

joining the dock, on a reclaimed area, there will be established an extensive ship repair yard which will include the following buildings: Main offices, boiler, engine and machinery shops; steel and brass foundries; joiner shop, plater and framer shops, blacksmith shop, pattern shop, stores and molding loft, power house.

The estimated cost of the dry dock is \$5,500,000, of which the ship repair equipment will cost \$1,100,000.

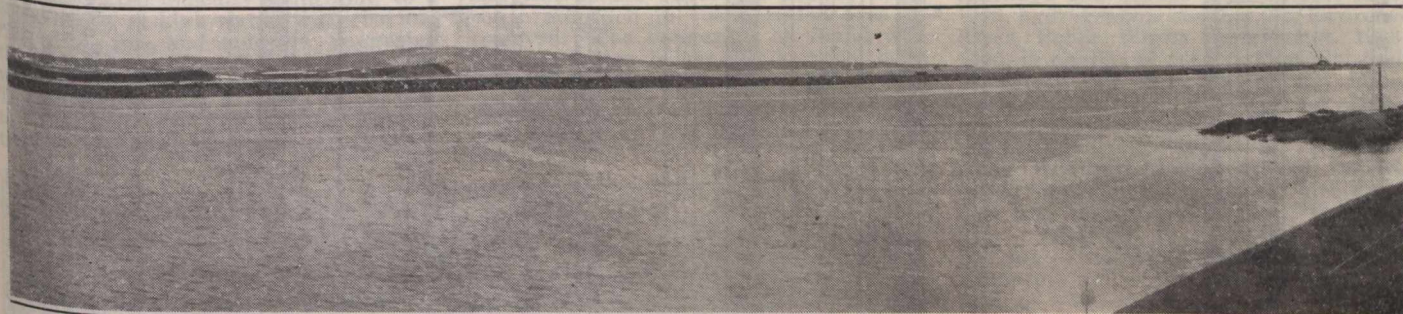
**Progress of Work.**—The contract for these works was awarded in July, 1918,

been reached over a considerable portion, is El.—21.5 (extreme low water—zero datum) and the coping level is El. +36.0, the most difficult problem was one of tracks and grades to get over the 57.5 ft. lift in a pit only 1,150 ft. long. This was accomplished by a switch-back along the south side of the excavation. The excavation is remarkably free from water, few springs having been encountered, and the pit is kept dry by intermittent pumping of a 4 in. centrifugal pump.

It is expected that the excavation will

and form an integral part of the lower north wall of the dock and will house in the three large submerged 52 in. centrifugal main pumps and the two 12 in. drainage pumps. All pumps will be direct electric motor driven. Power for operating all pumping equipment, cranes, shops and lighting, will be generated in a central power station, by three turbo generator sets, developing about 4,000 h.p., the equipment for which is on hand.

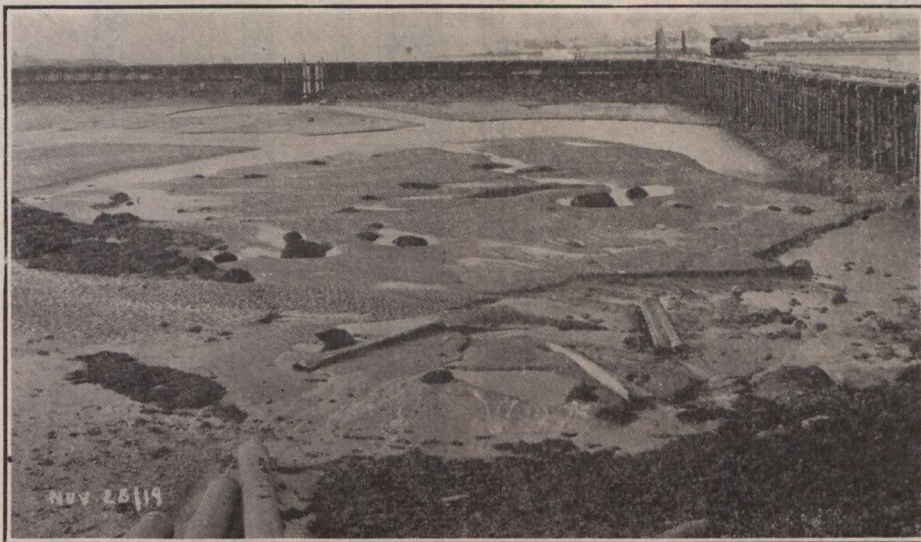
The work resulting from the dry dock excavation has been transported, in 6 and 15 yard dump cars, to the break-



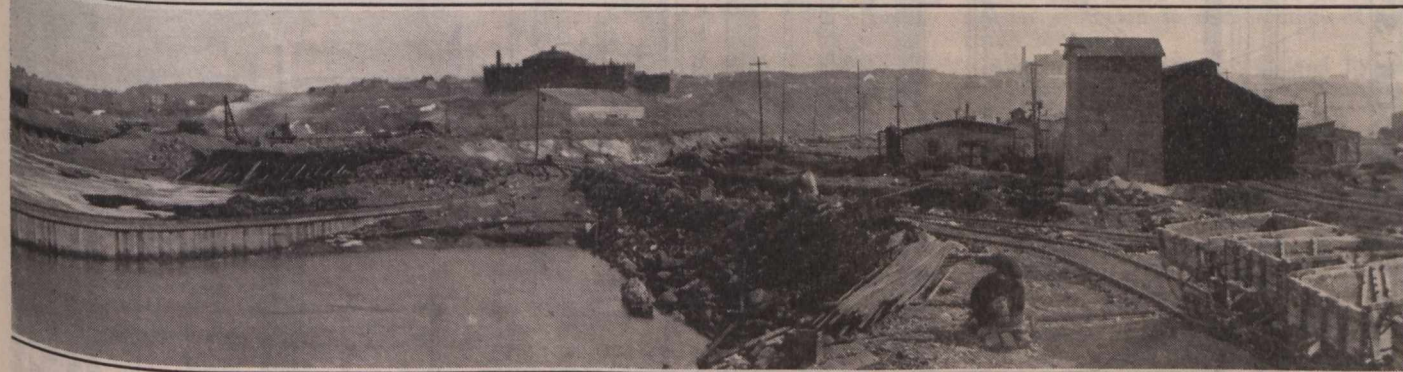
Breakwater, at Courtenay Bay, St. John, N.B., from west side.

and preparatory and organization work followed which was somewhat extensive, requiring the repair and outfitting of excavation plant then on the work and the taking in of additional plant to excavate the dry dock site and prism. This work involved an entirely new track layout, the installation of a compressor plant, with air line distribution, and repairs to steam shovels and car equipment. Excavation was started on Dec. 1, 1918, with steam shovels and, up to Mar. 31, 1920, a period of 16 months, a total of 575,000 cu. yd. of rock had been removed from the dry dock site and prism of which 490,000 cu. yd. were placed in the 2,500 ft. breakwater extension.

With the exception of a small amount of earth overburden, all the excavation is in rock, a large portion of which is a hard, greenish trap, with seams and faults, generally at an angle of about 45 degrees, thus making it difficult to drill. In the lower end of the prism, a carboniferous shale is encountered, with a 45 degree stratification. Excavation



Interior of Cofferdam, at Courtenay Bay, St. John, N.B., from drydock entrance.



Cofferdam, at entrance channel to Drydock, Courtenay Bay, St. John, N.B.

in the trap has resulted in fairly well defined and satisfactory break, but considerable overbreak occurs in the shale. There have been no unusual features connected with the rock excavation. The drilling has been done by tripod air drills, holes, generally spaced 8 to 10 ft., for 12 to 15 ft. lifts.

Three large Marion steam shovels have been used in the prism. As the grade depth of the excavation, which has now

be completed during the ensuing summer and consideration is now being given to the actual construction of the dry dock, which will be entirely of concrete, with the exception of the stops and sills, three in number, for the two floating steel caisson gates. The sills and stops will be built of granite. A departure from usual practice will be the use of concrete for all altars.

The pumping station will be built in,

water extension, dumped from a single 4 pile bent trestle, and built up to side slopes of 1 on 2 horizontal, with top width of 20 ft. This breakwater extension is very nearly completed, with the exception of the placing of the large cover stone required for the slopes. Cover stones up to 20 tons have been sent out to the breakwater, and these are being placed into position by a travelling derrick.