M.Can.Soc.C.E.

PETERBOROUGH, a city of about 22,000 inhabitants, derives its supply of water from the River Otonabee, about $2\frac{1}{2}$ miles upstream from, and at a slightly higher elevation than, the centre of the city. The water is pumped direct to the consumers, and as the highest part supplied is only 100 feet above the pumps there is no difficulty in maintaining sufficient pressure.

A reinforced concrete dam, about 300 feet long, thrown across the river, impounds the water in the river for the development of power and as storage for the supply to the citizens. The depth of water behind the dam is about 12 feet and affords an available head on the



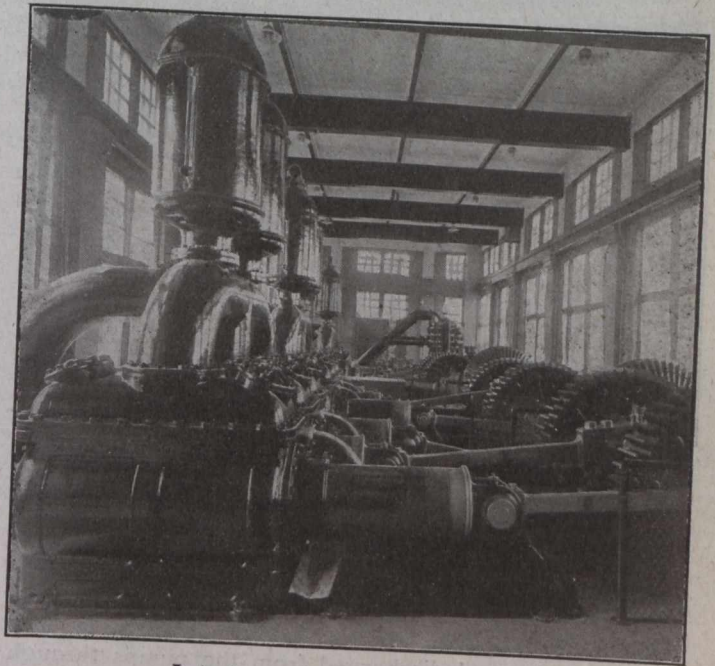
Reinforced Concrete Dam Across Otonabee River.

water turbines of an average of about 10 feet, and the suction lift of the pumps ranges from 3 to 10 feet. Provision is made to draw water from the tailrace, when frazil ice causes trouble above the dam, or when the stream is low and it is desirable to conserve the water for power, the suction lift in this case is about 18 feet.

The pumping station is a substantial building of reinforced concrete framework and brick panels and measures about 125 feet long by 40 feet wide. It houses three sets of water-driven horizontal single-acting triplex pumps, a Worthington centrifugal pump and an auxiliary steam pump. The two oldest pumps were installed in 1893 and are massively built. They have three plungers each 18 inches in diameter, 30-inch stroke, and are operated at 20 r.p.m. when run at full capacity. Each of these are capable of delivering $2\frac{1}{4}$ million gallons per day. The plunger heads are connected to the crankshafts carrying massive cog-wheels which are driven by pinions from a horizontal shaft that transmits the power from the water turbines through bevel wheels. The water power is developed by vertical Samson turbines—62-inch wheels. Speed, 66 r.p.m.

The other triplex pump of similar construction was built in 1909 and has a capacity of three million gallons per day. The plungers are 21 inches in diameter, 30-inch stroke, and driven in a like manner to the other by a Samson vertical turbine, having a 68-inch wheel running at about 80 r.p.m. The bevel gear reduces the speed of the pumps to 22 strokes per minute.

There is a 3-stage Worthington vertical centrifugal pump, also driven by a Samson water turbine. The water-



Interior of Pumping Station.

wheel rotates about 80 r.p.m. and by means of an increasing gear the pump is capable of being driven at about 640 r.p.m. The delivery from the pump is rated at about three million gallons daily.

The steam auxiliary pump, installed in 1915, is a De Laval single-stage turbine driven by a 400 h.p. steam turbine running at about 6,000 r.p.m. under 125 lbs. steam pressure. The pump is driven at about 1,385 r.p.m. by the steam turbine by means of the usual reduction gear. This pumping unit is split horizontally for easy access to all parts. The suction is 14 inches diameter and the delivery 12 inches. This pump is arranged to draw water either from above the dam with a suction lift of 3 feet or thereabouts or from the tailrace with a lift of about 18 feet, and is rated at six million gallons per day under a total head of about 228 feet. The condensing plant consists of a Schutte-Koerting multi-jet condenser