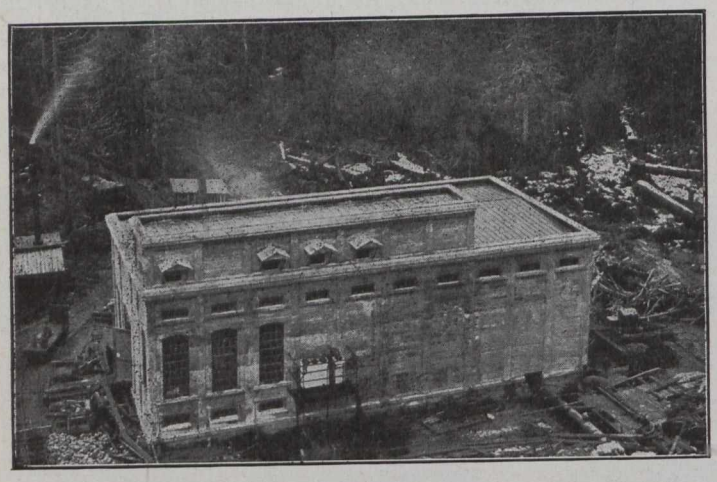
Having taken these precautions in predetermining the bearing power of the soil, it appeared that this material was entirely safe for foundation purposes with the load to be imposed.

After the building was completed observations taken indicated that a slight settlement was taking place. These observations were continued for several months in order to establish beyond a doubt that the building and machinery



View of Rear of Power House.

foundations were actually settling, and to determine as nearly as possible the rate of settlement.

In June, 1911, a series of test holes were put down at points around the building, which showed that a soft muck bed from 5 to 15 feet in thickness lay some 50 feet below the floor level, and about 25 feet below the bottom of the foundations. The layer of clay on which the foundations were set had been stressed beyond its supporting power, and had gradually compressed the stratum of muck and peat beneath.

This most extraordinary condition could not have been found by any means of testing other than sinking deep drill holes, and, even if this had been done previous to the setting of the building, the strength of the clay seam could not have been determined by any test, except the application of a load approximating the entire weight of the structure and contents, which was, of course, impracticable. Only such a weight would have caused the bending of the clay stratum and the consequent yielding of the peat seam.

In the course of the original investigation, test piles 45 feet in length were driven adjacent to the power house, the bearing power of which, computed from the penetration under the hammer blow, was from 12 to 15 tons per pile. It is evident that if a pile foundation had been installed with piles driven to apparently ample depth based on penetration, the condition would not have been discovered in advance, nor the settlement obviated.

The underpinning of the machine foundations was begun July 15th, 1911, and carried on continuously night and day until September 10th, when the plant was put in operation.

Standard pipe or casing 12 inches in diameter was sunk with well rigs to the bed-rock beneath the peat seam around the machine foundation and pipe line immediately behind the power house.

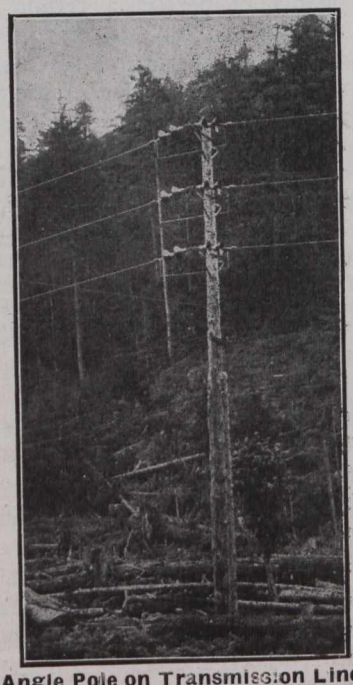
The pipes were pumped out, cleaned, and after inserting steel reinforcing bars, were filled with concrete, forming a system of some 26 steel and concrete piles. Steel I-beams were placed on top of the piles supporting the concrete foundation, wedges being driven as tight as possible between the tops of the beams and concrete of the foundation, and the whole surrounded with concrete. No settlement has been observed since the completion of this underpinning.

The building foundations proper were not strengthened, and no settlement has taken place since the clay stratum was relieved of the weight taken by the piles.

Transmission Line.—The transmission line leading from the power station to the city of Victoria traverses the rough, heavily timbered country along the west coast of the island for a distance of about 40 miles. The first 15 miles of its course is located along the bluff shore line of the Straits of Juan de Fuca, the wires in some places overhanging the sea. No road or trail existed along this section at the time the line was built, and the materials, except poles, which were cut from the adjacent forest, were delivered with small boats along the beach. The remaining 25 miles of the line follows generally the Provincial Government highway, with more or less diversion to avoid acute angles and to shorten the distance.

The current is transmitted at 40,000 volts, 3-phase, 60 cycles.

Cedar poles (with a minimum diameter at the top of 9 inches) are used throughout, 50 feet, 55 feet and 60 feet in height, and spaced from 300 to 400 feet apart. Three steel galvanized cross-arms, each composed of two 1¾-inch by 1¾-inch angles 9 feet long with 1¼-inch angle iron branches are mounted on each pole, all bolts, lag-screws and washers being galvanized. The initial circuit is hung on one side of the pole, leaving space on the other side for the installation of a second and similar circuit at some future time. Brown glazed, two-piece suspension insulators, Locke Type No. 275, are used, one element only being installed for ordinary suspension. At dead end angle points, two elements were used to avoid trouble in adding the second element when the line voltage is raised to 60,000 volts, upon the completion of the second unit. Dead ends were made at all angles where the conductor is drawn toward the pole. Standard line insulators are used on either side of the cross-arm, and the conductor was taken across in a suspended loop.



Angle Pole on Transmission Line.

The conductor is seven strand aluminum cable, No. 00 B. & S. gauge, and is designed to transmit the output of one generator at 40,000 volts, and two generators at 60,000 volts.

A metallic circuit telephone line, No. 9 B.W.G. galvanized iron wire was installed on a short wooden cross-arm below the power wires.

The timber growth along the route of the line is exceptionally heavy, and a very extensive clearing was necessary along and on either side of the line for its protection, all trees being cut that could reach the wires in falling. For many miles a zone from 400 feet to 600 feet in width was cleared through the finest fir belt on the island, and an aggregate of approximately 20,000,000 feet, board measure, of merchantable timber was paid for and cut down in the course of the work, some of which may perhaps be put to profitable