The turbine, flywheel, butterfly valve, etc., supplied by the Wm. Hamilton Company, were delivered at South Falls on June 28th, and the governor and relief valve on July 15th. These were erected in place and grouted in by July 24th, and the new unit was put on commercial load on August 25th, 1916. The old unit was then shut down and the steel penstock emptied. Concrete saddles were built under it, earth and debris removed, and the pipe painted.

The wood-stave pipe is 946 feet long and 60 inches inside diameter, and is connected to the head works by means of a steel thimble 5 feet in diameter. The penstock at the lower end of the pipe is 64 feet long and 5 feet in diameter. It is provided with a 48-inch diameter "T" connection for a future surge tank, and a 42-inch diameter cross-over connection to the old steel penstock in order that the capacity of the same may be increased when required.

The turbine is a 23-inch single runner horizontal Samson wheel in a cone-cylinder case, and is provided with a 3-ton, 60-inch diameter flywheel. The rated capacity is 1,060 mechanical horse-power at the generator coupling when operating at 102-foot head and 720 r.p.m. The unit is controlled by a Ludlow oil-pressure governor, and a governor-operated relief valve.

The turbine is direct connected to a 750 k.v.a., 60-cycle, three-phase, 6,600-volt generator installed by the Canadian Westinghouse Company, of Hamilton, Ont.

The capacity now installed in this plant, including the old unit, is about 1,500 electrical horse-power, and is now in continuous operation, supplying light and power to the municipalities of Gravenhurst and Huntsville.

Cobden Plant

A hydro-electric power plant of about 135 e.h.p. was completed for the village of Cobden during 1916 by the Ontario Hydro-Electric Power Commission. This plant is designed to carry the lighting load of the village, and a small 10-hour industrial load.

The designs for this plant were prepared, and the engineering work in general carried out by the Commission, on behalf of the municipality. The financing of the proposition was, however, a purely municipal undertaking, all costs being paid by the municipality.

The development scheme involved the construction of a storage dam at the outlet of Olmstead Lake, from whence water is drawn through about seven miles of natural channel to the pond at the original mill site, which is controlled by an old, but still serviceable stone and earth-fill dam. This old dam has been made part of the new development, and water is drawn from the pond through 200 feet of new head-race. After passing through a new concrete head-block, the water is carried to the wheels through a 30-inch wood-stave pipe.

The storage dam is a small earth-filled crib structure controlling about 96,000,000 cubic feet of water, this volume of storage being considered sufficient to meet the anticipated load requirements.

The power house is an entirely new structure throughout, and as the plant is situated about a mile from the village, it was provided with an upper residential story, and a rear annex for the operator and his family, the whole being designed to combine practical utility with homelike architectural features. The foundations are of concrete, except for a portion where the stone foundations of the old mill were utilized. The lower story of the main building is pressed brick, and the upper story and annex is of wood with stained shingle trim and roof. The building contains eight residential rooms in addition to the machine room, which opens directly into the living-room.

The machine installation consists of one Boving globe casing single runner turbine, of 160 h.p. capacity, running at 720 r.p.m., and provided with a flywheel coupling. Direct connected to the turbine is a Canadian General Electric Company generator, 3-phase, 60-cycle, 2,300 volts, and 100 k.v.a. capacity, with a belt-driven exciter. The unit is controlled by a type "C" Woodward mechanical governor.

This plant was tested out and put in commercial operation on November 24th, 1916, and has been operating satisfactorily and continuously since that date. The plant as originally designed did not include the operator's residence, but apart from the increase in cost, which this change involved, the work was completed within the original estimates.

Almonte Plant

In the spring of 1916, the town of Almonte asked the Ontario Hydro-Electric Power Commission to investigate the possibilities of changing over their generating station and distribution system from direct to alternating current. The station is located on the Mississippi River, and operates under a 24-foot head.

The old equipment consisted of a pair of 42-inch diameter Barber turbines, set horizontally, belt connected to a countershaft driving three-belted direct current generators of 130 k.w. total capacity.

The two wheels were originally coupled together with a flange coupling, but this coupling broke due to vibration in the setting, so that at the time of inspection the wheels were working independently, though belted to the same jack shaft.

It was decided to extend the turbine shaft through the power house wall and place a single new a.c. generator in a new building to be erected against the wall of the existing power house. This arrangement ensured a solid foundation for the generator, and placed the drive belt well away from any leakage or dampness from the turbine casing.

A pit for the drive pulley was excavated in rock and lined with concrete, and a concrete foundation constructed for the generator. A frame building 15 feet x 19 feet was erected, to house the generator and exciter, and a frame housing was built over the pulley pit and belt. The centre line of the generator was set 18 feet 5 inches above, and 19 feet over, from the center line of the turbine shaft.

With this arrangement it was necessary to lengthen the turbine shaft 6 feet 4 inches, but as the drive was to be all from one end it was necessary to remove the old shaft from the near wheel, and replace it with a 5-inch shaft 19 feet 6 inches long. This new shaft was procured, the necessary key seats cut, and collars turned for thrust bearings. New thrust bearings were purchased, being standard bearings 4 15/16 inches x 15 inches with adjustable base plates, and babbitted to fit the thrust collars on the shaft.

When all was in readiness, the plant was shut down, the top of the wheel casing was dismantled and both shafts removed from the runners. One runner was taken to a local machine shop, where it was rebored to fit the new 5-inch shaft, and the end of the other shaft was turned and fitted to receive one-half of the jaw coupling.

The runner was then replaced and pressed onto the new shaft, and when the jaw coupling, new stuffing box and dome bushings had been placed, the shafts were lined up and the thrust bearings grouted.