

The Canadian Engineer

A weekly paper for engineers and engineering-contractors

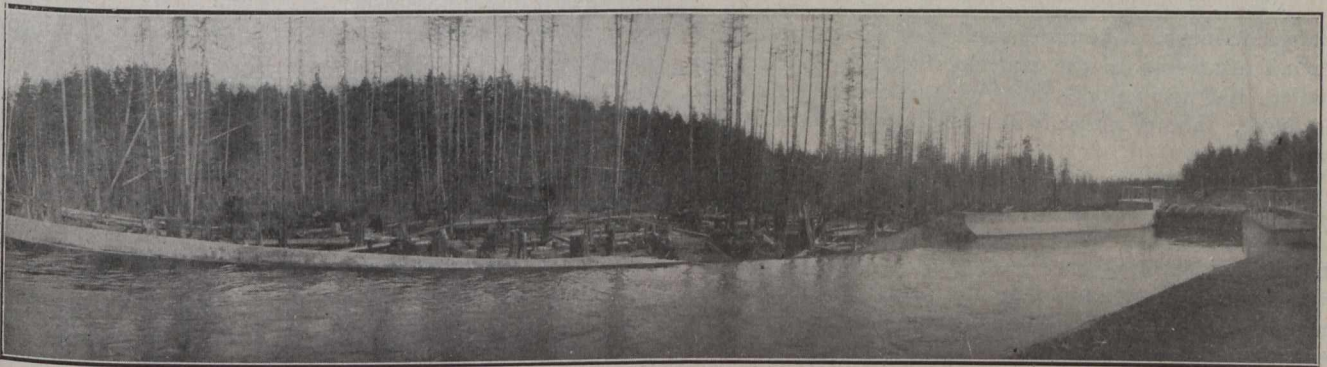
PUNTLIDGE RIVER POWER DEVELOPMENT

ONE OF THE MOST UNIQUE CANADIAN INSTALLATIONS—NOTES ON THE DESIGN OF IMPOUNDING AND DIVERSION DAMS, CANAL, FLUME AND POWER HOUSE—METHOD OF POWER REGULATION ADOPTED.

ONE of the most interesting hydro-electric power developments of Western Canada is that recently put into commission on the Puntledge River, British Columbia, by the Canadian Collieries (Dunsmuir), Limited. This firm operates a group of coal mines in the vicinity of Union Bay, Vancouver Island, and the output of the new installation is being used for lighting and hoisting purposes around the mines and docks, and also for lighting the town of Cumberland. Heretofore, power for the coal mines was generated by separate steam plants at the various mines, but the problem of power extension presented itself a few years ago and estimates secured for a central steam-electric power station with

The dam is built on solid rock, and is of concrete, partly reinforced. The mix used was F. : 1 : 2½ : 5, with about 10% of hydrated lime added as a neutral filler to obtain watertightness. To insure against uplift of the structure from pressure in horizontal seams which might exist in the underlying rock, a number of weep-holes were drilled in the rock and fitted with open pipes leading out to the down-stream face of the dam. A special feature of the impounding dam is a log-slucice 10 ft. x 26 ft.

There are 6 steel butterfly valves each 5 x 6 ft. and stepped in bearings set in the sill. The valves fit loosely into the gateway, it being not intended to obtain watertightness. Spindles extend to the gallery at the top of



Concrete-lined Canal and Circular Forebay, Showing Spillway and Tainter Gate.

distribution system and also for a hydro-electric power installation. With coal for the former at \$2.50 per ton delivered, the cost of installation and operation was greatly in favor of the latter, and plans were accordingly prepared and adopted.

Puntledge River has a flow which varies from 330 to 3,500 second-feet. It is the outlet of Puntledge Lake, situated about 8 miles from Comox Harbor. The lake has an area of about 9 square miles and a level at low water 420 ft. above tide water. As shown in the general plan, the scheme included the construction of an impounding dam at the outlet of the lake. This dam is of the Buttress type with 9 spillway openings closed by needles. It is approximately 300 ft. in length with a crest elevation of 445 ft. and a gate spill elevation of 416 ft. The gateways, together with the spillways, aggregate 100 ft. in length and give a flood discharge capacity of 10,000 second-feet, which exceeds the highest recorded outflow from the watershed.

the dam, and through a cast iron pedestal frame which carries the weight of the valve and spindle and holds a worm-operating gear fitted with double hand cranks. The dam has a maximum height of 30 ft.

Diversion Dam.—The course which the water takes from the impounding dam is the natural bed of the river to an intake reservoir formed by a diversion dam about 2½ miles below the lake. This is a gravity type structure with a spillway 100 ft. in length, having a maximum height of 7 ft. with a possible 11½-ft. flow over the spillway. This dam is also built of concrete and is partly reinforced at the intake end. The government regulations required a fish ladder which is built in one of the concrete abutments so as to be protected from damage in time of flood. There are two gateways in this dam, each 7 x 6 ft. The gates are constructed of steel plates riveted to frames of steel channels and fitted with rollers to reduce friction during operation. The gates are operated vertically by screw gears, the stems being 2½ inches in diameter with