by the Jens Orten Boving Company, Limited, of London, England.

Power Station.—The power station faces the ocean and is erected on low ground at the foot of the pipe line hill, which slopes very abruptly for the lower three hundred feet of its length. The ground surface is elevated only slightly above extreme high-tide elevation, but the waterwheel nozzles are placed 5.5 feet above the maximum high-tide level. A very heavy growth of cedar, spruce and hemlock timber was removed from the site in preparation for the construction work.

The power house building is 49 feet by 97 feet, sufficient space being provided for the installation of two complete generating units, with exciters, transformers, switchboards, low-tension and high-tension switches, etc. Concrete and steel were used exclusively in the construction of the building, account being taken in making the location for its extension to contain an ultimate installation of four generating units.

The pipe line previously described enters the power house at the back and is connected to the generating unit through a 24-inch gate valve, there being an effective head of 1,100 feet. The water is controlled by a needle regulating nozzle in conjunction with an auxiliary needle nozzle, the needle of which is mechanically connected to the main needle and is so arranged that it opens automatically as soon as the main needle closes rapidly or beyond a certain predetermined point. In this way the auxiliary nozzle maintains a sufficient vent to avoid a dangerous rise of pressure in the pipe line. The auxiliary nozzle is also fitted with an independent slow-moving adjustable time element mechanism which gradually closes the nozzle when the main needle stops moving, thus conserving the water supply.

A Lombard, Type Q, oil pressure governor is used for speed regulation and is directly attached to the main nozzle needle.

The main generating unit consists of a 4,000 kilowatt generator and a 6,000 horse-power impulse water-wheel. This unit is of the two-bearing type, having the revolving field of the generator mounted on the shaft between the bearings and the water-wheel overhung at one end. The speed is 400 revolutions per minute.

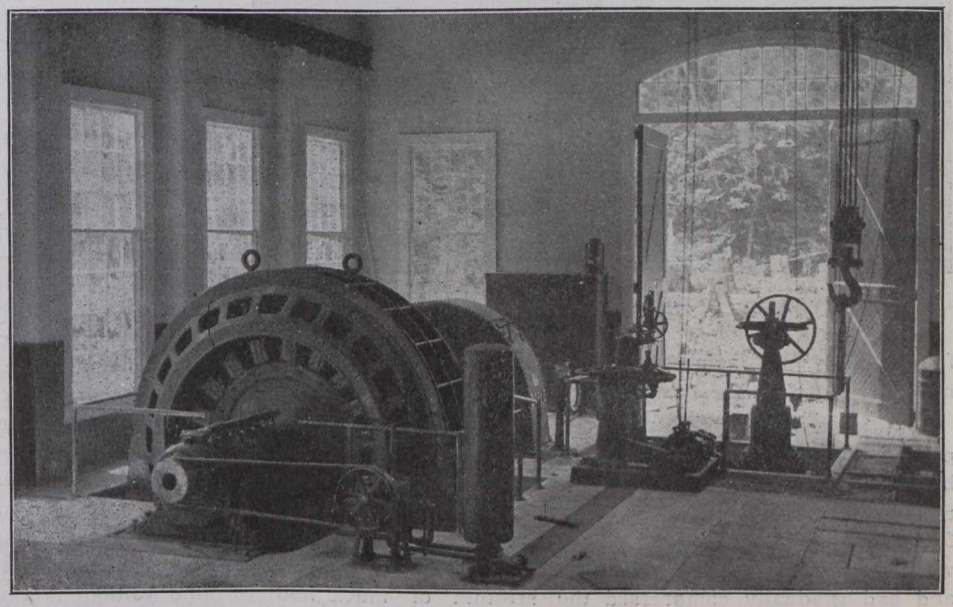
One exciter is installed which has sufficient capacity to supply maximum field current for two generating units. The extended shaft carries on one end an overhung impulse water-wheel, and is connected at the other end to an inductor motor, which operates at the generator voltage, and has sufficient capacity to drive the exciter generator continuously. The exciter water-wheel is equipped for hand control only, as the motor serves as a speed regulator and no governor is necessary.

A four-panel marble switchboard, provided with a complete equipment of instruments and controlling devices, including Tirrell regulator, is mounted on the switchboard floor, which is elevated about 6 feet above the generator floor.

The current delivered by the generator at 2,300 volts is stepped up to 40,000 volts by means of three 1,400 kilowatt-ampere oil-insulated water-cooled transformers, which are installed in fire-proof compartments back of the generator. These transformers are now operating with delta connection, delivering current to the transmission line at 40,000 volts. This voltage will be raised upon the installation of the second unit to 60,000 by changing the delta connection to star connection with grounded neutral.

The water-wheel equipment was furnished by the John McDougall Caledonian Iron Works, Limited, of Montreal, and manufactured under the Doble patents; the generator and exciter by the Allis-Chalmers-Bullock Company, Limited, and the transformers, switchboards, switches and lightning arresters by the Canadian General Electric Company, Limited.

A 75,000-volt three-pole oil switch with disconnecting switches, and arranged for hand operation from the generator floor, is installed in the high-tension room. A complete equipment of three-phase aluminum cell, 40,000-volt lightning arresters has been provided to protect each end of the transmission line.



View of Inside of Power House.

At Victoria the sub-station used in connection with the operation of the transmission line from the old Goldstream hydro-electric station has been utilized. Extensive alterations were made in the old building, including the erection of transformer stalls for two banks of transformers, and high-tension switch-room of reinforced concrete, space being provided for bringing two transmission circuits into the building.

An unfortunate and very unusual set of conditions were encountered in the power station foundations, the remedying of which was fortunately taken in hand in time to prevent serious delay in putting the plant into operation.

In the construction of the building and the setting of foundation, unusual precautions were observed; the excavation for the foundation walls and the machine settings were carried to a depth of about 21 feet below the floor level. Some seams of peat, varying in thickness from 2 inches to 2 feet, were encountered. At the bottom of the trench a fairly stiff, blue, sandy clay was found, into which borings were made for a distance of 12 feet, showing the same class of material throughout this distance.

Tests of the bearing power of the ground were made, which showed that a load of five tons per square foot would not cause any settlement.